7th International Conference on New Business Models

Sustainable Business Model Challenges: Economic Recovery and Digital Transformation

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Business Model Conversation and a springboard for future research

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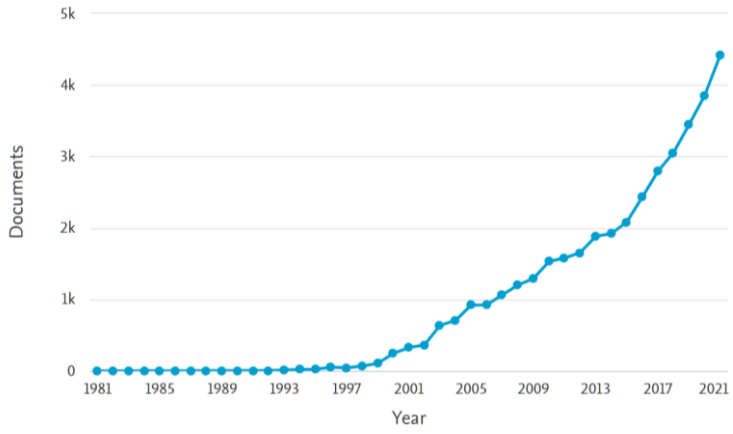
In the last decades, management research and practice have devoted increasing attention to explore the core tenets underlying business models and the forms that business models can take (Afuah, 2004; Zott, Amit & Massa, 2011; Massa, Tucci & Afuah, 2017).

To date, by googling "business model*", we find about 235,000,000 results (on June 16, 2022). While, in 1995, "there have been at least 1,177 articles published" (Zott et al., 2011: 1020), to date, Google Scholar reports about 1,160,000 results, including editorials, conceptual and empirical publications, and working papers.

To assess the evolution of literature, we retrieve all the articles for all years-available (1968 to 2022) in the Scopus platform published in the journals with titles, abstracts, or keywords containing the words "business model*" (Figure 1). We observe 40,511 peer-reviewed academic journals and practitioner-oriented studies on business models. This confirms that the business model is a well-established topic in academic literature (Cuc, 2019; Wirtz, Pistoia, Ullrich & Gottel, 2016). Additionally, the trend is significantly expanding.

Figure 1: Evolutionary path of literature on the business model from 1981 to 2021



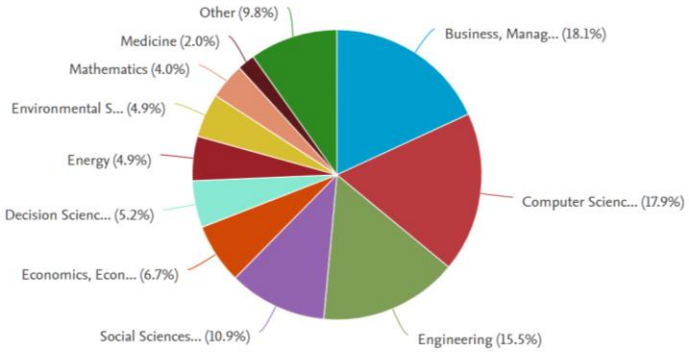
Source: Scopus platform

The relevance of exploring business models has grown according to a multidisciplinary perspective. While almost 19% of business model studies are included in business and management, the

remaining business model literature also spans from economics, social sciences, computer sciences, decision sciences, engineering, and environmental studies to psychologies and energy.

Given the multifaced nature of business, "it is not surprising that there is a move to build bridges if not to live on one island," and the study of the business model involves many disciplines (Knights & Willmott, 1997: 9).

Figure 2: Documents by subject area



Source: Scopus

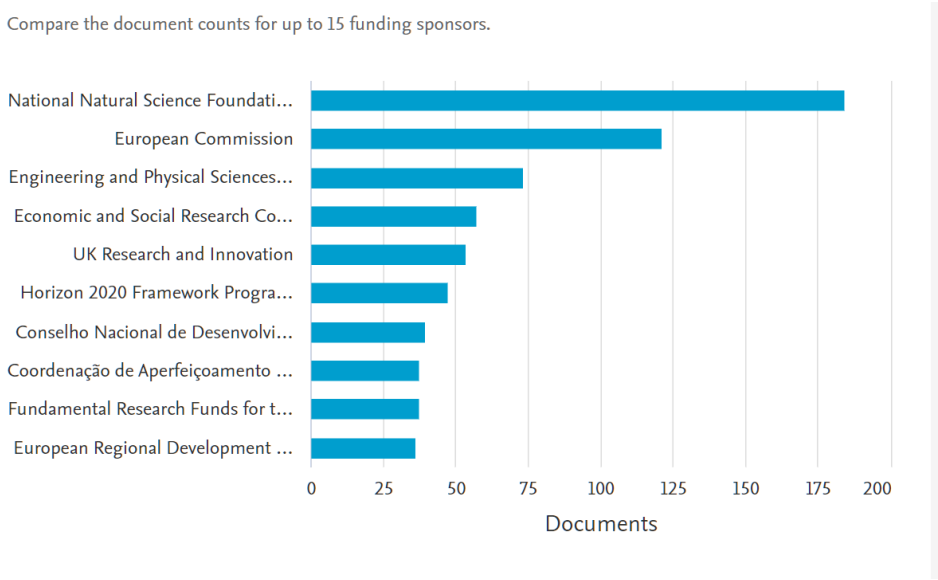
At this point, two questions deserve to be addressed:

a) Why has the interest in business models (or related topics) spread worldwide?
b) What are the most promising directions for future research on the business model?

Why the interest in business model has spread worldwide

In this section, we arrange two complementary answers to the question why the interest in business models (or related topics) has spread worldwide. First, business model is an important topic for policymakers. Focusing on business, management and accounting journals, Figure 3 reports the English articles of the founding sponsors of research related to business models. We can infer the policy makers' significant financial attention related to business models. Arguably, the recent intersections among business model and sustainability, digitalization, social inclusion, and circularity have shifted the attention from a more traditional and profit-oriented model to sustainable business models (Inigo et al., 2017). Accordingly, policymakers need to address these global issues and develop a research agenda that can inform public policy requirements.

Figure 3: Sponsors for document

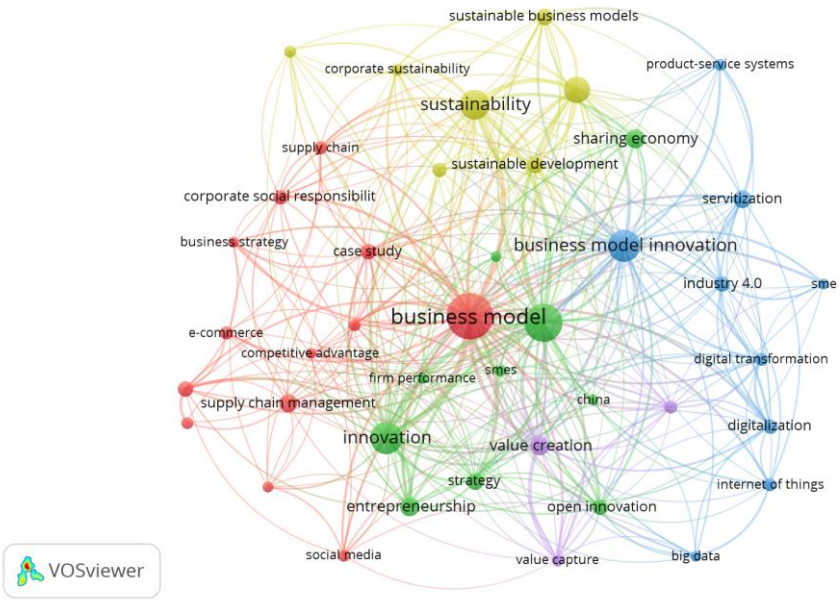


Source Scopus

Second, the research debate on business model has progressively evolved. Seminal studies on business models have explored the core tenets of business models, also providing several definitions (Shafer, Smith & Linder, 2005). The debate was primarily oriented toward exploring how firms can create and appropriate value how firms are structured and organized (Morris et al., 2005; Teece, 2010). The emphasis was mainly on how business models might shape firms' competitive advantage (Afuah & Tucci, 2001; Zott & Amit, 2007). Thus, business models represent the "architecture of the product" (Timmers, 1998) or the "content, structure, and governance of transactions designed to create value" (Amit & Zott, 2001: 511; Chesbrough & Rosenbloom, 2002; Johnson, Christensen, & Kagermann, 2008). Business models help value creation and firm performance (Casadesus-Masanell & Ricart, 2010; Zott & Amit, 2007). Later on, the investigation has progressively evolved and involved other domains, such as innovation and technology management (Baden-Fuller & Haefliger, 2009; Doganova & Eyquem-Renault, 2009; Gambardella & McGahan, 2010; Mitchell & Coles, 2003) and more recently, sustainability, social inclusion, circular economy, and digital transformation. The upsurge of global economic, environmental, and societal challenges has clarified that firms need to consider environmental and social aspects in their business activities and develop new business models to grow successfully in the long term.

Figure 4 attempts to offer a frame of the state of the art of academic and practitioner-oriented studies published on business models. Specifically, it considers the occurrences among authors' keywords of the first 2000 articles (ordered following the highest citation number) published from 1981 to 2021 for citations with a minimum number of occurrences of 16.

Figure 4: Occurrences among authors' keywords of the first 2000 articles published from 1981 to 2021



Source: Elaboration with VOSviewer

Figure 4 identifies the following clusters. Cluster 1 (i.e., violet cluster) considers topics related to dynamic capabilities and the challenges related to value creation and value capture. Cluster 2 (i.e., red cluster) encompasses the development of business models related to traditional themes in strategic management. Specifically, it considers topics such as collaboration, competitive advantage, knowledge management and supply chain management. Cluster 3 (i.e., green cluster) focuses on topics related with entrepreneurship, innovation, and some recent concepts, such as open innovation and sharing economy. Taking together the first three clusters, one might infer that business model is "a reflection of the firm's realized strategy" (Casadesus-Masanell & Ricart, 2010: 195). However, it has a different construct from the firm's strategy.

Recently, we see the affirmation of two additional clusters of studies that characterize business model literature. Specifically, cluster 4 (i.e., yellow cluster) refers to sustainability, social entrepreneurship, sustainable business models, and sustainable development and circular economy, while cluster 5 (i.e., blue cluster) is related to digital transformation, industry 4.0, and big data, business model innovation, internet of things and servitization.

Promising Directions for Future Research

Moving from Figure 4, we would like to point out some developments for future research. We believe that today the emerging topics on business models linked to sustainability (cluster 4), digitalization (cluster 5).

Business models and digitalization

Today, the economic landscape is being transformed by digital technologies and infrastructures such as robotics, cloud computing, and artificial intelligence. Additionally, the pandemic has boosted the adoption of digital services which enable remote working and education. Economic recovery demands digitalization at the heart of business model innovation. Accordingly, some important research questions are:

- What are the most prominent actors in digital ecosystems to support a firm's business model during the post-pandemic era?
- How leveraging data-driven business models to address environmental and societal challenges? Which are the critical complementarities in digital platforms and their corresponding ecosystems in emerging fields?
- Which characteristics should encompass an effective digital business model to create and capture value through frugal innovation implementation?
- How to consolidate the available knowledge on digital and phigital business model patterns and convert it into "knowledge for action"?
- How can socially and environmentally sustainable business models for the sharing economy be designed and implemented? Is it possible to effectively define strategies to improve the sustainability performance of sharing economy business models?
- How does the digital transition contribute to innovating financial resources transfer in financial markets?

Business models and sustainability

Academic interest in sustainable business models has grown considerably in the last years, mainly thanks to the 2030 Agenda for Sustainable Development, the recent "Next Generation EU" plan, and the rapid acceleration of digital transformation. It is crucial to find new solutions allowing continued progress toward sustainability. The achievements of SDGs and sustainable business models play a crucial role in this as they are primarily oriented toward resolving social and environmental issues (Dentchev et al., 2018). We propose the following research questions:

- How do we build more supportive ecosystems for sustainability? What are the most prominent ecosystem actors to support sustainability during the post-pandemic era?
- What work has been done thus far means for the topic of circularity and business models both for academia and practice, what issues have emerged along the way, and what issues remained untouched?
- What tools and methods are needed for sustainable and circular business model experimentation?
- What are success and failure cases of experimentation with reported sustainability impacts?
- Which frameworks, for example, sustainability accounting or integrated reporting, can be applied to assess and manage the sustainability performance of business models effectively?
- Which best practices, in terms of assessing and managing the sustainability performance of organizations, business model patterns, and management accounting tools do we currently see in practice?
- Can the social, economic, and environmental impacts of existing sharing economy business models be measured, and how?

Conclusions

We believe that the 7th International Conference on New Business Models in Rome represents an important occasion to fortify the debate on business models and provide impactful insights into the role of sustainable business models. Specifically, we will address two significant challenges of our times: economic recovery and digital transformation. Of course, if other questions come out … we will look forward to attending the 8th edition of NBM Conference!

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Call for contributions

Sustainable Business Model Challenges: Economic Recovery and Digital Transformation

Academic interest in the concept of sustainable business models has grown considerably in the last years, especially thanks to the 2030 Agenda for Sustainable Development, the recent "Next Generation EU" plan, and the rapid acceleration of digital transformation.

We are now in one of the most difficult economic periods there has been and so the 7th International Conference on New Business Models aims to stimulate debate and offer impactful insights into the role of sustainable business models in addressing two of the major challenges of our times: economic recovery and digital transformation.

This new decade began with the emergence of a pandemic that has had a devastating effect on people and organizations, both in social and economic terms. According to Schumpeterian theories (1939; 1949), economic growth can be sustained by the introduction of successful new products, processes and services, and it is the entrepreneur who is the prime mover in this process. Scholars and practitioners involved in the business model field of research should rise to the challenge of economic recovery by providing new ideas, knowledge, and research that meet the needs of businesses and entrepreneurs.

Furthermore, the economic landscape is being transformed by digital technologies and infrastructures such as robotics, cloud computing and artificial intelligence. The pandemic has boosted the adoption of digital services which enable remote working and education. Economic recovery demands digitalisation at the heart of business model innovation.

In this scenario it is crucial to find new solutions which allow continued progress towards sustainability, and the achievements of SDGs and sustainable business models play a key role in this as they are primarily oriented to resolving social and environmental issues (Dentchev et al., 2018). By adopting a multilevel perspective on these phenomena scholars should be in a position also to address new emerging issues such as food security, employee wellbeing, inequality etc., appreciating that they are characterized by inherent complexity and multiple actors, and involve and require interactions across multiple levels of analysis (Howard-Grenville, 2020).

Such challenges are to emerge and have features at different levels of inquiry and are therefore too intricate to be detected by one perspective. While each level can contribute on its own, they are integral parts of this conference. To spur and knowledgeably compare and leverage different levels of analysis, we consider four different themes respectively focused on: system level, sectoral and organizational level, impact and methodological foundations.

Authors are invited to address, but not limit themselves to, the following research questions:

Theme 1: exploring the system level

How do we build more supportive ecosystems for sustainability? What are the most prominent actors in ecosystems to support sustainability during the post-pandemic era? How can ecosystem actors support entrepreneurs to build resilience and increase their impact in this new era?
How can we design business models to support value capture from ecosystem services? How can the process be facilitated, organised, and governed?
What work has been done thus far means for the topic of circularity and business models both for academia and practice, what issues have emerged along the way, and what issues remained untouched?

Theme 2: exploring the sectoral and organizational levels

How best to leverage data-driven business models to address environmental and societal challenges? Which are the critical complementarities in digital platforms and their corresponding ecosystems in emerging fields?
What kind of tools and methods are needed for sustainable and circular business model experimentation? What are success and failure cases of experimentation, with reported sustainability impacts?
What are the sustainable factors affecting the resilience of financial institutions and financial markets during the Covid-19 outbreak? How the digital and green transition contribute to innovate the transfer of financial resources in financial markets?
Which characteristics should encompass an effective business model to create and capture value through Frugal innovation implementation?

Theme 3: exploring organizational impact

Which frameworks, for example from sustainability accounting or integrated reporting, can be applied to effectively assess and manage the sustainability performance of business models?
Which best practices, in terms of assessing and managing the sustainability performance of organisations, business model patterns, and management accounting tools do we currently see in practice?
How can socially and environmentally sustainable business models for the sharing economy be designed and implemented? Is it possible effectively to define strategies aimed at improving the sustainability performance of sharing economy business models? Can the social, economic and environmental impacts of existing sharing economy business models be measured, and how?
What are the sustainable factors affecting the resilience of financial institutions and financial markets during the Covid-19 outbreak? 2) How the digital and green transition contribute to innovate the transfer of financial resources in financial markets?

Theme 4: exploring theoretical and methodological foundations

How to consolidate the available knowledge on sustainable business model patterns, and how to convert it into 'knowledge for action'?
Which methods are best suited to develop sustainable business model classifications, both typologies and taxonomies, or even whole 'Alexandrian' languages? How to test the effectiveness of sustainable business model patterns as an additional element of business model innovation tools?

We invite participants from various disciplines (e.g., management, entrepreneurship, innovation, environmental studies, organization studies, design studies, change management, or policy studies) to address a broad variety of domains (e.g., energy, mobility, health, agriculture, food, tourism, finance, or retail) from a broad variety of perspectives (e.g., theoretical, conceptual, or empirical).

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Conference Tracks

Theme 1: Exploring the system level

- **Track 1.1: The role of Collaborative Business Models in creating Social and Economic Transition.**
  Track chairs: Jan Jonker (Radboud University), Milou Derks and Frank Berkers (TNO)
- **Track 1.2: Ecosystems in Support of Sustainability.**
  Track chairs: Nikolay Dentchev and Abel Diaz Gonzalez (Vrije University of Brussels, VUB)
- **Track 1.3: Natural Ecosystem Services as Drivers for Sustainable Business Model Development.**
  Track chairs: Anna Hansson and Niklas Karlsson (Halmstad University)
- **Track 1.4: Business Models for a Circular Economy.**
  Track chairs: Niels Faber (University of Groningen), Jan Jonker (Radboud University Nijmegen), Abhishek Agarwal (Edinburgh Napier University)

Theme 2: Exploring the sectoral and organizational levels.

- **Track 2.1: Data-driven Business Models for Sustainability and Digital Transformation in Emerging Fields.**
  Track chairs: Maya Hoveskog, Magnus Holmén (Halmstad University) and Lauri Paavola, (Aalto University)
- **Track 2.2 Business Model Experimentation for Sustainability.**
  Track chairs: Nancy Bocken, Marc Dijk, Jan Konietzko (Maastricht University), Ilka Weissbrod, Leuphana (University Lüneburg), Maria Antikainen (VTT), Sveinung Jørgensen (NHH Norwegian School of Economics) and Lars Pedersen (NHH Norwegian School of Economics)
- **Track 2.3: New Business Models in an International Context.**
  Track chairs: Svante Andersson, (Halmstad University) and Petri Ahokangas (University of Oulu)
- **Track 2.4: Resilience and Profitability through Sustainability for Financial Intermediaries, Markets and Corporate Finance.**
  Track chairs: Claudio Giannotti, Giovanni Ferri, Lucia Gibilaro (LUMSA University)
- **Track 2.5: Sustainable Business models: Create and Capture Value through Frugal Innovation.**
  Track Chairs: Alessia Pisoni (Insubria University), Francesca Ciulli (Tilburg University), Laura Michelini (LUMSA University), Hareem Arshad (University of Stuttgart)
- **Track 2.6: Sustainable Development.**
  Track Chairs: Giovanni Battista Dagnino (LUMSA University), Francesca Cabiddu and Ludovica Moi (University of Cagliari)

Theme 3: Exploring organizational impact

- **Track 3.1: Assessing and Managing the Sustainability Performance of Business Models.**
  Track chairs: Florian Lüdeke-Freund (ESCP Business School) and Romana Rauter (University of Graz)
- **Track 3.2. New Business Models in Times of Crisis.**
  Track chairs: Urtzi Uribetxebarria Andres Dorleta Ibarra Zuluaga, Leire Markuerkiaga Arritola (Mondragon University)
- **Track 3.3 Entrepreneurship for social inclusion: business modelling for impact.**
  Track chairs: Filippo Giordano (LUMSA University) and Alessandro Lanteri (Hult International Business School), Lucia Marchegiani (Roma Tre University)
- **Track 3.4: Sharing economy business models for sustainability: design, functioning and impacts.**
  Track chairs: Venere Sanna (Sapienza University), Cecilia Grieco (Sapienza University) and Trond Halvorsen (SINTEF)
- **Track 3.5: Responsible and sustainable production and consumption: the reduction of food loss and waste through new business models and circular economy.**
  Track chairs: Ludovica Principato (Roma Tre University), Luca Secondi (University of Tuscia)

Theme 4: Exploring theoretical and methodological foundations

- **Track 4.1: New Theoretical Foundations of Business Models for Sustainability as Social Action.**
  Track chairs: Florian Lüdeke-Freund, Tobias Froese (ESCP Business School)
- **Track 4.2: Design Thinking, Actor Engagement, and Legitimation in the Context of Circular Business Model Innovation.**
  Track chairs: Francesca Ostuzzi, Katrien Verleye, (Ghent University) and Fatima Khitous (University of Oulu)

Track 1.1 - The role of Collaborative Business Models in creating Social and Economic Transition

Track chairs: *Jan Jonker (Radboud University), Milou Derks and Frank Berkers (TNO)*

Our society and economy are in transition. Transitions have a fundamental impact on the way business operates. They lead to changes from organisation-centric business models to collaborative business models (CBM's). These are business models in which multiple organizations participate to create mutually beneficial value propositions that foster sustainability. We link transition thinking to CBM's as a means for enabling transition towards sustainability and circularity. We like to receive submissions addressing and analysing (ongoing) transition projects in which CBM's play a crucial part.

This track consists of 2 sessions: (a) a series of four presentations on CBM's and (b) a discussion on the role of CBM's in fostering transitions.

Collaboration Principles for Cascade Systems in a Regenerative Circular Economy

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Abstract

The current unsustainable production and use of cotton and textiles is exhausting the environment. The challenge is to recycle textiles several times, retaining or even creating value in each recycling step. Designing according to these principles can bring about a paradigm shift to a regenerative, circular economy. Cascades -a staircase model from high-quality applications to low(er)-quality applications- are an inherent part of the circular economy. Collaboration is recognized as key competency for implementing circular cascade design. By interviewing stakeholders at different phases in a collaboration, we explored collaboration principles in a cascade system. We conclude that collaboration principles require transparency, sharing and connecting. Partnerships start with an intrinsic motivation and a shared vision towards the regenerative circular system, using a holistic approach that puts humans and nature at its core. Learning collectively is important to do good as a system, in which the commonalities are trust and consciousness over suspicion. Co-creation over self-interest is important for sharing knowledge, resources, and materials. The individual business models of the partners become intertwined in a collaborative business model. Not one organisation is 'exclusively' in charge, a hybrid collective system is required: it alternates between specific contributions (own) and communalities (together).

Keywords

Regenerative Circular Economy, Collaborative Business Models, Cascade Principles, Value Chain Collaboration, System Change

1. Introduction

The textile sector is the second most polluting sector in the world, after the gas and oil industries. Moreover, global production of clothing has doubled in the last 15 years. Clothing represents more than 60% of the total textile consumption in the world. The most widely used and best known renewable natural raw material for the Dutch textile industry is cotton. The current unsustainable production of cotton and textiles is exhausting the environment, due to use of artificial fertilizers and pesticides, large amounts of water consumption and high CO2 emissions. In addition, cotton farmers worldwide but especially in the Global South are under pressure and end up in vicious cycles of debt because of rising costs and falling yields. At the other end of the chain, the useful life of clothing has become even shorter. In the Netherlands, 60 percent of the discarded textiles end up in residual waste streams where they are burned. Of the collected textile, approximately half is suitable to be worn again, the rest are processed into low-value applications (like cleaning rags or isolation material) and are ultimately incinerated (Van der Wal and Verrips, 2019). Both the economic and sustainable improvement potential for making longer use of textiles that are already in circulation is therefore enormous. However, in common recycling, the quality of cotton declines with every (mechanical) recycling, because the fibre length becomes increasingly shorter. The challenge is to recycle several times, retaining or even creating value in each recycling step. Following the Cradle to Cradle® design framework, the ultimate goal is to return the raw materials safely to the biosphere as nutrition for the soil after which a new cascade can begin: a cycle in the form of regenerative cascades.

Regenerative design is about asking yourself how many different forms of added value can be created for multiple parties (Raworth, 2017). Designing according to these principles can bring about a paradigm shift. This involves the transition from the linear, degenerative, take-make-waste economy to a regenerative, circular economy, focused on closing the resource loop and recovery. Few organizations can independently close a complete loop. Companies need to work together to establish a sustainable value system. Many organizations are struggling to adapt their existing business model or create new circular business models (Bocken et al., 2015). Our research investigates collaboration principles for a cascade system by designing collaborative business models in the transition towards a regenerative circular economy. This includes companies not only focusing on their own financial gains, but also considering the optimization of the entire system, aiming at a positive ecological and social impact.

2. Theoretical framework

Circular economy

The transition to a circular economy is one of the necessary conditions to reach prosperity while protecting a live-able earth now and later (WCED, 1987). This concept is recognised by both academics and practitioners as a proposition to face today's societal, economic and environmental challenges. According to McKinsey (2017), circular economy means creating 'a reliable way for industries to increase their profitability while reducing their dependence on natural resources'. Circular economy is defined as an economic and industrial system 'where material loops are slowed and closed, and where value creation is aimed for at every chain in the system' (EllenMacArthurFoundation, 2015). Circular systems ensure a constant flow of services and goods

without the need for new materials or raw materials, through different 'value circles' (EllenMacArthurFoundation, 2017; Jonker et al., 2018). A distinction is made here between the biological-cycle (e.g., cotton, wood) and the technical-cycle (e.g., plastics, metals). This was depicted by the EllenMacArthurFoundation (2015) in the well-known "butterfly diagram".

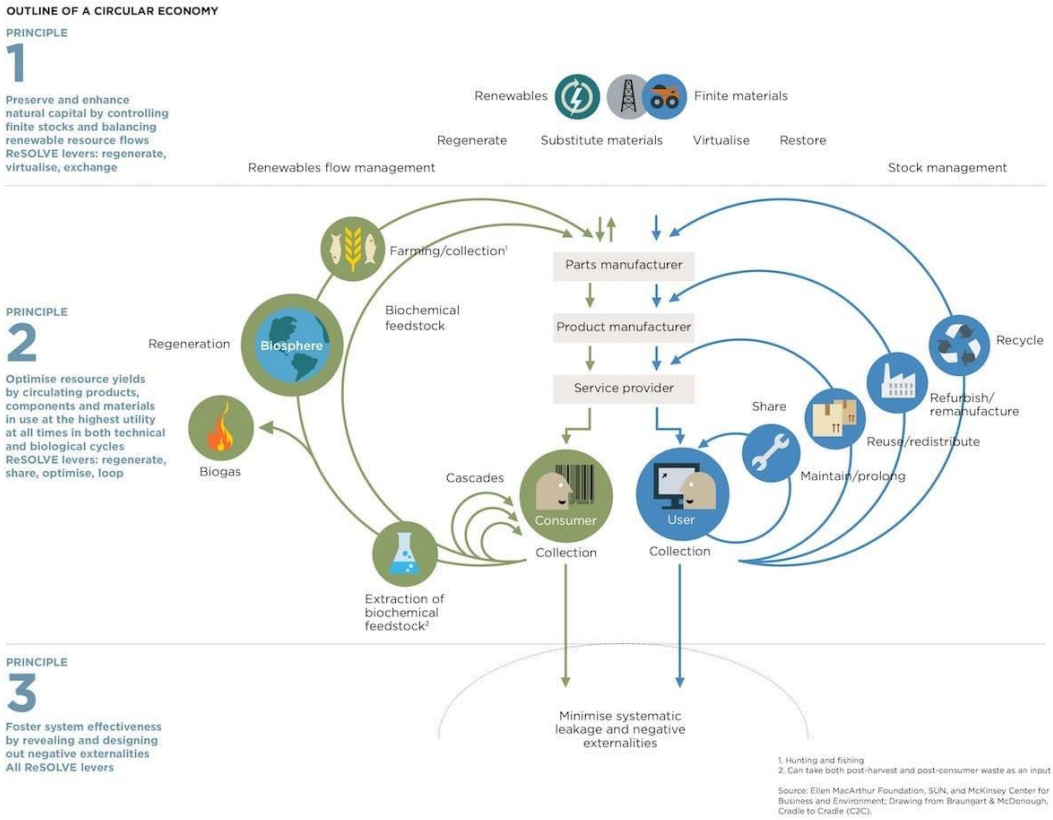


FIGURE 1 THE "BUTTERFLY DIAGRAM" SOURCE: ELLEN MACARTHUR FOUNDATION (2015)

The Cradle to Cradle® design framework, focuses on systems being restorative and regenerative by design (McDonough & Braungart, 2010). This can be in terms of materials, products, systems, and business models, in such way that they aim at reducing waste by focusing on restoration, reusing, and renewing (EllenMacArthurFoundation, 2013). Circular systems therefore always include efforts to optimize the use of raw materials, by reducing raw material use, reusing products and components, or recycling raw materials (Kirchherr et al., 2017). This repeated use of raw materials results in maximising reusability and minimising value destruction. For this, radical and systemic innovation is needed on the technical level as well as on the organisational level.

Cascading

Cascades represent a specific approach to the circular economy (EllenMacArthurFoundation, 2013; 2017), which focusses on an innovative value system of resource management, aiming at extending product use-time and closing material cycles (Mair & Stern, 2017). Cascading is based on the principle of resource sequentially by using a material in multiple phases for different goals (Winans et al., 2017). Consumption may take place in this cycle (fertilisation, food, water) as long as the flows are not contaminated with toxic substances and ecosystems are not overloaded (EllenMacArthurFoundation, 2015; McDonough and Braungart, 2002). The power of the cascade refers to the 'diversification of reuse in the value chain' (WorldEconomicForum, 2014). During reuse, the quality of the material decreases. When the initial function of a product or material can no longer be fulfilled, the transformation (e.g. through recycling) to the next step in the cascade can take place.

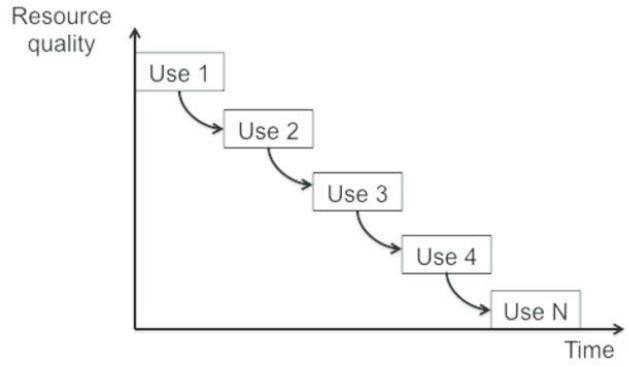


FIGURE 2 SEQUENTIAL UTILIZATION OF RESOURCES (SIRKIN, & VAN HOUTEN, 1994)

Therefore, recycling within the biological-cycle may occur in the form of regenerative cascades: a staircase model from high-quality applications to low(er)-quality applications as a result of (mechanical) recycling and unavoidable quality loss, in which the products and material can ultimately safely return to the biosphere as a nutrient (Mair, & Stern, 2017; Sirkin, & Van Houten, 1994). Cascades, even though they are an inherent part of the circular economy, are not yet widely practiced and/or thoroughly understood.

Inter-organizational collaboration

Collaboration is recognized as key competency for implementing a circular design (Sumter et al, 2020). Brown at al., (2019) indicate that a high level of collaboration supports more system innovation. Collaboration has a lot of benefits, like increasing knowledge flows, better access to resources and new markets, sharing risks, possibly bigger market share and more competitive advantage. This all could lead to better company performance. Collaboration is also needed to exchange materials because within a circular economy one company's waste is another company's input (Pinheiro et al., 2018). But on the other hand, there are disadvantages to collaborations such as loss of control, opportunistic behaviour, and trust issues (Brown et al., 2019).

Innovation processes create more leverage for change than other processes within the organisation. These innovation processes need to outreach collaboration in a chain, it requires decisive and conscious sharing of resources and risks by all stakeholders, and transparency and trust are essential (Janssen and Stel, 2018). Inter-organizational collaboration is needed to create new business models which focus on closing the loops. This means that extending the resource's lifecycle is possible when different actors in a production chain collaborate. This way of

collaboration is considered to be a key element in closing the loops and therefore critical for realizing a circular economy (Bocken et al., 2016). It is important to include all stakeholders when aiming to close loops (Korhonen et al., 2018).

Collaborative business models

Circular business models are networked by nature: they require collaboration, communication and coordination within complex networks of various and different actors and stakeholders (Antikainen & Valkokari, 2016). By working together and truly joining forces, companies in the value system can increase their positive impact for all actors, society and the environment. Communities are formed in which knowledge and ideas can be shared, exchanged and created (Jonker et al., 2018). Organizations need to reconsider how they maximise multiple values in product design and use of materials to decrease the usage of natural resources and create sustainable impact (Kraaijenhagen et al., 2016). For this, business models need to be shaped by different actors as a collective endeavour, referred to as collaborative business model. The collaborative nature of a business model means that both for the network as well as for the different stakeholders, the business model must create added value (Kraaijenbrink et al., 2019). In these collaboration-based business models, it is important that the value range includes the full spectrum of activities, carried out by different stakeholders, since the product continually circulates and creates value in the system (Rohrbeck at al., 2013; Fogarassy & Finger, 2020). Collaborative business modelling is a process in which parties jointly examine whether their partnership can create multiple value and design on a business model, or logic, by which the partnership wants to create value. It shows what the participating partners do, what matters for whom, what it takes to realise that and what yields are gained. Many organisations struggle to adapt their existing business model or create new circular business models (Bocken et al., 2015; Antikainen and Valkokari, 2016). The concept of collaborative business model development seems very promising, but more research is needed to operationalise it. Bocken et al., (2021) emphasize the need for deeper analysis within disciplines, as well as the need for trans-disciplinary experimentation with circular business models. To move towards a regenerative cascade, several new principles of entrepreneurship need to be developed. These collaboration principles include other ways of working, organizing, doing business, earning, collaborating, and creating value. This means that organizations have to 'rethink' how they organise their business, which involves a movement towards an economy that no longer sees humans and nature as a resource, but as a partner in creating well-being for everyone in harmony with the earth (Spaas, 2020). We explored the innovative collaboration principles of collaborative business models in a cascade system.

3. Method

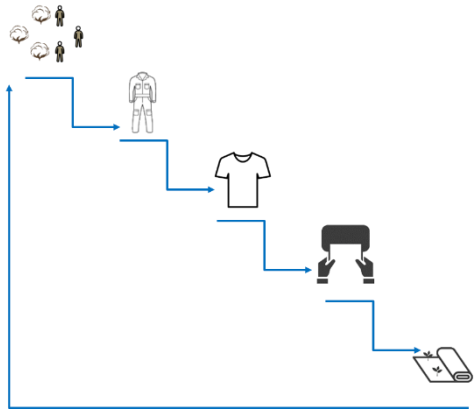
Research design

The current literature on cascading and collaborative business models is still limited. An explorative case study approach is chosen to gain insight into these new concepts that are still explorative and not looked into that much (Symon, & Cassell, 2012). We used a case study approach with semi-structured interviews since this provides the opportunity to ask ‘why’- and ‘how’- questions and get a thorough and in-depth overview of a situation. We organized two rounds of semi-structured interviews with six partners of a research consortium (farmer supporting organization, textile

producers and recyclers) to explore how they collaborate. On a small, but intensive and in-depth scale, we discussed which aspects these stakeholders considered important directly at the start of the project and again six months after the start. In these six months, we organized five online workshops on different themes (cascading, logistics & transparency, values & impact, business modelling) to gain more insights into their roles, influences and decision-making criteria, while drawing the cascade using a design research approach ('doing', 'harvesting what goes well' and 'developing and shaping'). Interviews and workshops were recorded, transcribed and coded for exploring the business principles, using the four building blocks of supply chain collaboration.

Case: circular cotton cascade

This research is part of a two-year project (raak.mkb13.020), in which Dutch companies (especially SMEs) from the entire textile chain are working together with Indian companies to design and record the process of a regenerative, circular system in which cotton is reused multiple times before it finally returns safely to the biosphere. Together with Avans University of Applied Sciences, the consortium is exploring and designing collaborative business model scenarios for this cascade system. The cascade starts with virgin cotton and continues in the following applications: workwear, T-shirt, hand towel and landscape fabric, to ultimately return safely to the biosphere.



The focus is both on research into the technical feasibility of the cotton fibre and on the development of collaborative business models.

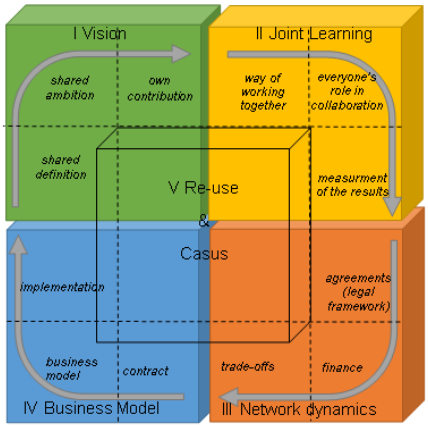
FIGURE 3 CIRCULAR COTTON CASCADE

Tool for Supply Chain Collaboration

Leising et al., (2018) have developed a conceptual framework for studying circularity in supply chain collaboration in the construction environment, using the four building blocks: (I) future vision, (II) Joint Learning, (III) Network Dynamics and (IV) Business Model. Our findings have been categorised according to the conceptual framework for circular economy in chain collaboration (Leising et al., 2018) that has been elaborated into a steppingstone tool for the design of collaborative business models (Janssen et al., 2020).

In step '**I Vision**', partners discuss their visions on circular possibilities. Partners need to agree on what they want to achieve and define their 'point on the horizon'. Defining a vision provides coordination between the partners and provides guidance and orientation on the joint actions and collective goals. Future visions contribute to the transition to a circular construction sector, for example, through pilot projects and demonstrations that showcase the potential gains.

In step '**II Joint Learning**', partners share information that individuals assimilate and apply in subsequent actions for themselves. First-order learning leads to new insights about options for a particular challenge and context, whereas higher-order learning can change problem definitions, norms, values, beliefs and goals of actors. The latter is necessary to implement radically new sustainable solutions and to support required change processes.



In step '**III Network Dynamics**' participants will find out how they are linked to each other. Organisations, companies and individuals are connected through different types of relationships. The connections not only arise from a technological transition but are also social. On the one hand, partners look at how they are connected based on their essential contributions to the project, and on the other hand, partners contemplate their relationship in terms of (1) strategic elements, (2) cooperation elements in shared activities and (3) cultural elements such as trust and transparency.

In step '**IV Business Model**', partners will redesign their business models. This redesign is essential for creating ecological and social value. A circular business model is defined as the rationale to create, deliver and capture value with and within closed material loops.

FIGURE 4: A STEPPINGSTONE TOOL FOR COLLABORATIVE BUSINESS MODELS (JANSSEN ET AL., 2020)

3. Findings

Circular economy and Cascading

In a collaboration, it is important that the partners have the same understanding of the concepts they are working on. Respondents were asked to define 'Circular Economy' and 'Cascading' In the first round of interviews, respondents defined circular economy based on concepts including 'reusing or recycling products that have reached their end-of-life, in the same functionalities', 'moving away from linear to repeated use' and 'waste becomes a new raw material, in order to reduce the production of new materials'. The respondents indicated that the term cascading was new to them and was still rather vague to them: 'it has to do with multiple recycling'. They explained that cotton fibres are being affected by use (wearing) and recycling (tearing) and that the quality of the material decreased when using it. They also explained that different products ask for a different quality standard of the fibre and that cascading is about adjusting the value and application

accordingly. All respondents indicated that cascades are therefore about quality: 'what chain can we invent and build from the material, to use the raw material for a new end product with a lower quality, instead of throwing it away?'.

In the second round of interviews, the concept of circular economy was described in more detail and was much more aligned between the partners. Almost all partners included the role of design in their definitions: 'infinite cycle of material in which everything is raw material for a new product; according to Cradle to Cradle® design, there is no waste'. In addition, they all used elements related to a journey of the raw material in a flow in which it is used in various forms related to the 'end-of-use' of the material in different forms of application. Respondents indicate that they have to explore if they need to 'influence usage time in order to find the highest value of products in the cascade in relation to quality'. Respondents also empathised that cascading therefore has to do with 'collaboration'. Together they need to look at possibilities by asking each other questions about the 2nd and 3rd processing step in a much more advanced way: 'I have the feeling that companies are looking at the bigger picture, it is challenging but it can be done'. Respondents stress the importance of doing it together, beyond a spear of loops, and tune in to details: 'humans interact as businesses, they go in diverging directions, need to figure out a way to realign to a new economy'. Respondents also addressed the technical challenges in the cascade. They explicitly addressed the need for transparency to assure that 'the cotton is really the cascade fibre that is going around in the system' and question if this fibre needs to be blending with other grades to get the best products, like blending short and long fibres to pick up the quality standards.

System innovation

In the first round, respondents indicated that the current non-sustainable production of cotton, the soil and the cotton plants are intensively exposed to chemicals and pesticides. Respondents acknowledged that the system is not acceptable because of exploitation and power disbalance in the chain. They indicate that the system needs to innovate to a more conscious one about the material, the production and processing, the equality in the chain in relation to value creation. Consumers need to respect and value cotton fibres more and become aware that textile is not a disposable product.

In the second round, respondents indicate the last step as being the most innovative. The material is still of high-quality value. The partnership is working towards something that can be put into the ground that does not yet exist and created additional added value for what a material can do there: 'the landscape fabric can also be a carrier of fertilisers, prevent weed growth, cope with weather conditions, retain water, reflect the sun'. Next to the technological feasibility of the material based on quality, the collaboration is also indicated as innovative. Partners refer to the challenge but also in cooperation between partners. Everyone functions on their own, but the challenge is to link everyone to each other: 'companies often work in a black box, where everything is shielded, and here, the anonymity has to come out, and it has to be open and transparent'.

Vision

The partnership started working together on textile recycling, with the ambition to help the sector move forward. The initiator of this concept (Dutch SME Yassasree B.V.) put the various pieces of the puzzle together, while having a good picture of what the partners were doing and proposed to work together on something concrete, like this cotton cascade. Participants indicated that they

wanted to learn how to preserve the quality of products as long as possible. They were curious about learning what the partners in the cooperation are up against and how to deal with challenges that arise. Respondents share a motivation to change, since they all have seen poor working conditions and bad environmental impact. They all share the intention to be better in the triple top line of social, ecological and economical value creation. In addition, they strive to make an impact by changing behaviour, creating awareness that 'waste' can be used in different loops and showcasing that it actually can be done. Respondents indicate that for passing on these multiple values, collaboration is necessary. Here they refer to the main challenge of a cascade system: 'how to manage the logistics moving across the different layers of the cascade and how manage and align the desires and the needs?'. Respondents know that they are still individual business that aim to co-create in a harmonised working relationship. They recognize that they need collective thinking in how they are dealing with this new concept, including a lot of uncertainties and assumptions, at a rather rigours pragmatic way.

After half a year, respondents elaborated more on the concept of collaboration and multiple value creation. They realised that it is more than the sum of its parts and that it is more about orchestrating the whole system. Although the concept becomes clearer, the concept also cranks up questions on the how. They gained more insights in innovative ways to move from a linear to a circular economy by learning about the possibilities and how to connect to others while making a positive impact. They honour the variety: 'it was an eye-opener that some look differently at things or use a different approach to challenges'. The partners realised that each partner is at a different point in the transition to a circular economy: 'some partners have great ideas that further sprouts, people observe and embrace those pioneers to learn'. Respondents feel that it is important to increase the magnitude by learning and developing. They created awareness of sustainability in their own organization by explaining the concept and picked up topics outside the project to improve their own business, but also to set an example for the industry. The partnership aims to showcase the importance of collaboration for the long term with multiple players.

Actor learning

At the start, respondents expected that knowledge sharing in a cascade will exceed normal collaboration. Although the project proposal looked solid, it all depends on the way partners are working together and the level of trust: 'we start with a good basis of trust, which need to grow further'. The respondents indicate that it is important that the partners communicate with each other in a transparent manner and that they respect each other in order to maintain a good level of trust for sharing knowledge. Respondents indicate that they have to learn from each other on design and materiality for re-use.

After six months, respondents indicated that they learned a lot from sharing experiences with each other. They gained more clarity on the roles and strategies of the other partners. Some respondents indicated that they now realised that quality is an extra dimension for connecting to each other: 'we are learning on standards, and we now raised the bar'. For others, the learning could be approached more radically in designing the innovation: 'we could have moved faster, but it takes time to align, we know that we now can be more effective, we are grateful and ambitious'.

Respondents still see a challenge in cooperation as the cascade is quite ambitious and priorities need to be aligned. For this, the partnership should not ask for guarantees, but give space to fail and learn. They stress the importance of feeling the connection and providing feedback. During the collaboration, partners shared experiences and content knowledge to gain insights into each other's companies and processes and realise the importance of commitment, involvement and ownership in the cascade: 'I think, we can always find a way around technology, but I am curious about how to achieve an equivalent cooperation'.

Network dynamics

At start, respondents indicate that cascade systems include enormous dependencies in supply and demand related to the position and role in the system. They point out that trust and respect are important for knowledge sharing. Partners have to find out to what extent they are 'going to share the recipe and give each other insight into their kitchen'. Some refer to the challenge of balancing between open and exclusive data and protecting information while bringing the cascade a step further. They indicate that it is important to have contracts to define what is confidential and what information can be commonly shared. Partners have the intention to draw up an agreement about how they want to work together by simple norms and values, based on the principles of conscious contracting. In the partnership agreement, the contributions in hours and money are fixed, but details on how to deal with trust still needed to be worked out: 'what happens if someone does not comply, or runs off with money or knowledge?'. Respondents indicated that they need to balance between control mechanisms and alignment by forcing each other to be open and transparent about sharing risks, profit goals and motivations . They think that this will further increase the level of trust and lowers the need to control, since negativity grows from distrust. Furthermore, they have dependencies with partners outside the project. They feel that it is important to create a level of involvement with their customers as well. Challenges refer to meeting the quality standards further down in the cascade: 'requirements are set for input streams and one of the biggest challenge is to match expectations on quality of fibre' and to tracking and tracing the product during its journey. Respondents indicate that it is important that dedicated partners support the system in an overall cooperation.

After half a year, respondents indicate again that everyone has a crucial role in participation and that collaboration is crucial: 'we have a mix of companies, and we need to work with the capacity and boundaries of each other'. Some respondents emphasised the importance of interpretation and nuances: 'we are on the verge of sharing details: what value and impact we can make is determined by making choices'. Respondents indicate that it helped to do exercises to get out of comfort zones and to take small steps when making it more concrete for own business. They acknowledge that honest sharing of challenges can help make them more tangible and contribute to collectively solving them. In this respect, respondents also refer to the role of government that need to set circular requirements to products (e.g. amount of recycled material) and the Extended Producer Responsibility (EPR). This means that textile producers become responsible for the collection, sorting, recycling and waste processing of products they bring onto the Dutch market. Moreover, respondents indicated that they have a quite good connection to the other partners, since they all share the same intension. Partners are open for cross-communication about experiences and feel confidence that sharing is good: 'making it concrete helps in understanding how it could be done, what we encounter'. At the same time, some respondents indicated that it might take more energy to start really working together. They indicated that they are prepared to

share more details and be open to changing possible steps in the current process. Some respondents also indicated that parallel collaborations arose on textile flows outside this cascade. Partners are learning more about the input streams of the others or technical requirements of the end products. Respondents specified the need to clearly communicate about expectations of the end product. Partners have to formulate concrete boundaries on this: 'we need to set go and no-goes, what do we find important and what do we agree on?' Trust in this is complex. Partners wish to protect aspects, but at the same time they know they need each other to make it happen. The feel that promoting honesty in expectations contributes to empathy and open behaviour in an ethical way.

Business model

Respondents were asked to describe the value proposition at the start of the project: 'value is created in different steps in the cascade, each step has a unique value that we want to deliver to the customers'. Next to that, they referred to aspects like: 'focussing on being less mean to nature, less waste, less negative impact but creating positive impact'. Respondents indicate at the same time that the biggest challenge is collaborating in a co-creating system: 'it's about cooperation: looking forward and backward, we don't throw things from one to another'. Respondents stressed the importance of achieve the common goal by thinking and acting in terms of the collective instead of the individual. Respondents highlighted they need to go beyond everyone doing their own thing, they approached it as a win-win-win leading to advancing the development and moving these processes from exception to the rule: 'it is in its cradle, everything is possible, but at the same time, nothing is possible.

Another part of the value proposition focuses on the wish to tell the story of the cascade, as a conscious process with efficient use of material, leading to a positive impact on human and nature, both at the beginning as well as at the end of the chain. By sharing the narrative, respondents intend to inspire others in the textile sector and also others in other sectors. For this, they indicate that the narrative needs to be shared in a simple way, not in technical jargon to make it understandable for everyone.

In relation to multiple value creation, respondents indicate the triple top line to be important at all levels: (1) ecological, such as not working with toxic material, (2) social, like equally paying attention to all partners and respecting cultural aspects and (3) economical, like a fair distribution. Related to this allocation of investments and return on investments, the respondents indicate that they have not thought about that. They mainly want to learn: 'this project is for learning, not for earning'. When thinking about an allocation key, some respondents think about putting all the ingredients together, make the cake and then divide it in pieces, based on transparency per recycling step: 'we have to look at the basics; what is happening, who has risks, what responsibilities, resources, intellectual value and bring it all to the table'. They indicate the need to brainstorm about what is acceptable.

After half a year, respondents further specified the value proposition as 'offering controlled material flows through all layers of diverging products'. They referred to the system that brings four products to the market in a fully circular manner, by a supply chain that is taken responsibility, starting with farming conditions and taking care of the soil in India, towards collaborating to connect 'end of use' products from different qualities in an extended loop. Respondents also included elements related to backwards and forwards control. They realised that the value

proposition is larger than the business perspective: ‘we think of new BM with a broader range of stakeholders, including a layer of 2nd stakeholders and stakeholder beyond human’. Respondents again stressed that collaboration is key to making it work: ‘we are far away from the end-user, and those are the ones that we are doing it for, but there are many links in between that. We need how to get to the end consumer, here is what can increase it’. In this system, the respondents addressed that is it about a collective system, in which each partner is having its own value proposition which is enlarged by the added value of the cascade: ‘we draw the cascade from the I to the We, the added value is in the collaboration’. Some respondents also indicate that a partner universe and impact matrix can contribute to how to allocate investments and return on investments: ‘in an Utopian world, we put all value on the table at a fair and transparent way, and make an equitability distribution’. Others think that they have to divide sales, according to a fair allocation key among the 4 steps of the cascade, in which the added value can be included as flexible distribution key. Respondents all think that it will be a difficult process since what is good, fair or acceptable might be different for everyone.

5. Conclusion and Discussion

Collaboration principles

Cascading is based on the principle of resource sequentially by using a material in multiple phases for different goals Designing according to these principles can bring about a paradigm shift. This involves the transition from the linear, degenerative, take-make-waste economy to a regenerative, circular economy, focused on closing the resource loop and recovery. We investigated collaboration principles for a cascade system by designing collaborative business models in the transition towards a regenerative circular economy.

Holistic approach

The cotton cascade aims at re-using and recycling from the onset, starting with regenerative cotton production. Regenerative agriculture goes beyond “less bad” and focuses, inspired by nature, on how to regenerate, restore and nurture. Regenerative cotton often goes beyond organic cotton practices and turns cotton, often seen as a culprit, into a driver of positive impact. An intrinsic motivation and shared vision to this closed loop system in which the raw material is ultimately given back to the soil is important. A holistic approach to agricultural systems puts humans and nature at its core.

Organising the collaboration

The partnership started to work together from the perspective to learn about technologies and applications to develop a sequence of re-using materials in different applications in a cascade system. While working together, the learning perspective moved to learning about how to organise the supply chain and the collaboration. Collaboration is seen as a necessity but also as the greatest challenge.

Collective learning

The network consists of a co-creating system in which the commonalities are trust and consciousness over suspicion. The stakeholders aim to learn collectively to do good as a system.

Creating an open and transparent environment, with a good basis of trust, is important for sharing knowledge, resources, and materials. A linear economy is purely transactional., for the cascade the entrepreneurial attitude is different. Specifically, when aspects are not sure, it is important to not give up. Regularly discussing and aligning expectations contributes to overcoming challenges. New and innovative ideas can be discovered during open brainstorms, with actors in their own supply chain, but also with other actors outside the partnership. A supportive network is needed to realise the cascades.

Mapping the partner universe

In a circular cascade system, everything is a resource for something else. Mapping the partners' universe contributes to defining dependencies and identifying inputs and outputs to realise a controlled downcycle process and define leakages. Knowing your partners contributes to acquiring new information to extend viewpoints create new knowledge, and also to acquire new resources and materials. NGOs and government need to be involved to set up a broader system. This also includes also to give a voice to non-human stakeholders through representatives to check whether it is also positive for them.

Positive impact

By visualising all impacts, systems move away from an anonymous chain. Dependencies become a positive force to create a positive impact on the triple top line of sustainability: ecological, economic, and social. At the ecological level learning to respect the processing of the raw material is important. At the social level, allowing regenerative agriculture contributes to pioneering how to take better care of the land and to respecting and valuing farmer communities.

Balance between control mechanisms and openly sharing

Mentioned multiple times, a basis of trust is crucial in collaboration. This trust originates from previous experiences or from openly sharing expectations and being honest about intentions from the start. Nevertheless, still, agreements or contracts with clear statements on specific aspects of ownership are desirable to protect exclusive or confidential information. In innovative collaboration, partners always have to fear that ideas are shamelessly taken and question how to deal with protection. It appears to be important to articulate concerns and define the boundaries. Partners need to set the do’s and don’ts in an open and empathic process based on shared ethics.

Intertwined business models

In a cascade system, the individual business models of the different stakeholders become intertwined in a collaborative business model. This means that choices made in different parts of the system have a direct or indirect effect on all involved in the system. In this, it is a challenge to allocate investments and returns on investments. Brainstorm about a fair allocation key, in which the added value is included as flexible distribution key, contributes to developing a fair system. This is a difficult process since what is good, fair or acceptable might be different for everyone. The importance of organising a balanced distribution of multiple value creation for all actors in the system is also stressed by Kirton et al. (2014). However, if a partnership manages to achieve a balanced allocation of resources, opportunities, basic needs and usage and property rights (Valente, 2012) collaborative business models are more likely to be viable and remain robust.

Collective system

In sum, business principles for a cascade system require transparency, sharing and connecting. Trust over suspicion. Co-creation over self-interest. Pre-competitive collaboration agreements are an important part of this. To create value in these areas, not one organisation is 'exclusively' in charge, but cooperation in a system is required. The collective system is hybrid: it alternates between specific contributions (own) and communalities (together).

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From citizen initiative to a multi-actor business model

Conditions and context for successful development and implementation of a community-based eHealth business model aimed at positive health promotion in neighborhood communities

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Abstract

Our practice-based research provides an exciting opportunity to advance our understanding of stakeholders' active participation in collaborative value creation and new organizational forms. This paper describes the preliminary findings and experiences of a participatory action research project's first phase to distill the success factors and impediments in establishing a multi-actor, community-based business model focusing on positive health promotion by using eHealth. With this first phase, our objective is to establish a shared view on the participatory action research's design and denote the emerging themes to take on collaborative action. Moreover, by using a scoping review, we aim to defragment the literatures from various domains relating to multi-actor, community-based business models and the formalization of citizen initiatives and synthesize these findings.

To collect the data, we are using a mixed-method approach. We use a Participatory Action Research (PAR) design and follow a citizen initiative in-depth. This paper reports our multiple activities to date to co-create the PAR-design to be used and prepare and conduct our scoping review. The research question guiding this is: how to collaboratively set up the Participatory Action Research Design to accelerate a local citizen initiative's business model development process by empirically validating the conditions that influence multi-actor, community-based business models focusing on eHealth?

We trust that these outcomes will contribute to synthesizing and mapping the various literatures to contribute to a more holistic overview of the various conditions when developing collaborative eHealth business models. Likewise, the outcomes of this collaborative process will be useful for further research as well, as it highlights the interdependencies in such a multidimensional and complex process.

Keywords

Scoping review, eHealth, multi-actor business models, community-based, positive health promotion, PAR

Introduction

There is an urgent need for solutions and business models that address major social issues and challenges. Healthcare is one of those domains needing innovative solutions due to a lack of inclusivity, accessibility, self-management, and increasing cost due to d*emographic and aging populatio*ns (Broerse & Bunders-Aelen, 2010; Johansen & van den Bosch, 2017; Ross et al., 2016). These threats put the current system under pressure, resulting in even more health inequality. There is a demand for preventive healthcare solutions to address issues that threaten the healthcare system's long-term sustainability (Broerse & Bunders-Aelen, 2010; Johansen & van den Bosch, 2017). It is, therefore, increasingly argued that the system has become inefficient and that it needs to be more local and people-oriented. This challenges equally the way we organize health care and results in new business models that address these issues. A promising way forward may lie in multi-actor community-based preventive eHealth business models. Especially business models that create an ecosystem where relevant stakeholders co-create value within their community (Lumpkin & Bacq, 2019). For (e)health transitions to succeed, local community engagement is vital (Cyril et al., 2015) and can help to overcome commercialization challenges (Menko et al., 2013; Oh et al., 2005). In addition, adapting tools to articulate and meet end-users' needs is often challenging. Ethical and legal boundaries, the design choices, and the stakeholders' various interests within a network add to the contextual complexity. Different scenarios and interactions result in uncertainty, making it unclear how to address the plurality of ambitions and establish long-term financial and/or societal sustainability. These developments result in a need to map how this affects the value reciprocity between the actors in a network, and how to act in accordance and learn from this.

Essential for the successful commercialization of innovations is their surrounding social system (Groen, 2005) and the stakeholders in the network (Aarikka-Stenroos et al., 2014). The collaboration of stakeholders to create value can take many forms, such as multi-actor business models, network business models, ecosystem business models, and cooperatives, whereby the collaboration may or may not aim for multiple and reciprocal value creation (Boumans et al., 2015; Lumpkin & Bacq, 2019; Menko et al., 2013; Oh et al., 2005; Oliveira et al., 2015; Phillips et al., 2015; Ross et al., 2016; Saebi et al., 2019; Shepherd et al., 2019; van Limburg et al., 2011). There is a lack of research on developing collaborative business models focusing on eHealth and how to manage the multi-actor complexity involved (Gjellebæk et al., 2020; van Limburg et al., 2011). This indicates a lack of clear conceptualization and shows that the literature is fragmented. Therefore, our objective is to research the process to find the combination of conditions that may result in the successful implementation of a multi-actor business model focusing on eHealth in neighborhood communities and whether these conditions will change over time. We use Participatory Action Research (PAR) to develop a multi-actor community-based business model that focuses on positive health behavior in a local community in the Netherlands. The research question guiding this paper is: how to collaboratively set up the Participatory Action Research Design to accelerate a local citizen initiative's business model development process by empirically validating the conditions that

influence multi-actor, community-based business models focusing on eHealth? Distinguishing and defining elements in this research are the collaborative relations of the various stakeholders, e.g., the multidimensionality, complexity of the contextual elements, and empowerment and emancipatory engagement in collective problem-solving who are working together towards implementing the eHealth technology through a business model. As the problems related to the implementation of eHealth solutions are multi-level and complex (Ross et al., 2016), and the citizen initiatives objective is to enhance learning by increasing their knowledge and skills in developing a business model (i.e., changing the current practice), a PAR design is justified (Cargo & Mercer, 2008; McTaggart, 1991). We use a mixed-methods approach to collect and analyze the data. Close collaboration with the researchers and stakeholders and the insights derived from this scoping review will help derive the analysis conditions.

The outcomes of this scoping review contribute to synthesizing and mapping the various disciplines, which provides a more holistic overview of the various conditions at play when developing collaborative eHealth Business models. Likewise, it will be the starting point on mapping the complexity surrounding multi-actor collaborative business models and the various routes to achieve this outcome. With our participatory action research, we contribute to the call for defragmenting the literatures related to e-health implementation and a better understanding of factors and strategies influencing this (Ross et al., 2016, p. 2). Our research provides an exciting opportunity to advance our understanding of stakeholders' active participation in collaborative value creation (Lumpkin & Bacq, 2019) and new organizational forms (Daskalaki et al., 2015). The scoping review provides an overview of the factors influencing the successful implementation of preventive e-health applications for local communities. With this first step, we map and integrate the essential conditions from the literatures on (e)Health innovations and business models, providing an overview that future research can use (Corley & Gioia, 2011; Whetten, 1989). This overview will help scholars and practitioners to focus on the relevant design issues in designing preventive e-health applications and organizational arrangements. The insights of the process towards collective action are highly relevant as the call for more bottom-up citizen initiatives and the transformation of the current (health) system increases. Research is increasingly called upon to find the connection with practice. This complex co-creation and adaptive process and the learning and reflection cycles are not unique to this case study. Hence our findings will inform theory and practice.

The structure of this paper is as follows: we first describe the method to conduct our participatory action research and scoping review and display our preliminary findings. As we are still in the middle of analyzing the available data, it is premature to have a meaningful discussion or draw conclusions based on what we have so far.

Method

Context

This research initiated from the question of mapping the development process of a community-based, multi-actor business model focusing on positive health behavior and how eHealth can support this and started in September 2021. The process revolves around a citizen initiative that focuses on health, well-being, and (self) care at the neighborhood level and is part of a larger field

lab in the Netherlands. The citizen initiative strives to set people into motion (literally and figuratively). This citizen initiative developed various interventions and actions that contribute to health promotion. The activities focus on self-management, health, exercise, and mutual support, supported by an app (an eHealth tool). This tool is expected to improve community residents' self-management, co-reliance, and participation. The participants can use the app to map their progress. Accordingly, this eHealth tool may also help to show the program's effectiveness once coupled to the IFC indicators (World Health, 2001). However, it is challenging to develop tools that align with the capacities and possibilities of citizens with a low(er) socioeconomic status (SES) population (Flinterman et al., 2019). Another effect of this citizen initiative and the eHealth tool may be the shift in care tasks of (in)formal care providers. However, research needs to map how this affects the network and the value reciprocity between the actors. The uncertainty caused by different scenarios and interactions makes it unclear how to establish long-term financial sustainability to realize the plurality of ambitions. These complex questions fit within a broader development that is apparent in health care (as well as the formalization of citizens' citizen initiatives in a broader sense). This process's objectives are to make the current interventions sustainable and sharable, the development of critical performance indicators in various areas, and share the accumulated knowledge and support and development of other neighborhoods and municipalities (scaling). Close collaboration with various partners and stakeholders helps to accomplish these objectives.

Methodology

We use a participatory action research (PAR) design. PAR is the systematic inquiry in close collaboration with those affected by the research problem to learn, take action, and transform to change the current situation (Bradbury, 2021; Cargo & Mercer, 2008, p. 327). This design enables participation and knowledge-co-creation and brings together action and reflection, theory and practice to achieve practical solutions to issues of pressing concern *with* people (emphasis added) (Bradbury, 2021, p. 185). PAR commits to democratic principles of justice and equality and refers to an epistemology that engages research design, methods, analyses, and products through a lens of democratic participation and collective action (Torre, 2014, p. 1323). Hence, PAR enables people to solve complex problems together in their (professional) lives. The research problem embeddedness into the larger system, the desired situation, and the opportunities for change and transformation are found by jointly examining the specific situation and the perspectives of various stakeholders (Eelderink, 2020). This research design guides learning and action and is common in health, community-based processes, and local social innovation (Aiken, 2017; Cargo & Mercer, 2008; Sadabadi & Rahimi Rad, 2021). Owing to our research question, how to collaboratively set up the Participatory Action Research Design to accelerate the business model development process of a local citizen initiative by empirically validating the conditions that influence multi-actor, community-based business models focusing on eHealth, seems as the justified choice. Specifically, because an important aim of the research is to empower the citizen initiative-takers.

An action research design has a more open, unpredictable, and flexible character. The research design of PAR is cyclical (consists of several 'rounds') and is flexible; it adapts to changes in practice. Although an exact research plan cannot be determined in advance, basic structures can be used (Wouters & Van Zaalen, 2012). PAR designs use various research methods, ranging from quantitative to qualitative and single-case designs to mixed-method designs (Cargo & Mercer,

2008). We use an explorative case study with a mixed-method approach (Creswell & Clark, 2007; Ivankova, 2017; Tashakkori & Teddlie, 1998).

The activities employed in this stage are two-fold. We conduct a scoping review to familiarize ourselves with the relevant themes and possible courses of action. Munn et al. (2018, p. 2) define scoping reviews as a tool to determine the scope of a certain topic's body of literature to identify and map the available evidence. The authors continue that this review type provides insight into the available evidence in a field, clarifies key concepts and definitions, examines how research is conducted, identifies the main characteristics or factors related to a concept, and might be a precursor for a systematic review. A scoping review seeks to "explore and define conceptual and logistic boundaries around a particular topic to inform a future predetermined systematic review or primary research" (Sutton et al., 2019, p. 211). Our review will provide an overview of the factors influencing the successful implementation of preventive eHealth applications within multi-actor collaborations in and for local communities. In this preliminary stage, our scoping review focuses on clarifying key concepts and finding relationships between the bodies of literature. With this step, we map and integrate the essential conditions from the literatures on (e)Health innovations and multi-actor business models focusing on blended value in and with local communities, providing an overview that future research can use (Corley & Gioia, 2011; Whetten, 1989). This overview will help focus our action steps within the PAR design and contribute to the relevant design issues in designing preventive eHealth applications and organizational arrangements. Due to the duration and depth regularly employed in a scoping review, it is best to regard the current process and outcomes as a mapping review and (Munn et al., 2018; Sutton et al., 2019) to guide our search, we use the PRISMA-ScR guidelines (Tricco et al., 2018).

Secondly, together with the members of the citizen inititiave acting as co-researchers, we create a shared understanding of the need for improvements (McTaggart, 1991). In doing so, researchers and co-researchers are collaboratively developing the scope and purpose of the research and, by doing so, working on establishing trust and mutual respect (Cargo & Mercer, 2008). Furthermore, establishing cycles of action and reflection (Ivankova, 2017; Ramos-Mejía et al., 2019) will focus on learning to act and acting in close collaboration with the people involved (Burnes, 2012; Burns et al., 2021; Lewin, 1942). Most of the sessions with the stakeholders are and will be recorded. When this is not possible, the researchers take field notes. PAR is known for its iterations, and we are in the middle of defining and specifying these loops. Please see the preliminary drafts of this process in Table

TABLE 1 PROJECT PHASING

Phase	Time period	Objectives	(anticipated) Outcomes	Data collection
Pre-orientation phase	September 2021-February 2022	Forming a public sphere for communicative action. Building trust, refining on the research question (Kemmis et al., 2014)	- strategic actions - communicative actions	Recorded stakeholder sessions (observation and interviews), fieldnotes and scoping review

Orientation	February 2022-	Establishing a shared language and identification of the themes. Establishing data-collection and reflection Setting-up a structured PAR-cycle for action and reflection, in order to learn to act and act to learn	Weekly appointments are scheduled in which the participants will look at the current most important themes. Additionally, the researchers observe in the stakeholder meetings to understand the pressing issues. In these meetings the participants dream (set out their ambitions) and take actions (which serve as input for the reflection. This will define the various needs and the actions. This is the input to 1) clarify the important themes and 2) reduce the complexity and multidimensionality so that concrete actions can be taken.	Recorded stakeholder sessions (observation and interviews), field notes and scoping review. Additionally, we will interview all the stakeholders when there is enough trust. We use purposive sampling and a snowball technique (Gerring, 2007).
Phase 2		Enhance knowledge that contributes towards learning and taking action. The cycles of action and reflection aim towards this objective		we will conduct group interviews with the various stakeholders to map the collaborative value creation potential method group model building (Scott, 2018).

Phase 3		Generalize our findings	The data from the stakeholder sessions, (group)interviews and survey form the input to conduct a FsQca analysis to shed light on the various combinations of conditions that may contribute to successfully implementing a viable and feasible multi-actor business model focusing on preventive eHealth solutions in local communities.	

Sample

The sample differs based on the phase of the research project. In this initial phase, three?? participants are engaged. Our sample will consist of various stakeholders collaborating within this local community in later stages. The stakeholders are at least four SMEs, several formal and informal healthcare providers, potential end-users, and the city's municipality. A joint task force of stakeholders oversees the project, where the first phase is the mapping of the users' needs and the last phase is the implementation of the business model, which is developed based on the distilled conditions.

The empirical data collection will occur between December 2021 and January 2023, as we intend to monitor these conditions over time. We aim to send the survey to a larger sample of relevant stakeholders with the same characteristics at the end of this project.

Preliminary results

This section reports our preliminary results on setting up the PAR-design with this community and our scoping review.

Preliminary reflection on learning to act and act to learn

When we started this project at the end of September 2021, the objectives for this research project were thought to be clear. The researchers and the focal participants had several meetings to get to know each other, the citizen initiative, interventions, and organizational structure. Additionally,

these meetings were held to understand better the stakeholders involved, how far the citizen initiative was regarding their value proposition, and to learn whom they have spoken to regarding this and whom they were planning to speak to. Most of these meetings were online due to the lockdowns caused by the COVID pandemic. In these meetings, the participants expressed a lack of trust in researchers in general and that their previous experiences with research were not favorable.

Nonetheless, the researchers were encouraged to write down what they intended to do and align their actions. The citizen-citizen initiative felt this document confirmed the lack of participation or co-creation they experienced before because the researchers were distanced from the citizen initiative. When the researchers asked to interview the most essential stakeholders individually to determine the baseline for comparison to the joint stakeholder meetings, the citizen initiative taker would not allow this. It took several weeks before it became clear to the researchers that they did not want the researcher to conduct these interviews as they feared that it would hinder and disturb the fragile process and possibly even hurt this. A possible explanation may be that a shared understanding was lacking due to the pivot in research design and the citizen-citizen initiative's protective attitude towards their process. The researchers were not invited to meetings, and information that may have been important for understanding the citizen initiative was not shared. This realization led to changing the course of action and taking a few steps in the orientation phase again. The new objective was to build a sense of shared knowledge and understanding and work towards the objectives. We now have had several creative sessions where all the participants got to know each other and learned to trust each other. This was essential to move forward. What also helped the researchers become more visible and spend a day onsite every week.

Preliminary findings scoping review

Our early-staged findings are structured around a few key themes that need to be further synthesized and structured based on the grounded theory method for literature reviews (Wolfswinkel et al., 2013). We started with a narrative review to get an idea of the various fields (Popay et al., 2006), where we used several articles as a starting point to determine the keywords. These keywords (see table 2 in the appendix) have led to the current article base. These hits, containing the author information, title, database, and abstracts, were incorporated into Eppi-Reviewer. This software assists in literature reviews (Thomas et al., 2020). After reading the titles and abstracts, we added several keywords and conducted an additional search. The first step is to search for duplicates automatically, which led to the exclusion of 2175 articles. The remaining articles are scanned on their titles and abstracts and fit with this research project. The decision for inclusion or exclusion based on the full article follows. For an overview of the search process, we followed the guidelines of Page et al. (2021); please see below. Please see our current findings so far in Table 2.

What we found in the literature

The literature on eHealth is fragmented (Ross et al., 2016). It touches upon related fields such as hybrid entrepreneurship (Shepherd et al., 2019), social innovation (Phillips et al., 2015), social entrepreneurship (Saebi et al., 2019), end-user innovation (Oliveira et al., 2015), and civic wealth creation (Lumpkin & Bacq, 2019), digitalization and medicine (Oh et al., 2005) and business models (Menko et al., 2013; van Limburg et al., 2011). eHealth solutions are often diffused or commercialized in the social domain. The social domain comprises market citizen initiatives

contributing to a societal cause (Volkmann et al., 2012) and civic wealth, including health, happiness, and social justice (Lumpkin & Bacq, 2019).

We find that many domains address collaborative business models (de Man & Luvison, 2019), such as renewable energy (Camarinha-Matos, 2016; Delnooz & Six, 2013), the social domain (Haugh, 2007), technology developing countries, and bottom of the pyramid settings (Oukes et al., 2021). Several authors have researched context-specific health care business models with differing foci, such as the collaborative nature, including the ecosystem, network, and stakeholders and, or focus on the technology(Andriole, 2006; Armstrong et al., 2021). Underneath these descriptions of these business models lie a variety of trends and developments, research methods, and methodologies. Several authors describe the current trends and developments that result in changing foci on health care and social value creation, in which the Covid-19 pandemic is seen as an essential accelerator (Bacq & Lumpkin, 2020; Khandelwal et al., 2021). Furthermore, collaboration is also seen as a tool in health care also received attention (Armstrong et al., 2021; Hoffmann et al., 2004; Rosa et al., 2019).

TABLE 2 PRELIMINARY OVERVIEW RESEARCH FINDINGS

Collaborative Business Models	
Definitions	The collaboration includes "supply chain management, personalization, customization, optimization, automation, and transaction trust."(Andriole, 2006) Collaborative Networks (CNs): "constituted by a variety of entities (e.g., organizations, people or machines) that are largely autonomous, geographically distributed, and heterogeneous in terms of their operating environment, culture, social capital, and goals, but that collaborate to achieve common or compatible goals better, and whose interactions are enabled by computer networks"(Camarinha-Matos, 2016) "a activity where multiple organizations that might differ in type (industry, public research and nonprofit), their position in the value chain (manufacturing, service, etc.) and industry (energy, ICT, etc.) work together to create a value creation system. In some cases, they will also attempt jointly to create the value capture system."(Rohrbeck et al., 2013, p. 8)
Business model archetypes	Forms "collaborative business models: sharing, specialization, and allocation These models all have their characteristics for value creation, capture, and delivery." (de Man & Luvison, 2019)
Research opportunities	Operationalization of collaborative business models (de Man & Luvison, 2019) Lack of knowledge on how multidirectional value flows between a business and its stakeholders and how this could be systematically analyzed in business model theory and practice(Freudenreich et al., 2020, p. 2).
Domains	Sustainability Electric vehicles (Delnooz & Six, 2013)

		Smart grids (Camarinha-Matos, 2016), renewable energy (Yildiz et al., 2015), sustainability innovations(Rohrbeck et al., 2013), multiple stakeholders and sustainability (Freudenreich et al., 2020; Tapaninaho & Kujala, 2019)
	Social	Civic wealth creation (Lumpkin & Bacq, 2019)
		Community-led ventures (Haugh, 2007)
		Collaborative value creation (James E. Austin & Maria May Seitanidi, 2012; James E. Austin & M. May Seitanidi, 2012)
	Technology	Mobile apps (Armstrong et al., 2021)
		E-commerce (related to health)
		Information technology (Andriole, 2006)
		Digital innovation (Senyo et al., 2019)
	Health	Care cooperatives by citizens in local communities (Boumans et al., 2015)
Approaches		Multi-actor business model design by using the e3-value methodology, which focuses on the exchange of all economic value, including actors, market segments, value objects, and value exchanges) and standard modeling concepts for describing which stakeholders exchange objects of economic value with whom (Delnooz & Six, 2013, pp. 2-3)
Related topics		Networks, social capital, alliances (de Man & Luvison, 2019)
		Platform-centric ecosystems (Mukhopadhyay & Bouwman, 2018) Collaborative innovation networks (IT focus): social product development (Abhari et al., 2016) related terms “democratizing innovation” (von Hippel, 2005). See Abhari et al. (2016) for success factors for social product development.
		Open innovation and service innovation (Rajala et al., 2016)
		Cooperatives, co-ops.
Stakeholders		Customers, network actors, society, environment, customers,/users/consumers, suppliers, regulators (policymakers), competitors, business model actors, NGO’s, specific segments, employees, local communities, board and managers, shareholders, CEOs, actors affected and involved, which the authors summarized into societal stakeholders, financial stakeholders, customers, business partners and employees (Freudenreich et al., 2020)

Business models in Health Care

Approaches	Brilliant business models in health care (Kemperman et al., 2016) Health care disruptive business models focusing on value creation and strategic choices related to future markets, internal and external capabilities, performance anatomy(Elton & O'Riordan, 2016) The STOF business model framework. This is a combination of eHix and the STOF framework. STOF stands for the service domain, technology domain, organization domain, and finance domain. This is combined with the innovation phases of Cooper, which are the inventory phase, design & development phase, experimental phase, pilot phase, and implementation phase. This results in a matrix also called the Matrix Model (Menko et al., 2013)
Business model archetypes	Lean-innovators, Around-the-Patient Innovators, Value Innovators, New Health Digitals and Hybrids and other novel solutions (Elton & O'Riordan, 2016)
Success factors and characteristics	Success factors are "profitable, loyal customers, satisfied employees, contribute to society [..] the value creation had to be measurable and demonstrable and for all parties concerned" and this is "achieved by being vision-driven, business model perseverance and being pioneers for and by stakeholders." (Kemperman et al., 2016, pp. xiii- xiv). The authors developed a framework that can be applied to achieve this.
Barriers	Usability*:* Technologies are not developed for a specific target group (Armstrong et al., 2021) "Obstacles in the path of health e-commerce are numerous and include future data standardization, privacy regulations, and health insurance underwriting laws, as well as the fact that a further market downturn may choke development resources."(Parente, 2000, p. 89), Diffusion and adoptions of eHealth solutions are slow(Menko et al., 2013)
Collaboration in (e)Health	
Community engagement models	Social-Ecological model, the Active Community Engagement Continuum, Diffusion of Innovations, and community-based participatory research (CBPR) to achieve positive health outcomes and reduce inequalities (Cyril et al., 2015, pp. 1-2)

Collaboration forms	Care coordination programs focused on dementia describing costs and stakeholders (Rosa et al., 2019)
	Person-centered care Coordination, where collaboration is achieved by using the Continuity of Care model of Wagner and the INtegrated CAre (INCA) health issue spiderweb (Hofdijk & Cillessen, 2021)
	Collaborations as a tool Achieving cost reduction in programs for psychiatric patients (Hoffmann et al., 2004)
Community Characteristics	Disadvantaged groups experience health inequalities and bear a disproportionate burden of disease due to structural, social, and cultural barriers. They face challenges by geographic access to health care, culturally inappropriate services, financial barriers, poor health literacy, and language barriers that impede their effective utilization of health services. Additionally, they often have higher risk factors for diseases, lack of awareness of the existing health resources, and poor eligibility for health insurance, further limiting their access to health care."(Cyril et al., 2015, p. 2)

Trends and developments in (e)Health	
Demographic changes	Increasing costs and changing needs (Boumans et al., 2015)
	Demographic changes lead to different foci, such as output-focused instead of treatment or intervention-focused, from reactive to preventive (Elton & O'Riordan, 2016).
	Changes lead to new ways to think about health care, cost-efficiency, and more holistic views (Johansen & van den Bosch, 2017)
COVID-19	Digital health technologies have as promising tools to respond to the global outbreak of COVID-19 (Khandelwal et al., 2021) related to the accessibility of health
Role of technology	Mobile apps for youth with mental illness(Armstrong et al., 2021) related to the accessibility of health

eHealth		
Definitions	The term eHealth encompasses a set of disparate concepts, including health, technology, and commerce, where the technology expands, assists, or enhances human activities, but not substituting this (Oh et al., 2005, p. 9)	
Domains	Technology	Telemedicine and e-consultation (Almathami et al., 2020)
	Service	eHealth innovation are seen as a service innovation rather than technological development(Menko et al., 2013)
	Success factor:	Requirements approach focusing on the end-user/ stakeholders and their specific context developed by a multidisciplinary team (Van Velsen et al., 2013)

Discussion and Conclusion

Our research provides an exciting opportunity to advance our understanding of stakeholders' active participation in collaborative value creation and new organizational forms / business moodles. This paper describes the preliminary findings and reflections of our participatory action research project's first phase to distill enabling factors and impediments in the process of establishing a multi-actor, community-based business model focusing on positive health promotion by using eHealth. With this first phase, our objective is to establish a shared view on the participatory action research's design and denote the emerging themes to take collaborative action on. Moreover, by using a scoping review, we aim to defragment the literatures from various domains relating to multi-actor, community-based business models and the formalization of citizen citizen initiatives and synthesize these findings.

Developing shared objectives and mutual trust-building takes more time than anticipated, which has led to changes in the design, the research objectives, and the research question. This continuous adapting and learning from the process has yet to shape out. The lack of a shared understanding of the research objectives and role-fulfillment has been a significant obstacle. Currently, we are in the phase where this is being discussed with the citizen citizen initiative. We aim to reflect on this process using the PAR-research and anticipate that we can share these findings at the conference.

Regarding our scoping review, as our preliminary results indicate, the field of collaborative business models focusing on eHealth prevention is multifaceted, with many sub-dimensions and overlaps with related domains – and we have only just begun to map this. Our findings so far demonstrate the need to synthesize the research findings and contribute to a shared understanding of the relevant conditions that influence this emerging phenomenon. This exercise will help to provide the theoretical consensus and help to move forward.

Research into collaborative business models addresses sustainability (Rohrbeck et al., 2013) and social issues (James E. Austin & Maria May Seitanidi, 2012; James E. Austin & M. May Seitanidi, 2012). An emerging body of literature addresses citizen-citizen initiatives, addressing market and governmental failures. However, it remains unclear how such citizen initiatives formalize and

perpetuate in the context of health and how the interplay its context and the dominant systemic logic changes such citizen initiatives.

We trust that our empirical findings and experiences will enhance the available knowledge on the entrepreneurial learning process to accelerate business model development (Fischer & Julsing, 2019). In this instance, a citizen citizen initiative will be helpful for all similar processes aimed at empowering local actors and producing bottom-up change. These insights will help scale up social transformation to benefit society.

Limitations

As mentioned, we are finalizing the first phase of our PAR project and we intend to reflect on our preliminary findings to understand better the process that has unfolded by using the PAR-design as well as literature from among, but not limited to, business modeling, (social) entrepreneurship, community entrepreneurship, and grassroot and frugal innovations. Structuring and synthesizing our data will be the next step. Therefore, our preliminary findings are not yet conclusive but support establishing our research objectives. In addition, the presented PAR process has been written down from the researchers' perspective. Although there is no reason to assume that this is not a shared narrative of these events, their perspectives are not discussed fully and have not yet been enriched by other participants yet. A further understanding of the complexity of developing a citizen citizen initiative's business model requires reflections and critical dialogue from and between all parties involved.

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Appendix

For Pubmed: only books and documents, reviews and systematic reviews.

24-12 did the pubmed search again without the medical and trail information – too much noise in the dataset due to this.

Duplicates – marked automatically >.9

Searching strategy per database			
Period 1 sep 21 – 1 oct 21	Scopus	PUBMED	Web of Science
(TITLE-ABS-KEY ("preventive") AND TITLE-ABS-KEY ("health") AND TITLE-ABS-KEY ("business model*"))	52	23	24
(TITLE-ABS-KEY ("multi actor") AND TITLE-ABS-KEY ("business model*"))	27	0	28
(TITLE-ABS-KEY ("cooperative") AND TITLE-ABS-KEY ("business model*"))	637	20	684
(TITLE-ABS-KEY ("ehealth") AND TITLE-ABS-KEY ("business model*") AND TITLE-ABS-KEY ("cooperative"))	2	1	2
cooperative business model health	55	14	46
(TITLE-ABS-KEY ("multi actor") AND TITLE-ABS-KEY ("business model*") AND TITLE-ABS-KEY ("health"))	2	0	0
(TITLE-ABS-KEY ("success factor") AND TITLE-ABS-KEY ("business model*") AND TITLE-ABS-KEY ("health"))	34	7	2
(TITLE-ABS-KEY ("collaborative") AND TITLE-ABS-KEY ("start-up*"))	388	47	Added network 134
(TITLE-ABS-KEY ("collaborative") AND TITLE-ABS-KEY ("start-up*") AND TITLE-ABS-KEY ("health"))	45	25	299
(TITLE-ABS-KEY ("collaborative") AND TITLE-ABS-KEY ("start-up*") AND TITLE-ABS-KEY ("ehealth"))	1	0	1
(TITLE-ABS-KEY ("multi-actor") AND TITLE-ABS-KEY ("start-up*"))	3	0	1
TITLE-ABS-KEY ("network business models")	66	205	13
(TITLE-ABS-KEY ("network business models") AND TITLE-ABS-KEY (health))	3	138	1
("network business model") AND ("ehealth")	0	7	0
(TITLE-ABS-KEY ("network business model*") AND TITLE-ABS-KEY ("success*"))	5	43	0
(TITLE-ABS-KEY ("community entrepreneur*") AND TITLE-ABS-KEY ("health*”))	7	49	3

(TITLE-ABS-KEY ("collective entrepreneur*") AND TITLE-ABS-KEY ("health"))	5	4	4
TITLE-ABS-KEY ("healthcare entrepreneur*")	21	0	8
“healthcare” AND “entrepreneur*”	1962	59	
TITLE-ABS-KEY ("collab** business model*")	114	189	36
TITLE-ABS-KEY ("collabor* value creat*")	58	20	99
“multi-actor business model* technique*”	0	0	Without m 4
“business model* technique*”	39	4	4
Formi* citizen initi*	2	0	
Citizen initia* and business mod			
Community business model			5
Communit entrepre*			
Citizen entre*			
Value mapping communit*			
Value exchange ‘’’communit			

Additional keywords	critical infrastructure systems capability-based business model transformation value co-creation multistakeholder

Business Model Innovation and Digital Technologies in SMEs: the Role of External Actors

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Abstract

Business model innovation has been extensively studied in startups and large corporations. However, extant literature lacks studies on business model innovation in SMEs. The study's objective is to shed light on SMEs business model innovation processes when adopting digital technologies. The manuscript focuses on the role of external actors in supporting SMEs unfolding business model innovation processes. It develops a qualitative explorative study collecting data from six cases. The cases are mainly Italian SMEs located in Marche Region. Data are analysed according to an abductive approach. The paper unfolds new perspectives on SMEs business model innovation processes while these are adopting digital technologies by shedding light on the role of external partners throughout the process. It identifies the actors who participate in the SMEs innovation. Also, it develops preliminary theoretical and managerial implications related to the role of the actors identified in supporting business model innovation processes linked to digital technologies adoption.

Keywords

Business model, Business model innovation, digital technologies, SMEs, External Actors

Introduction

Business model innovation and digital technology adoption are paramount for firms to improve their business potential. Firms are increasingly eager to engage with external actors to seek support and guidance to stay on top of these complex and multifaceted processes. Even though prominent authors carried out plenty of studies on business model innovation, few focused on empirically exploring incumbent SMEs perspectives of external actors engagement when adopting digital technologies (Cfr. Habtay and Holmen, 2014; Chesbrough, 2007; 2010; Foss and Saebi, 2015; Chesbrough and Schwartz, 2007; Chesbrough and Bogers, 2014; Ojasalo and Kauppinen, 2016; Moeuf et al., 2018; Müller et al., 2018). Since SMEs are still crucial for most worldwide economies,

the study aims to shed light on how incumbent SMEs engage with external actors to support their business model innovation process when adopting new digital technologies.

SMEs are since ever considered the driving force in most economies (Bowman et al., 2019); however, the analysis of how these unfold business model innovation processes through the adoption of digital technologies supported by external actors is still lacking. So far, SMEs are renowned for their lack of resources and strategic approach; thus, their challenge is even greater. In addition, looking at the crises that emerged since the early 2000s globally and the disruption brought by "internet technologies" first and digital technologies now, SMEs are now at a turning point in business model innovation issues (Cucculelli and Peruzzi, 2020). Thus, an explorative study on the phenomena is required.

The study argues that SMEs might overcome their typical managerial shortcomings in digital technologies adoption and business model innovation deployment through the engagement of external actors. These actors support SMEs to enable their ability to manage business model innovation processes and digital technologies adoption. In addition, the need for understanding BMI and external partners links with the fact that extant studies mainly focus on startups and large corporations (Chesbrough and Bogers, 2014).

The paper is organised as follows. The second section outlines the study's literature background. The third section outline the methodology used to carry out the study. The fourth section outlines the findings gathered from the cases. The fifth section outline theoretical and managerial implications. The last section presents the study's conclusions.

Literature Background

2.1 Business Model and Business model innovation: define the phenomena

Business model (hereinafter BM) has been defined with several perspectives among researchers (Cfr. Bucherer et al., 2012; Teece, 2010; Chesbrough and Rosenbloom, 2002; Osterwalder et al., 2005; Magretta, 2002; Zott and Amit, 2008; Amit and Zott, 2001). Although there is still no consensus on a shared conceptualisation of it, the study takes the Osterwalder et al. (2005, p. 17) as the most consistent with the research aim:

"*A business model is a conceptual tool that contains a set of elements and their relationships and allows expressing the business logic of a specific firm. It is a description of the value a company offers to one or several segments of customers and of the architecture of the firm and its network of partners for creating, marketing and delivering this value and relationship capital, to generate profitable and sustainable revenue streams*".

Also, business model innovation (hereinafter BMI) is still a multifaceted and blurred field of research. In fact, among the several contributions about the concept of business model innovation (Cfr. Markides and Charitou, 2004; Bowman et al., 2018; Foss and Saebi, 2018; Frankemberger et al., 2013; Foss and Saebi, 2015; Bucherer et al., 2012; Khanaga et al., 2014; Liu and Bell, 2019) the study identified the most suitable by relating to the processual perspective of BMI. The study analyses the BMI process and the changes generated by the engagement of external actors. Thus, the study takes the BMI conceptualisation developed by Bucherer et al. (2012, p. 184):

"*We define business model innovation as a process that deliberately changes the core elements of a firm and its business logic."*

Nonetheless, BMI represents a disruptive innovation in SMEs (Habtay and Holmen, 2014). Moreover, while BMI is often seen as an opportunity recognised and exploited (Schneider, 2017), the study acquaintance also that the firm develops BMI with a precise strategy. Besides, creating a new BM can be done by integrating internal and external resources (Foss and Saebi, 2015).

BMI process relates to the new product development and innovation process (Whiteralter et al., 2017; Frankemberger et al., 2013; Bucherer et al., 2012). The analogy with NPD and innovation processes opens up several debates. Identifying the BMI as an innovation process allows to divide the process into different stages, gates, or phases (Cfr. Cooper 1998). Among the others, Frankemberger et al. (2013) has proposed four main phases of BMI's process to describe its evolutionary nature until achieving the change of the business model. The phases are initiation, ideation, integration and implementation.

Therefore, BMI processes interact with endogenous forces and elements, such as innovation trends, external partners, economic turmoil, industry transformation and changes in customers preference (Chesbrough and Schwarz, 2007). The present study will focus on the role of external actors. Acknowledging that nothing is created in isolation, also BMI foresees the interaction of different actors.

According to extant theories on the BMI process (Frankemberger et al., 2013), the study develops the analysis according to three macro temporal frames as a processual reference. These are: before, during and after the BMI process. This temporal partition aims to support the study in understanding the flow of how external actors participate in BMI processes and where – within the process – they are eager to contribute most.

2.2 Defining Digital Technologies

Digital Technologies (from now onwards DT) are embedded within the firm under different forms; these can be products or services, tools, platforms, and infrastructures (Elia et al., 2020). DTs are related to the digitisation process, where DTs are changing the way of doing at the firm level (Vial et al., 2019). The study conceives digitisation as the process that underlies digital technologies adoption in organisational contexts (Legner et al., 2017). When DTs are incorporated as a vital component of the firm's business model, these can enable the firm to seize new business opportunities (Elia et al., 2020; Ibarra et al., 2018).

DT potentially can be embedded into customers interfaces side, thus as part of the end products or services; or can be deployed to improve and renovate firms' internal processes and organisational management (Matt et al., 2015; Kiel et al., 2017). DTs are recognised in software and hardware components such as business software, social media, cybersecurity, big data, robot, IoT, sensors, cyber-physical systems, virtual reality, cloud technologies and artificial intelligence (Moeuf et al., 2018). Because of their nature, DTs enables and supports collaboration and ease interactions among different actors (Elia et al., 2020) towards a unique innovation goal.

However, DT calls incumbent firms for their integration into their BM (Berman, 2012). The integration of new technologies is crucial because DT themselves has no value; therefore, how firms improve their business potential by adopting those technologies should be considered the value of those technologies, especially in SMEs (Christensen et al., 2016). Nonetheless, the DT adoption is

ever more complex for SMEs, often recognised as lacking in managing the digitalisation process (Müller et al., 2018).

2.3 Business Model Innovation, Digital Technologies and SMEs: the role of external actors

The study posits that BMI is still a blurred phenomenon, enacted with DT, calls for a specific investigation and that SMEs still lack strategy and resources to manage both. From the theoretical and managerial studies yet developed, it is possible to argue that external actors are a central element to BMI (Osterwalder and Pigneur, 2010; Foss and Saebi, 2015). Thus, the article argues that the SMEs should recognise, as a viable way to enact BMI, the development of collaboration with external partners to exploit the potential of the DTs. Since Chesbrough (2010) concept of "open innovation", several studies highlighted the role of external actors but still lack to shed light on BMI.

Incumbent SMEs BMI process may face challenges related to the existence of a prior business model as well as to path dependency related to an existing dominant logic, assets and resources setting, the pressure on short-term results and the risk to undermine the existing business model (Ciulli and Kolk, 2019). Nonetheless, SMEs typically lack time and resources to experiment with new business models and strategies (Moeuf et al., 2019; Leithold et al., 2015; Bowman et al., 2018). Thus, SMEs calls to be supported by external actors in developing BMI processes and overcoming their typical barriers towards innovation.

The role of external actors is identified in the whole BMI process. Moreover, most studies suggest an increasingly relevant role of the external actors' ecosystem to support SMEs in their development. External actors allow SMEs to seize opportunities (Chesbrough, 2010). Through external actors, SMEs can respond to emerging stimuli and trends, moreover when these can refer to blurred areas such as digital technologies. External actors are of great support for SMEs in DTs exploitation because SMEs are typically suffering from a scarcity of resources and know-how to cope with innovation and technological adoption processes (Chesbrough, 2007). Partnership with external actors seems paramount to bridge technological and innovation gaps, as SMEs suffer from scarce ability to innovate their business although they may have already deployed new digital technologies (Chesbrough 2010). In addition, external actors are paramount to extend the capability to experiment, test and trial new technologies and new business models (Chesbrough, 2007). Finally, external actors are critical for SMEs to address new challenges related to sustainability.

Often these collaborations begin because of the resource scarcity of the SMEs, mainly in the areas of managerial and technological skills to support the BMI process (Chesbrough, 2010). However, one BMI major challenge to manage is the conflict between the new and old BM (Chesbrough, 2010). Among the others, Ojasalo and Kauppinen (2016) suggested several challenges and benefits of developing external partnerships; however, the perspective on the adoption of DT is still missing from their findings (see Table 1, below).

Benefits	**Challenges**
Identify changes and new opportunities Develop know-how and skills Establish a routine for sustainable innovation Economical, with lower costs and investments and potentially new revenues Change in attitudes and firms' culture	Find enough time to work on the process Be aware of the length of the process Adopt a systematic approach to collaboration Address the change resistance Address the resource scarcity

Table 1 - Benefits and Challenges of external partnerships in BMI - Our elaboration based on Ojasalo and Kauppinen, 2016

What is still missing is an explorative study that aims to uncover how SMEs face BMI processes with external actors' support. Likewise, the study aims to depict the role of external actors supporting SMEs to change their business model. The study aims to shed light on the opportunities and challenges of external partnerships for SMEs deploying BMI while adopting DT. Moreover, according to the time frames discussed before, the study aims to depict the potential role of external actors in supporting the BMI process (See, Figure 1 below). As outlined in the figure below, since the study has a twofold purpose, the research questions explored are:

RQ1: Which external actors play a role in SMEs BMI processes?

RQ2: How the role of external actors unfolds in the BMI process?

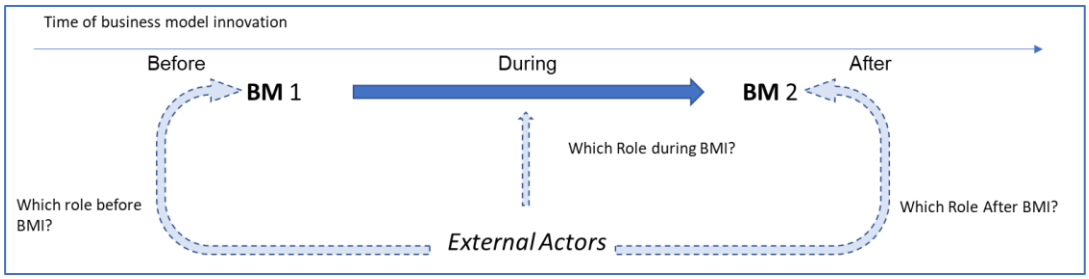

Figure 1 - Overview of the conceptual model of study

Methodology

The explorative study develops through six semi-structured interviews with SMEs. The study selects key informants through purposeful sampling (Eisenhardt and Graebner, 2007) to provide theoretical contributions and managerial suggestions. The research questions and the conceptual model of external actors' involvement in BMI developed (see, Figure 1 above) provided the researchers with guidance and focus for collecting empirical data. In addition, empirical material and secondary data (e.g., formal reports, attended business meetings, website, formal plans, financial statements) have been added to ensure triangulation and validity of the study (Yin, 2014; Eisenhardt, 1989). Data gathered from key informants have also been integrated and triangulated with notes and other secondary data gathered on the web. The study outlines exploratory research based on qualitative empirical data collected from six key informants among leading personnel as SMEs' entrepreneurs and managers. These firms have been selected from a sample of seventy SMEs enrolled in a university-industry collaboration program. The cases are identified through purposeful sampling and snowballing processes (Eisenhardt and Graebner, 2007). The case firms have been selected from researchers to engage with SMEs already involved in adopting digital technologies and business model innovation processes (see Table 2 below). All the key informants have been submitted the same interview protocol to ensure the study's validity (Yin, 2014).

N.	Data	Firm	Actor	Lenght	Support
1	May 27, 2019	Gamma	R&D Director	70 mins.	Audio + Note

2	January 21, 2020	Teta	Marketing Director	15 mins.	Audio + Note
3	June 28, 2019	Alfa	Entrepreneur	15 mins.	Audio + Note
4	June 5, 2019	Epsilon	CFO	60 mins.	Note
5	October 8, 2019	Eta	Entrepreneur	45 mins	Note
6	October 21, 2019	Delta	Entrepreneur	40 mins.	Note

Table 2 - Data collection overview

According to the study's exploratory nature, data have been analysed by adopting an abductive approach (Corbin and Strauss, 2015). The study results unfold from a constant and continuous comparison between the literature and the data gathered. The adoption of this approach allows the study to address the research questions and develop further theoretical and managerial implications to contribute to the extant literature stream.

3.1 Cases description

The study explored six cases gathered within Marche Region, Italy, characterised by a relevant number of SMEs. These small and medium-sized firms are heterogeneous; for example, operating in shoemaking, industrial constructions, production, and distribution of machinery. All the firms have been interviewed using the same research protocol. Then, all the firms interviewed were collected further data from secondary sources. Below, the cases are summarised (see Appendix A) in the following table, highlighting the different typologies of external actors involved (See Table 3). The cases identified the profile of the actors involved in the digital technologies' adoption and business model innovation paths in SMEs: universities, hardware providers, software houses, marketing agencies, business consulting firms, and digital innovation ecosystems. The study provides evidence of their centrality for beginning, developing and realising BMI in SMEs.

Case companies → ***External Actors ↓***	***ALFA***	***GAMMA***	***DELTA***	***EPSILON***	***ETA***	***TETA***
University	×	×		×		
Hardware Provider	×	×		×		
Software House		×	×			
Marketing Agency		×		×	×	×
Business Consulting			×		×	×
Digital Innovation Ecosystem	×	×				

Table 3 Summary of the cases and external actors involved

4. Findings

The cases highlight that while adopting digital technologies, the firms analysed involved external actors such as universities, hardware providers, software houses, marketing agencies and management consultants. SMEs involved the university in developing new "enabling" digital technologies for products and services (industry 4.0). The cases suggest that university involvement refers mostly to the engineering faculty, specifically to computer science, mechanics, and information engineering departments. The cases highlight the role of technology suppliers (hardware and software providers). Usually, the technology suppliers complete the development activities started by the university. When SMEs collaborate with the university, almost all the cases will go through the technology supplier. The technology suppliers, in some cases, also provide the final product ready to be commercialised or adopted in the production facility. The software houses usually begin by mapping internal processes to ease digitisation. For example, when SMEs adopt new software to enhance the company's abilities, it usually involves software houses.

To commercialise the new products and services enabled from the adoption of new technologies, from the cases emerge the role of marketing agencies and business consultants. Four out of six cases suggested that marketing agencies improved their ability to communicate with customers and stakeholders and enhance their value proposition. The study highlights that marketing agencies have supported companies in innovating and commercialising new products. Besides, the business consultants supported firms in improving their innovation process, from studying new technologies to managing organisational design and operations development.

Finally, the digital innovation ecosystem played a broad role in supporting SMEs in scouting and adopting new technologies. The study also identifies these actors as the trait-d'union between the SMEs and the other partners supplying technology and know-how to exploit DTs. These actors are, for example, digital innovation hubs, competence centres, and research centres.

The study found that the interaction between SMEs and external actors emerges in three business model's building blocks:

- Value Proposition: Companies involving universities and technology suppliers were usually more focused to innovate their value proposition. Value proposition innovation led to the development of new products and services (mostly digital) (Alfa, Gamma).

- Value Creation: the interaction with marketing agencies and new technologies allowed SMEs to improve their ability to manage customers and suppliers. For example, the Epsilon case, where the company has invested in improving the communication of the value of artisanal production (Epsilon).

- Value Capture: in this case, the companies that involved management consultants and marketing agencies have adopted an approach to enhance services with new revenue models. However, this innovation did not involve a technological part but a new combination of existing factors (Delta, Eta, Theta cases).

The cases suggest external actors may have a different role in the BMI process depending on their involvement and core business. However, most of the BMI observable processes are still in progress. In fact, from the case analysis stems that the university is usually present in pioneering projects involving innovative technologies research. Particularly, from the study emerges the evolving role of the university. New technologies have enabled a more practical use of research and university activity in technological transfer. According to technology suppliers, both hardware and software providers, although they have been asked a more practical approach towards adopting digital technologies, these players also come into play before the design of the BMI is complete and formalised. At this level, the firm involves management consultants. They are often in charge of strategy design and market analysis to identify the potential innovation in the business model, combining digital technologies and new approaches to customers. Therefore, university and technology suppliers support SMEs to ensure innovation potential. The role of business consultants is also crucial, as they continue to support the firms developing their strategic perspectives about the technologies and the new products. Here SMEs are still involved in developing value proposition and the design of their new business model.

Then, after the firm creates a new value proposition and completes the adoption of digital technologies, the actors who support the firms are mainly business consultants and marketing agencies. The latter is particularly useful for enhancing the new digital channels for creating new

robust relationships. Furthermore, these agencies allow the company to deploy activities that otherwise would not have yet found a place in the organisation. Here, the technology suppliers are involved in supplying components or the entire products and supporting the commercialisation.

The potential opportunities and challenges arising from the external actors' involvement in the business model's innovation processes are summarised in table 5 below. The cases suggest that external actors' role before starting the business model innovation process is to identify new opportunities. At this level, the main challenges are the firm's ability to understand innovation sharing with external actors, consistent with SMEs' investment capacity and capabilities. During business model innovation, the opportunity lies in developing new technologies (patented in the case of Alfa and Gamma) that led to new business models, while firms experiment with new configurations of both the strategy and business models. Identifying a path for a long-term innovation process addresses a major shortcoming. The risk links with firm resources scarcity. Finally, the challenge is to have the two business models, old and new, concurrent for a certain amount of time. After the firm deploys BMI, value creation and capture development issues should be consistent with the new value proposition. These develop in the interaction with business consultants and marketing agencies through new communication channels and business strategies. The actors also support SMEs in understanding the return on investments of these innovation processes. In fact, due to the length and the complexity of the business model innovation, the major concern of firms is to understand whether they will achieve a positive yield.

		Before	During	After
External Actors	**Opportunities**	Business analysis to exploit the full potential of the firm Identify new viable technological and business solutions	Develop the strategy Experimentation of new BMs	Developing new business opportunities
	Challenges	Projects might be too innovative for the firm Investment capability of the firm is limited	Become to a clear path for technology and business innovation Coupling new and old business model	Return on investment over time

Table 4 - Opportunities and challenges overview

Theoretical Contributions

The study suggests that the external actors involved contribute to the DT adoption driving the BMI process from the initial steps of technology development and strategy design to the final steps of value capture through sales and marketing channel management. The study highlights the relevance of external actors in business model innovation processes involving the adoption of new technologies (Chesbrough, 2010).

The cases suggest that the external actors involved in BMI are complementary according to the resource needed to support the firm in reaching its full potential, and their role is critical to support the SMEs at a broader level (Chesbrough, 2007).

The study is in line with the previous study on BMI, suggesting difficulties in observing and delimitating the BMI process. Thus, the study suggests that it is useful to adopt the involvement of external actors and the firms' aims to adopt and develop new products embedding DT as a proxy of future BMI processes (Osterwalder and Pigneur, 2010; Foss and Saebi, 2018).

Therefore, the study proposed a conceptual model to understand the potential role of external actors in the three different macro temporal frames of BMI (See Figure 1 and Table 4). The following table 6 summarise how every external actor engages in the SMEs BMI processes:

MAIN ROLE	*ACTOR*	***Before***	***During***	***After***
Value proposition	***University***	*Technology Scouting*	*Technology application and development*	-
Value proposition	***Technology Provider***	*Technology development*	*Technology Deployment*	*Supply of technological components, assembly or products*
Value Proposition	***Software House***	-	*Processes and services engineering*	*Supply of software and further improvements*
Value Creation	***Marketing Agency***	-	*Analyse the new products or services communication*	*Developing customers and relationships channels*
Value Capture	***Business Consulting***	*Analyse the business and design the strategy*	*Experimenting and testing of the new BM and Strategy*	*Controlling and BM revision according to business performances*

Table 5 - External actors involvement and macro temporal frames

The study suggests that university and technology providers support SMEs in developing their value proposition (Osterwalder et al., 2005, Osterwalder and Pigneur, 2010). Marketing agencies have a stronger role in developing SMEs marketing channels and defining customers segments (Osterwalder et al., 2005, Osterwalder and Pigneur, 2010). Business consultants, instead, seems to be engaged in supporting firms in the whole business model innovation process, both in defining the new value proposition and designing new marketing strategies in terms of marketing channels and customer segments; however, they focus in design new value capture mechanisms consistent with the new value proposition and creation (Osterwalder et al., 2005, Osterwalder and Pigneur, 2010).

The analysis of the challenges and the opportunities linked to the involvement of external actors in BMI suggests how external actors contribute to reducing the managerial backwardness of SMEs, such as the short-term strategic approach, the centrality of the entrepreneur, lack of resources and difficulties to commercialise new products (Moeuf et al. 2019; Leithold et al. 2015). The role of external actors, thus, can be seen not only in the development of new technological solutions related to the new BM but also in creating understanding and support SMEs in being aware of the business and technological potential that could be exploited in value creation and value capture (Chesbrough, 2010; Osterwalder et al., 2005). Findings also shed light on the role of external actors as a driver of BMI. These actors support SMEs in changing or improving their core elements and shifting their business logic to new avenues (Bucherer et al., 2012; Giese et al., 2010). Digitisation processes enhance BMI, in line with previous literature, although findings provide evidence on the central role of external actors to push SMEs DT adoption (Christensen et al., 2016). Thus, external actors play a crucial role in both DT and BMI when SMEs aims to adopt new technologies. External actors support SMEs in overcoming their lack of experimenting and testing new strategies and BMs (Bowman et al., 2018). In broader terms, findings suggest that external actors support SMEs in improving and developing their business potential (Chesbrough, 2010). Thus, the role of the external actors according to the three macro temporal frames of BMI can be summarised as follows (See, Figure 2).

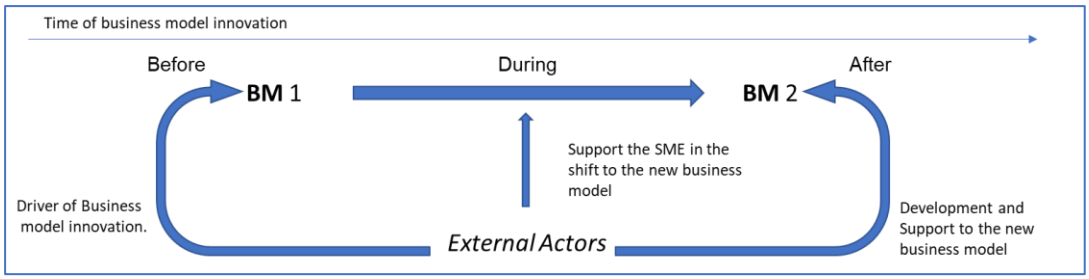

Figure 2 - Summary of external actors role in SMEs' BMI

5.1 Managerial Contributions

The study suggests that the interaction with external actors eases SMEs BMI processes. SMEs overcome their typical shortcomings to innovation through the interaction with external actors. The study highlights that the actors support SMEs, especially in developing new technologies, marketing channels, and revenue models.

However, developing new products and technologies requires a new approach to innovation. The study suggests that investing only in technological development is a necessary but not sufficient condition to favour the firm's business model innovation. Thus, the study suggests engaging with different actors to identify new paths toward innovating business models' components.

Therefore, SMEs should pay more and more attention to involving a heterogeneous panel of actors in the innovation chain (as presented above) who can offer them technological and managerial development support. Thus, after investing in value proposition and digital technologies, SMEs should involve specific actors to improve their value capture and value creation mechanisms.

The study highlights and suggests that the early involvement of these actors allows the smoothest innovation process. External actors' early involvement supports SMEs' BMI process by providing experience to avoid pitfalls and unexpected mistakes.

Conclusion and Limitation and further research of the study

The study sheds light on how incumbent SMEs might develop business model innovation processes related to adopting new digital technologies in interaction with external actors. Therefore, the study adds to the extant literature on BMI that developing collaboration and partnerships with external actors that are highly specialised in managing the exploitation of the business potential of digital technologies can be the key to enabling business model innovation processes. These actors are universities, technology providers (hardware and software), management consulting firms and marketing agencies.

The study also sheds light on the different contributions these actors made according to business model structure. The study addresses each external actor according to the three main dimensions of business models, value proposition, value creation and value delivery. Accordingly, this adds to theory and practice, suggesting the enabler partners for incumbent SMEs looking toward business

model innovation. External actors can be of great support to the incumbent SMEs in closing the gap between the adoption of digital technologies and their exploitation through a tangible change in the business model structure of the firm.

However, these partnerships are not without shortcomings. The case suggested that many challenges lie yet in managing the exploitation of external actors, following their guidance and allowing them to express their potential. Moreover, external actors' partnerships see the SME risks to find in a lock-in collaboration that posits risks to the future developments of the firm. The cases suggested that firms lack knowledge and technological background, making them dependent on certain decisions and processes.

Besides, the study has limitations in the blurred nature of the phenomenon under exploration, the limited number of cases analysed, and the adoption of a qualitative methodology. However, the results presented confirm the relevance of the phenomena and the study premises in the importance of shedding light on SMEs BMI processes. Further studies are suggested in this field to produce a thorough understanding and develop the present literature and knowledge.

The manuscript suggests further studies to shed light on each of the partnerships addressed and a deeper exploration with longitudinal and cross-case comparisons. In addition, quantitative studies are welcomed to gather a comprehensive understanding of a phenomenon that is still uncovered. In addition, specific studies – both qualitative and quantitative - on the evolving role of the university as a partner for technological development within the business model innovation process are called.

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Appendix A

Case Company	**Alfa**
Case Profile	Alfa sells tapes and adhesives for industrial printing. The firm focuses on innovation through the partnership with University. They developed a machine for industrial printing that is Industry 4.0 technology compliant. Alfa has about 6 million euros turnover and about 30 employees.
Background	The firm was founded by a sales-oriented entrepreneur who is still managing the firm. The firm has its focus on commercial activities. Since the beginning, alfa worked as a distributor of industrial printing's tapes and adhesives for multinational producers. The company experienced steady growth, which opened several new avenues. One of them was the research and development programs developed with the two universities: The latter collaboration brought the development of new Industry 4.0 printers that promise to cut costs and support users in being more sustainable.
BMI and DT Focus	The company was not familiar with digital technologies. Although it has developed an Industry 4.0 compliant product, the firm still lacks know-how on digital tools. Lacking digital technologies adoption goes to detriment also to the firm's capabilities to develop its business model; in other words, in how to design and enact business model innovation.
Background of the key informant	Sales executive, owner of the firm since the beginning.
External actors	University, Technology Provider, Innovation Ecosystem
Digitisation approach	The firm invested in producing industrial printers compliant with Industry 4.0 paradigm. Thus, they embedded digital technologies within industrial printers.
BMI potential effects	Attract new customer segments, new sales and relationship channels. Then, with the new machinery, they can also improve their core business of tape and printing consumable distribution.

TABLE 1 - ALFA CASE PROFILE

Case Company	**Gamma**
Case Profile	Gamma produces and sells high-end coffee machines. Gamma has a turnover of about 80 million euros and about 100 employees.
Background	Gamma historically produces and sells high-end coffee machines. They invested in the internationalisation strategy to expand their business network. Gamma is considered one of the best coffee machine producers globally. For that reason, Gamma decided to invest in the technological development of its machines together with UNIVPM and several other technology providers.
BMI and DT Focus	Gamma begins to study how to embed digital technologies within their coffee machines together with University. These technologies based on data are for predictive maintenance, understanding customer behaviour, optimising costs, and increasing revenue. Besides, the firm adopted a new approach with digital marketing technologies by developing a new web platform where they commercialise machines and spare parts. Finally, the firm digitised several internal processes, such as an e-learning program for customers, employee training, and paperless bureaucracy. Despite a deep involvement of digital technologies in production, products and management, the firm has still not achieved a new business model.

Background of the key informant	COO and CTO of the firm. They do not own shares of the firm.
External Actors	University, Technology provider, Software House, Innovation Ecosystem, Marketing Agency.
Digitisation approach	Gamma approach to digitisation is pervasive. The firm strongly believes that DTs might improve their production, sales, and coffee machines performance. However, they manage a group of technological suppliers because they do not have enough internal know-how and resources.
BMI potential effects	The investment in digitisation and the collaboration with external partners should open soon many new opportunities for the firm; however, the firm now is still searching for a technological setup.

TABLE 2 - GAMMA CASE PROFILE

Case Company	**Delta**
Case Profile	Delta manufactures, applies and commercialise epoxy resins for floors and waterproofing. Delta has a turnover of about 3 million euros and about 13 employees.
Background	Delta applies epoxy resins and waterproofing for industrial floors since the beginning of the 1970s. Delta has a small production facility that blends resins for internal use and a small part of commercialisation. The firm adopted new technologies only in business management, such as ERP and CRM software.
BMI and DT Focus	The firm started collaborating with a consulting firm to deploy digital marketing operations. The firm has changed its business model over time, shifting from floor application to waterproofing and production and commercialisation. Although, its digital technologies adoption is still weak, mostly applying organisational and sales operation management technologies. The firm is planning to develop new projects that will involve the adoption of the different meanings of digital technologies.
Background of the key informant	CEO, owner of the firm, took the lead after his father.
External Actors	Business consulting, Software house.
Digitisation approach	The firm involved external partners in understanding where and how to adopt digital technologies and design how these might contribute to developing a new business model. Then, involved a software house to develop all the digital tools demanded from the designed strategy.
BMI potential Effects	The potential effects on the BM brought by the introduction of digital technologies might be addressed mainly on the firm capability to reach new customer segments and open new distribution and communication channels.

TABLE 3 - DELTA CASE PROFILE

Case Company	**Epsilon**
Case Profile	Founded in the early 1970s, Epsilon is an Italian luxury shoemaker. Epsilon is a medium company with a turnover of about 14 million and about 60 employees.
Background	Epsilon is a handmade shoemaker who aims to combine tradition and style to produce classic leather shoes both for men and women. Although the firm dwells in a traditional

	sector as shoemaking, they challenge the status quo by embracing digital technologies. The firm adopts digital technologies following the craftsmanship and heritage of shoemaking. The adoption of new digital technologies started from adopting a new ERP. Then, the firm manages to embed digital technologies also to machines through sensors to acquire data about leathers and materials. These technologies are leather-cutting machines and other shoemaking machines. The adoption of those technologies improves the controlling capability of the firm to acquire new data on the production processes. Other technologies (e.g., visors and CRM) were adopted to enhance customer relationships and exploit handmade processes.
BMI and DT Focus	The firm developed paramount investments in digital technologies for the traceability of every single production process. Also, find new ways to communicate with business actors such as shops and wholesalers. Besides the technologies deployed in the production facility, the firm adopted new ERP and CRM to improve business and customers management. Although the investments in digital technologies, the firm seems still looking to identify a major change in its business.
Background of the key informant	Temporary CFO. He does not own shares of the firm.
External Actors involved	University, Technology Provider, Marketing Agency.
Digitisation approach	The firm introduced new technologies to enhance the customer experience and communicate its artisanal approach to traditional shoemaking. In partnership with the University, which supports their whole digital innovation processes, they introduced new ways of cutting leather by adopting Big Data CAD/CAM machines and software. Then, they integrated smart visors (Smart devices) along the whole production process to record every production process and create a story behind each pair of shoes produced. The aim is to make craftmanship visible and give value to artisans. Also, these technologies enhance the traceability of the production; thus, it makes the firm's efforts visible to the customers.
BMI potential effects	Notwithstanding these efforts on developing innovation and adopting new digital technologies along the whole production process, the firm's business model is still the same: the production and commercialisation of high-end classic Italian handmade shoes. The technology adopted could only support the firm in improving its cost and revenue management capabilities and developing the customers' experience in the purchase process.

TABLE 4 - EPSILON CASE PROFILE

Case Company	**Eta**
Case Profile	Eta is a car dealer of two worldwide automotive manufacturers, one in the premium segment and one in the generalist segment. Eta is a medium-firm with about 60 million euros revenue and 100 employees.
Background	Eta begins in the late fifties. Since the beginning, the firm's core business has been the sales and distribution of cars. Since then, they acquired and developed several partnerships with worldwide automotive manufacturers. The firm has five business units: car sales, car repair, rent, insurance, and administration services. Since the automotive industry's evolution, the firm was pushed by its partners to develop and adopt digital technologies to support sales and marketing activities. Nowadays, the firm is keen on developing new solutions to enhance its capability to develop and maintain the relationship with business actors and a private consumer. They support the development of these new solutions and the adoption of digital technologies such as software or digital marketing channels.

BMI and DT Focus	Since the firm has multiple business units, digital technologies seem pervasive, especially in linking information in those activities that involve customer management and the operation of marketing activities. The firm adopted a wide range of software such as ERP, CRM and warehouse management. Besides, the firm developed a new e-commerce platform to ease the commercialisation of used and new vehicles. These innovations related to digital technologies might be crucial to surviving in a hyper-competitive industry such as automotive.
Background of the key informant	Sales manager, board of directors, owners, family member
External Actors involved	Business Consultant, Software House.
Digitisation approach	Before, they used only the ERP, CRMs and instant messaging to smooth communication between employees and customers. Nowadays, they are working to open new digital channels and in developing a digitalised sales approach that aims to create a new competitive advantage.
BMI potential effects	The major effects of the last investments in digitisation could greatly contribute to re-shaping the firm's business model's value-capture and value-creation building blocks. The major innovation relates to their business model's value proposition, communication and relationships channels, and key partnerships. Even if the process is still slow due to the dimension and background of the firm, they have embarked on a trajectory that potentially may lead to the adoption of new business models.

TABLE 5 - ETA CASE PROFILE

Case Company	**Teta**
Case Profile	Teta commercialises and applies synthetic turf for private users and business surfaces. Teta is a micro-firm, with total revenue of about 1 million euro and about four employees.
Background	Teta commercialises and applied synthetic turf for ten years. The firm stems from the ashes of the previous business of the founder. Since the founder's son is a digital marketing and social media expert, they developed a new venture that could benefit from their backgrounds. The firm's strategic approach is to sell these turfs via e-commerce.
BMI and DT Focus	The company developed digital technologies to manage the commercialisation and customer relationship process. The business model changed several times for the influence of the strategic decision of the founder to change customer segment and to change the value proposition. The first regarded shift from private users to business users. The second regarded the shift from different typologies of turf and application services and intermediaries in the distribution and applications. Within these change processes, digital technologies support the firm in deploying a broader marketing strategy.
Background of the key informant	Owner (sales and fitting) and owner's son (digital marketing and social media)
External Actors Involved	Business Consultant, marketing agency.
Digitisation approach	The digitisation approach provided by the owner's son started after the crisis of the building sector in Italy. They reinvent a construction company to a synthetic turf fitter for private houses, businesses and public buildings. They use digital marketing channels to reach customers and sell projects. They also developed software to manage customers opportunities and the status of several works in progress. The business consultants

	supported the firm in developing a business analysis and defining the strategy to expand geographically.
BMI potential effects	The effects of digitisation on the firm's business model were relevant to value capture and value creation. The firm developed new products that are sold only in the firm's e-commerce. Moreover, the firm deployed a network of fitters by using digital marketing channels

TABLE 6 - TETA CASE PROFILE

Integrating justice and collective value creation

Collaborative business model for just protein transition

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Abstract

Just transition is needed to ensure that the transition towards a low-carbon economy happens in a fair way. Collaborative business model through collective value creation can contribute to just transition across the boundaries of private, public and non-profit sectors within and outside the value chain. This paper integrates the concepts of justice and collective value creation with collaborative business model for just transition and presents an illustrative case of just protein transition.

Keywords

Justice, collective value creation, collaborative business model, just transition, food system

Introduction

Transition to low-carbon economy requires changes in business models on what value is created, how, and to whom, as every transition has its winners and its losers, both economically and in terms of social justice (Lennon et al., 2019). It is important to note, that transition is more about multiple social interests than individual (organizational) interests (Jonker et al., 2020). We argue that integrating the concept of justice into collaborative business model (CBM) and collective value creation (CVC) can increase the legitimacy, acceptability and effectiveness of low-carbon transition in the society. There is a gap in business model research addressing the dimensions and principles of justice. However, especially in CBM networks, trusting and reciprocal relationships with stakeholders are crucial. Harrison et al. (2010) argued that stakeholder management based on distributional, procedural and interactional justice can unlock additional potential and conditions for value creation process. Hence, justice and fairness are key considerations for stakeholder management (Bosse et al., 2009) and CBMs.

This short paper fuses justice and business model literature and aims to identify areas where justice perspective can influence value creation practices. An illustrative case, just protein transition in

Finland, is presented to show how the integrated framework of CVC and justice can be applied to food system transition. To the best of the authors' knowledge, this is the first attempt to integrate justice approach and CBM for transition. Its novelty is in proposing a practical way of connecting CBM literature with policy and business relevant justice literature.

Collective value creation for transition

Collective or multiple value creation for low-carbon transition requires extending the traditional business model from organization-centered business model towards value creation through collaborations in hubs, networks and chains. Firm-level construct of the business model and a firm-level unit of analysis are inadequate to respond to the challenges of low-carbon transition (Diener et al., 2021). In contrast, collaborative hub-level, network-level or chain-level construct of the business model is able to engage a wider spectrum of stakeholders and actors for transition. These actors may represent private, public or non-profit sectors and may be located within and outside the conventional value chain. Hence, participating actors can differ in type and in position in the value chain/ network (Jonker et al., 2020). For example, Mihailova et al. (2022) discuss the many roles of energy citizens in CVC for energy transition. In addition, CBMs need supportive regulative, financial and technical environment and governance frameworks (Hiteva and Sovacool, 2017). The blurring of the private-public boundaries and blending of corporate and social missions, however, requires successful collaboration and trust between the parties. Trust, defined as 'the mutual confidence that no party to an exchange will exploit another's vulnerabilities' (Barney and Hansen, 1994: 176), is an essential ingredient in CVC (Harrison et al., 2010).

Compared to conventional business models, CBMs are better suited for justice considerations, as they are inherently open for multiple stakeholders and values, which are necessary for just transition. Literature on integrated value creation highlights that value creation stems from resources exchanged in relationships within the value creation network (Norris et al., 2021). A stakeholder theory perspective on business models is useful in understanding the stakeholder value creation network and mutual stakeholder relationships in which stakeholders are both recipients and co-creators of value in joint value creation processes (Freudenreich et al., 2019). Value creation, defined as collaborative effort in relationships, can benefit the business and all its stakeholders by asking with and for whom value is being created (Freeman, 2010; Freudenreich et al., 2019). CBM actors can contribute to three central elements of CVC: (1) what value is created, (2) how it is created, and (3) how it is distributed. This is in line with the study of Freudenreich et al. (2019), who argue that the concept and analysis of value creation through business models need to consider different types of value created with and for different stakeholders and the resulting value portfolio.

Traditional business models focus on creating financial value for the focal company and its shareholders. CVC, where various actors create more than just financial value by expanding the range of values, emphasizes proactive value creation for society by finding solutions to social and environmental challenges and needs (Hiteva and Sovacool, 2017). It is associated with the creation of shared values (Porter and Kramer, 2011), which simultaneously creates societal value(s) and economic value for the value chain actors. Hence, extending the considered value range can be traced to social and environmental drivers, which can inspire participating organizations in a CBM to take greater responsibility towards society and nature (Foxon et al., 2015; Jonker et al., 2020).

Actors' perceptions on fairness in value creation and distribution depend much on reciprocity, which can be understood as a universally accepted moral norm (Dunfee, 2006; Harrison et al., 2010). For example, a firm with low accounting-based profitability may create a lot of value but allocate most of it to stakeholders, society and the environment (Harrison et al. 2010). In the value creation process it is also important to discuss those who are left behind and the underlying moral and ethical implications of such distribution (Hiteva and Sovacool, 2017). Simultaneously, fair distribution of value across the network can increase trust and reciprocity between participants upon which just transition is built. We argue that the principles of justice can be useful in increasing trust and reciprocity between multiple actors of CVC. Additionally, justice approach helps identify alternative values and actors who are invisible, vulnerable or excluded.

Social justice, just transition and integration to collective value creation

While justice was initially associated only with nation states' activities, recent corporate responsibility literature proposes that organizations' responsibilities for justice go beyond regulatory compliance (and voluntary CSR). For example, corporate responsibilities to protect and even fulfil human rights (instead of merely respecting them) stem from the significant power of corporations (Mills and Karp, 2015). Corporations exercise power in public decision-making (lobbying) and via significant influence on some stakeholders, such as employees and their families, and communities involved in value chain activities. Justice in organizational activities can be urged for both normative reasons, i.e. legitimacy (it is morally unacceptable that corporations act unjustly), and instrumental reasons: distributional justice literature suggests that stakeholders' willingness to fully collaborate is related to their perception of the fair value they receive, relative to the value other stakeholders receive (Harrison et al., 2010).

From the competing notions of justice, we use the well-established idea of relational social justice. Social justice concerns how societies' basic structures impact on the equality of people (relative to given standards). We adopt a theoretical framework of relational social justice that conceptualizes justice comprising of three dimensions (Table 1). *Distributive justice* is about the fair distribution of benefits and burdens; *procedural justice* means equal participatory opportunities in decision-making; and *recognition justice* means institutional patterns that support equal socio-cultural statuses instead of value hierarchies that might marginalize certain groups due to their socio-cultural, ethnic, or other differences (Fraser, 2009; Schlosberg, 2007).[1] The framework is spatially extensive: actions can be just near yet unjust to distant people, like in the case of climate change (Schlosberg, 2007).[2]

[1] Management studies also speak of interactional justice, "fairness in the way that stakeholders are treated in transactions with the firm" (Harrison et al. 2010). Interactional and recognition justice have been used as synonyms referring "to recognizing the needs, values, and preferences of all stakeholders in a safe, fair, and non-discriminatory environment" (Kronenberg et al., 2020).

[2] The relational notion of social justice has also become well-established in the environmental contexts, because for example environmentally locally impactful industrial activities (such as the placement of hazardous waste stream materials or the placement of polluting factories) have often been carried out without the consultation of the local communities.

Dimension of justice	Focus	Examples in CVC
Distributive justice	The proportional distribution of benefits and harms	Fair distribution and value allocation; identification of non-financial values
Procedural justice	Opportunities to participate in decision-making; balanced power relations	Fair and respectful treatment of stakeholders in decision-making processes; less opportunistic use of power; increased trust and reciprocity
Recognition justice	Socio-cultural inclusion and respect in institutionalized practices	Identification of non-evident (non-visible, vulnerable, excluded) actors; respectful treatment of differences; increased trust and reciprocity

Table 1. Dimensions of justice, their focus and examples in CVC.

The three-dimensional framework has become common in just transition studies that concern how the transformation to low-carbon societies could be made as fairly as possible (e.g., Williams & Doyon, 2019; Newell & Mulvaney, 2015; McCauley & Heffron, 2018). Just transition acknowledges that while emission mitigation is crucial for avoiding dangerous climate change, mitigation itself will have transformative economic and socio-cultural impacts on societies that need attention in the course of transition. Just transition has widened from employment focus to involve any injustices that low-carbon transition may bring about (Kaljonen et al., 2021). This is crucial for food systems discussed in the demonstrative case, since required transformations are there significant and food is so culturally/socially embedded that food system transitions invoke difficult tensions and value conflicts (Kaljonen et al., 2021). Just transition is important both for legitimacy and sustainable development.

Because achieving a low-carbon, climate resilient society is a non-economic value and many companies are engaging in climate mitigation, just transition framework offers a good platform for integrating justice considerations and CVC. However, justice requires clarification regarding whom/what should be given consideration (and how) in low-carbon transitions for the sake of justice (Tribaldos & Kortetmäki, 2022). Because promoting justice and low-carbon transition both contribute to the social value creation in CBM activities, integrating these perspectives seems a well-made match. However, just transition also complexifies emission mitigation demands and raises new questions (Kaljonen et al., 2021; Williams & Doyon, 2019). We suggest that the CVC endeavors would benefit from a **just transition tool,** based on the principles for just transition (Tribaldos & Kortetmäki) but adapted fit to the CBM context. The tool would help the network participants discuss and clarify the values and goals of collaboration from the just transition viewpoint and risks that need to be taken into account.

A framework-based just transition tool for CBMs could help:

Foster trustful and reciprocal collaborative relations by suggesting principles for fair collaboration.
Make different actors visible in the CVC network, fostering the recognition of non-paid work and nature's contributions.
Promote more balanced collaboration prospects between network members by helping identify vulnerable groups and power and resource disparities.
Clarify values that are created by the CVC and for whom. The latter question is also important for distributional justice.
Bridge social and environmental responsibilities.

Just protein transition through collective value creation

To illustrate our framework-based tool for transition, we apply it to protein transition in the Finnish food system. Dietary change or transition has been recognized as one of the transition pathways towards low-carbon food system in Finland, in addition to land use change and technological changes, and protein transition as a part of dietary transition constitutes eating considerably less animal-based and more plant-based and alternative sources of protein (Paloviita, 2021). Dietary transition widens the justice considerations in transitions to basic needs, food security and nutrition (Kaljonen et al., 2021). Justice approach can pave the way for just protein transition by helping identify actors of value creation network and multiple values to be created and distributed.

Protein transition requires CVC related to plant-based proteins and less commonly known protein sources, such as microbe-based proteins, fungi-based proteins, underutilized fish species and insects. In Finland, CBM called “protein cluster” was launched in 2020 by Ministry of Agriculture and Forestry, the Finnish Cereal Committee and VTT Technical Research Centre of Finland to promote the functioning of Finnish plant and alternative protein value chains (Lampinen et al., 2021). Collaborative value creation network of the protein cluster includes participants at different levels. The primary level contains the most important actors in the entire value chain from the field to the table, from farmers to consumers. The secondary level has parties supporting or promoting the activities, such as decision-makers, associations and financers. Participants of the tertiary level cross sectoral boundaries and shape the general market, such as investors, authorities, government and health actors. According to the first workshops of the protein cluster, the greatest challenge identified was the lack of trust between actors (Lampinen et al., 2021).

We next provide the preliminary version of the just transition tool for CBMs and discuss, with examples, how it could help promote more trustful and reciprocal relationships in the context of protein transition (Table 2). Due to the very limited space here, our exploration is by no means comprehensive but aims to shed light on how the tool highlights different viewpoints to just transition via CVC in protein transition.

General principle	**Examples of action principles for trustful and just CBMs for low-carbon transition**
Right to vital goods	The possibility of people to achieve food and nutrition security is supported.
Just supply chains and fair livelihoods	Established food chain relations are reciprocally agreeable.
	Collaborative networks are designed so that different sized actors are able to participate in them.
Procedural justice	Collaborative processes are sufficiently transparent, inclusive, and provide a fair opportunity for different voices to be heard.
Respectful pluralism and esteem recognition	Traditional, indigenous, and local knowledge is respected and given a voice.
	Contributions by different professions and by genders are recognised and esteemed.
Non-discrimination	People are not discriminated on ethnic, gender, or age-related grounds.
Global fairness	Activities respect the participatory control over, and access to, productive resources elsewhere in the world.

	Activities for decarbonisation do not undermine fair livelihood opportunities for distant actors.
Ecological integrity	Soil, water, and air health and quality are protected or improved.
	Biodiversity is protected or increased.
Justice to nonhumans	The inherent value of nonhumans is respected, and they are treated respectfully.
Capacities	Developing individuals' skills for transition activities is supported.

Table 2. General principles of justice and examples of action principles for CBMs for low-carbon transition.

Just supply chains and fair livelihoods are central issues in creating new, low-carbon protein value chains. How do new protein value chains impact on farmers? A minimum condition for just transition is that the new value chains do not worsen the profitability of farming that has been identified indecent; oftentimes, improving the status of farmers can be demanded. Improvements can be economic or non-economic, helping farmers build capacities for climate mitigation and adaptation, increase livelihood security, or otherwise support their well-being and the recognition of their work. This could be addressed in a CBM by involving farmers or farmers union as key stakeholders for identifying priorities and values related to livelihoods or power disparities in supply chains.

Procedural justice concerns collaborative relations and ethical stakeholder management. CBMs necessitate transparency and dialogical relations, treating diverse views respectfully and examining dominant value patterns critically. For example, trustful collaboration requires openness to different visions, so that the dominant socio-cultural views do not ignore, disparage, or exclude the visions represented by other parties in the collaborative network. Respectful consideration also calls for rethinking network actors: for example, the protein cluster represents 'the usual suspects' as constituting the protein transition networks, but just transition tool asks whether there are actors who should be made visible, or actors whose contribution to the CVC should be better recognized. This urges openness to the diversity of values and goods that can be created by protein transition activities. Alongside economic goods and emission mitigation, created values may concern health benefits, biodiversity protection, food culture renewal, capacity building for actors, accessible innovations, and increased inclusiveness – just to name few. This could be addressed in a CBM by involving public health organizations and nutrition experts as key stakeholders for identifying values related to health and wellbeing of diverse populations.

Capacity building is integral to CBM: collaboration itself is purported to yield something greater than its parts alone. In Finland, obstacles to protein transition include the lack of processing facilities, socio-cultural factors, misconceptions downplaying the benefits of novel products, and insufficient research and innovation. In the traditional business models enterprises have focused solely on fostering their own capacities to increase competitive advantage; CBM changes this perspective. One key for mutually beneficial capacity building in protein transition is more open knowledge exchange between different types of actors. Collaboration between companies and research groups exemplifies such collaboration, and research groups are often also skilled in promoting a more inclusive participation in the CBMs. This could be addressed in a CBM by involving

a broad set of civic organizations and community groups as key stakeholders for identifying concerns related to socio-cultural values.

Discussion and conclusion

This article contributes to new business model research by applying a theory of social justice to CVC in a business model. This study revealed the potential of integrating the principles of social justice into CVC for low-carbon transition. Addressing different dimensions of social justice in CVC can ultimately increase trust and reciprocity between participating actors. Including distributional justice in CBM promotes fair distribution and allocation of value across the value network. As genuinely fair distribution of tangible and intangible value among stakeholders is difficult, procedural justice can compensate the potential unfairness of value distribution by emphasizing the fair decision-making process and respectful treatment of stakeholders. Recognitive justice, in turn, helps identify excluded, vulnerable and non-visible actors, who are affected by the low-carbon transition but are not initially included in the value network construct. Social justice perspective combined with a stakeholder theory perspective on business models emphasizes business models as devices that organize and facilitate trustful and reciprocal stakeholder relationships and fair value exchanges.

Strengthening the link between justice and CBM can accelerate transition to low-carbon economy by increasing acceptability and legitimacy of radical change among stakeholders of business model transformation. Successful involvement of key stakeholders, development of a collective vision and creation of a joint transition agenda for CBM depend much on perceptions of fairness among CBM actors. Hence, the participatory design of CBM can be strengthened by justice considerations. Development of support among stakeholders for transition can benefit from a just transition tool presented in this paper. Our illustrative case of protein transition highlights the importance of the principles of justice in dietary transition towards plant-based and alternative protein sources. We hope that the insights in this paper will contribute to more ethical value creation in CBMs, which highlight the active contributions from and engagement of stakeholders to transition through fair CVC processes.

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Green Collaborative Business Model Innovation in Symbiosis Business Value Networks

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Extended abstract

Abstract

Symbiosis Business Value Networks (SBVN) is one archetype out of many Collaborative Business Model (CBM) constellations where different businesses collaborate with their Business Model (BM) in Value Networks (VN). SBVNs are potentially one of the most promising CBMs in relation to green transformation and Green Business Model Innovation (GBMI). In this transition of the economy, society and network to be greener and circular, businesses are confronting challenges regarding how to construct VN with new types of operation, effectiveness, and openness practice that value all business network partners. The research is based on a combination of a literature study and a case study conducted within two different existing SBVNs. The paper contributes to the literature on CBM in the context of SBVN, with the following research questions:

How have and can SBVN be defined?
Within which parameters is it more/less successful than other CBMs?
When are the results better of a SBVN than other archetypes of CBMs?

Introduction

Businesses are heavily investing these days in new ways to become greener, more sustainable and to meet the increasing request and goals for circular economy and GBM´s – green transition. Businesses - in this context - define and operate their GBM and GBMI in many ways (Lindgren 2021). Considering the role of businesses in the transition is to explore the potential for BMs and VNs to act as an enabler of or an obstacle to change. It is shown that this individual “single-business ” or “stand-alone” approach leads to green and circular improvements but tends to result in measures that are optimized in the best interests of the single individual business (Håkonson 1989), and do not consistently capture the potential of the VN at system level. Hereby enormous GBMI potentials are lost both in the BM network and to the society. Therefore, more and more focus to GBM and

GBMI are changed from single business activities to VNs at open system level. Here, BMs as complex systems interdependent with other businesses, BMs and stakeholders, interrelated with socio-technical transitions (Aargaard 2021), and GBMI can serve to yield sustainable impacts and transform practices without significant technological innovation (Sarasini and Linder 2018).

A prerequisite for realizing holistic solutions is to achieve synergies in symbiotic CBMs, a strategy where different actors and businesses collaborate to gain competitive advantages for all parts being involved in the network (Chertow 2000), boost GBMI and increase business' resource efficiencies and competences (Ghali et al. 2017; Afshari et al. 2018; Wolf and Petersson 2007; Sun et al. 2017). Moreover, collaborative 'VN´ refers to a group of three or more businesses, connected in ways that facilitate the achievement of a common goal (Provan and Kenis 2007). SBVN are thus based on CBM to support ecosystems for sustainability. The effects and value related impacts of applying SBVN´s seems to be higher than classical green, sustainable, and circular BMs in stand-alone (Camarinha-Matos and Afsarmanes 2004; de Man and Luvison 2019).

Nevertheless, BMI has been acknowledged to be an important enabler of the transition to a circular economy (Linder & Williander, 2015), and it seems as SBVNs could attain even higher results of green and circular transformation as they still have some challenges to measure, calculate and monitor the GBM and GBMI in the terms of monetary and nonmonetary values. It seems like SBVNs could gain more advanced GBMI based on more advanced secure technology. This is highly needed in a future more digitalized and virtual world (Lindgren 2017). Fundamentally strong, new and open VN constructions are needed, and trust and openness seem core to make these SBVN grow (Ristola and Mirata 2007).

This work is necessary to create clearness and reduce investment risks and transformational mistakes in collaborative SBVN. The research partly compiles issues that have emerged along the way by transition projects of creation of CBM. Meanwhile, the technology and digital transition are pushing the society and businesses into a transition itself, and can aside from activities to strengthen the social dimension including e.g. collaboration, relationships, openness, culture and trust, which have shown to be certain challenges (e.g. Boons et al. 2011; Lombardi and Laybourn 2012; Mirata and Emtairah 2005), contribute in the transition where businesses operate. This paper introduces and link the possibilities and previous research to on-going transition activities for SBVN. This, to strength the CBMs and increase values of the transition of the society and economy. So far, research shows great potentials for SBVN, but the question remains how the research can support CBM further and GBMI in symbiosis value networks.

The overall contribution of this paper is to strengthen the literature on CBM in the context of the strategy industrial symbiosis and SBVN. The findings show further how SBVN operates technically and BM wise and how SBVNs can improve GBMI – taking GBMI to the next level. Also, how businesses and societies can achieve improved green and sustainable transition related to the requests set by society, businesses, and other stakeholders.

Methodology

A literature study was conducted on SBVN to define the strategy in the concept of CBM.

Two SBVN cases was studied in the first stage, i) Sotenäs Symbiosis in Sweden ii) Greenlab Skive Symbiosis Network in Denmark. The research of the cases will contribute with a business

perspective on which parameters is it more and less successful to be a part of a SBVN than other CBM archetypes and “stand alone”. This for enable sustainable, circular, and green transition - based on an open system perspective. The case study illustrates benefits, values, challenges, necessary inputs and outputs that emerge by transition and creation of SBVNs.

Symbiosis Business Value Networks

The following cases were elected as examples of on-going transition projects of SBVN and stand-alone GBM developers, related to CBM, further which challenges will be compared with the opportunities and possibilities of future wireless technologies. The names of the businesses are kept anonymous due to confidentially issues.

A. Sotenäs Symbiosis Network

Sotenäs Symbiosis Network (SSN) (Sotenäs Symbioscentrum, 2021) is a SBVN in Sotenäs municipality in Sweden, figure 1. SSN involves exchange of materials, energy, and knowledge among diverse actors to create a Symbiosis Ecosystem Network.

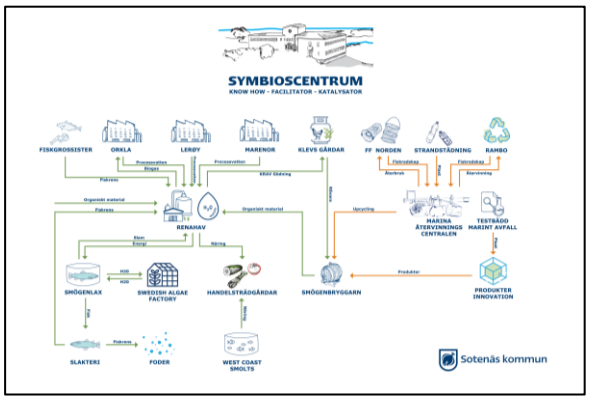

Fig. 1. Sotenäs Symbiosis Network

B. Greenlab Skive

Greenlab Skive (GS) Symbiosis Network, in Skive Denmark (Greenlab Skive, 2022) is one of the world's first truly green industrial symbiotic business park, figure 2. GS generate renewable energy, supply it to the businesses located in the nearby area, and store energy in different forms to match the market demand.

Fig. 2. Greenlab Skive

Preliminary results

The case study of the two SBVNs shows how different actors can interact and collaborate to gain competitive advantage, improve innovation, and develop GBMI in the aim of increasing the businesses productivity and efficiency. The on-going GBM transition studies both show successful results, but that could also be strengthen and further developed.

Conclusion

The literature review indicates that there are different ways of defining SBVN and that included dimensions in the definition have changed over time. However, there is a lack of contributions of analysing the approach in the context of GBMI, in relation to on-going activities.

The case study illustrates benefits, values, challenges, necessary inputs, and outputs of business that emerge by developing SBVNs.

Keywords

Symbiosis Business Value Networks, Green Business Model Innovation, Collaborative Business Model, Value Networks, Industrial Symbiosis

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Future-oriented collaborative business models to support the sustainability transition

Actor relations as a starting point for the creation of a transition framework

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Extended abstract

1 Introduction

1.1 Collaborative business models and foresight as enablers of sustainable transition

In the sustainability transition, firms and their business models have an essential role (Loorbach and Wijsman, 2013; Schaltegger et al., 2016; Baumgartner and Rauter, 2017; Bidmon and Knab, 2018). However, the current sustainability challenges in society cannot be met with the prevailing organization-centric business models which focus on economic value creation for firms (Jonker and Faber, 2019). Instead, new, collaborative business models should be based on the shared values of different actors, such as companies and citizens. They enable value creation between and for involved stakeholders, bringing also social and environmental benefits along with economic value. Yet no concrete approaches exist for developing collaborative business models for transition, nor has the issue received sufficient attention in the current research (Jonker et al., 2020).

The sustainability transition requires the exploration of alternative futures. The aim of foresight studies is to create an increased understanding about various future opportunities, enabling preparing for the future (Bell, 1997). The creation of firm business strategies and models are connected with strategic foresight because the strategies are formulated based on the analysis of change drivers (Vecchiato and Roveda, 2010). Yet the relationship between sustainable development and foresight is often given little attention (Destatette, 2010), as are the foresight approaches in company management. Like collaborative business models, participative foresight models with stakeholder involvement can also facilitate mutual understanding and shared value creation between different actors (Robinson et al., 2011; Näyhä, 2021).

Overall, the sustainability transition cannot happen without different societal actors and levels of society working in alignment. The multi-level perspective (MLP) is a framework for analyzing transitions within and between different levels of society: niches (protected spaces for innovations), socio-technical regimes (dominating, stable structures in societal systems) and socio-technical landscapes (wide-scale, exogenous environment). Transitions call for emerging niche-level innovations, landscape-level changes which create pressure on the regime, and the unsteadiness of regimes. This in turn create opportunities to niche innovations (Geels and Schot, 2007; Köhler et al., 2019). From the perspective of societal transition, individual firms –as niche actors – have challenges in advancing changes in the business environment. Firms' collaborative business models and stakeholder dialogue could facilitate change by helping new ideas to penetrate through different societal levels. In other words, collaborative value creation is an important driver for societal transition (see also Jonker et al., 2020).

1.2 The project and its starting point for developing a transition framework

This study is part of a research project funded the Academy of Finland: "Future-oriented collaborative business models as a remedy for the sustainability transition: Finnish forest-based sector as an empirical arena for the creation of a transition framework". The project's main goal is to develop a transition framework based on future-oriented collaborative business models, which can be utilized by firms in their strategic management and in the stakeholder dialogue but also by a variety of other actors. As a whole, the project builds on three theoretical premises – business, foresight and transition – and applies them to the Finnish forest-based sector (FBS) and its stakeholders as an experimental arena. The project explores elements of collaborative business models and participatory foresight, and their joint contribution to macro-level societal transition. The chosen sector was seen as ideal for this study for several reasons. The current sustainability challenges have not only created strong demands to renew their traditional business models in the FBS, which are based on the intensive use of wood, but also opened up space for new businesses (Näyhä 2019; 2020, 2021; Kunttu et al., 2020). Along with the call for more efficient environmental management, requirements for more transparent dialogue on these issues with stakeholders have also increased. From the stakeholders' perspective, getting comparable information and understanding the ongoing transition is often challenging. This has led to polarization within the societal discourse about forests, and commonly accepted future goals for the utilization of forests cannot often be found (Mustalahti, 2018; Näyhä, 2019, 2020).

In addition to revealing key conceptual and theoretical approaches for an overarching view of the project elements, this proposed paper for NBM 2022 aims at presenting the outcomes of the first phase of the project. This first phase explores the key actors in Finnish society and the societal discussion on forests and their sustainable utilization, forest-based businesses and related future views. More specifically, it aims to clarify the actors' discourses, relations, positions and power dynamics.

2 Data and methods

Societal actors and their connections are identified through the textual analysis of policy documents (Halonen et al. 2022), media sources and grey literature. By including diverse sources in the analysis, a thorough understanding on the views of the actors can be perceived. The core of the data is

formed by newspaper articles collected from the Finnish newspapers *Helsingin Sanomat* and *Maaseudun Tulevaisuus*, both of which have nationwide distribution, for a total of around 300 items. The search terms were “wood” and “forest” and their additions. The studied period is from 2019 to 2021. ATLAS.ti used to examine the data.

The analysis leans on the principle of critically viewing organic processes and discussions of the different actors in society, while aiming to reflect on the phenomena observed in the certain frames, thus its basis is in critical discourse analysis (Fairglough, 2001) and frame analysis (Goffman, 1974). The analysis framework created for this study combines elements from multi-actor perspective (Avelino and Wittmayer, 2016), social network analysis (Scott, 2000) and strategic action fields (Fligstein and Adam, 2011). Power is one of the common nominators in these applied analytical frameworks. Therefore, power and its manifestations in actors’ statements and relations was a central part of the analysis. At the end, the outcomes will be structured and the recognized actors will be positioned in the different societal levels by means of the MLP.

The analysis is currently ongoing. The key outcomes of the analysis will give an overarching understanding of the organizing societal system in which FBS actors and their stakeholders are embedded. Without understanding actors and their connections, research on more elaborate elements for the transition framework is not possible. In other words, collaborative business models cannot be explored and developed in the next phase of the study without identifying the key actors and understanding their relations and power dynamics.

3 Upcoming results and discussion

As stated, the media analysis is currently ongoing. Therefore, the findings of the media analysis revealing the key actors and their relations and power dynamics will be presented at the conference. In addition to these outcomes from the first phase of the project, I will shed light on the approach and its theoretical premises to build a transition framework in its entirety during the project. Overall, the scarcity of studies from a combined perspective on collaborative business models, corporate foresight and the transition enables a framework that can benefit academia, practitioners and a range of stakeholders.

In terms of the NBM conference, this study contributes to all the conference themes since as a whole it explores different societal levels and actors, collaborative business models and their role in the sustainability transition (track 1.1.) while integrating different conceptual and theoretical approaches (track 3.1). The author wishes to have a presentation in track 1.1 because the track is centered around collaborative business models

Keywords

collaborative business models, foresight, forest-based sector, transition framework, actor dynamics

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The effect of decision support tools on Collaborative Business Models to enable sustainability transitions

The case of Rotterdam Port

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Extended abstract

Introduction

Policymakers, businesses, and scholars widely agree that the circular economy is a promising sustainable alternative to the current linear economy (Geissdoerfer et al., 2018). After conducting extensive case studies, Pessot et al. (2019) find that one of the most important business models in creating a collaborative network is the recycling, re-use, and sustainability (RR&S) model. RR&S is defined as a system where "resource input and waste, emission, and energy leakage are reduced by slowing, closing, and narrowing material and energy loops" (Pessot et al., p. 333).

A prominent location in the Netherlands where this new business model could occur is in the petrochemical cluster in the Port of Rotterdam. The Dutch Government and the European Green Deal set policy targets for a CO_2-neutral future world. The Dutch petrochemical industry is currently responsible for 20-30% of all CO_2 emissions in the Netherlands, and a large part of this industry is in the Port of Rotterdam. Therefore, these policy targets put a lot of pressure on this industrial sector to transition towards a more sustainable future. Core to this transition is the investment decisions these companies need to make and the potential change in the business model these investment decisions cause.

Making these investment decisions is difficult for these industrial players for two reasons. The first is the changing relationship between petrochemical players. Most industrial clusters consist of "a geographically proximate group of interconnected companies […] in a particular field, linked by externalities of various types" (Porter, 2010). This structure means that these actors are usually physically interdependent to run their business. With this physical interconnectedness, we mean that the input that goes into company B is often created by company A linked to this company through infrastructure. Both companies accept this dependence because the cost of moving the products from neighboring companies is far cheaper than importing them externally. Even though this is the case, most business models are organization-centric, focused on being a single

organization that creates its financial value (Jonker et al., 2020). However, the energy transition puts pressure on these companies to reduce their CO_2 emissions. In practice, this means exchanging waste in the form of circularity or making decarbonization choices of the same category so the infrastructure can be prepared accordingly. Thus, the transition often requires collaboration with other companies in a cluster setting to become circular. These companies need to transition from an organization-centric business model to a collaborative business model. These companies must collaborate within their value chain to create from a collective perspective and allocate the necessary resources (Kais and Islam, 2016). However, transitioning to this new business model is challenging as these business models require a significant build of trust and collaboration among multiple stakeholders (Pessot et al., 2019). Moreover, it often requires a rethinking of the whole business logic of industrial stakeholders (Bocken, Rana and Short, 2015).

The second reason that making investment decisions is challenging is that the investment risk of these companies is very high. This risk is attributed to the fact that these new assets have very high investment costs, calling for technically specialized processes in place and being characterized by long lead times before projects are realized (de Vries, 2007). Moreover, the degree of uncertainty in these clusters is very high (Cuppen et al., 2021). This deep uncertainty is caused by future prices, (international) competition, security of supply of energy, availability of infrastructure, and policy intervention.

Purpose of this research

Policy targets and the energy transition put a lot of pressure on industrial companies to transition from their current business model to a new/collaborative business model. However, in practice, transitioning to these new collaborative business models is difficult due to the changing relationship between petrochemical players and the high investment risk in this industry. Decision-support tools in the form of simulation models are a way for scholars to assist stakeholders in developing a new business model. This model helps them gain knowledge of the system they are operating in (Bas, 2017; Cuppen et al. 2021). Moreover, testing new business models with stakeholders is essential for determining the viability of these novel structures (Bocken and Antikainen, 2018; Bocken, Boons and Baldassarrre, 2019; Weissbrod and Bocken; 2017). After conducting a literature review on agent-based models, Lange et al. 2017 concluded that no agent-based model had been utilized to test business model viability from the CBM perspective. After showcasing their model, they conclude that their method can be applied to all types of CBM in multiple industries. Moreover, they urge researchers to apply other/similar models in real-life systems. To this extent, we ask ourselves the following research question: *How can implementing a state-of-the-art decision support tool influence the implementation of circular collaborative business models?*

To answer this research question, we develop a model that can provide transition pathways for the energy transition between now and 2050. In a later chapter, we compare our model to the existing models in this field. Also, we show why/how our model differs. We develop our model by applying a participatory modeling approach to a specific case study: the Chlorine Cluster in the Port of Rotterdam. One chlorine supplier company (Nobian) and three chlorine users (Westlake, Huntsman and Shin-Etsu) are within this case study. In a recently completed EU-funded project called ZERO BRINE (https://zerobrine.eu) this cluster was investigated (Xevgenos et al, 2019), while in a follow-up project called WATER-MINING (Petrik et al, 2022) that was funded recently, Nobian and Westlake are collaborating to close the loop of the brine effluent (chlorine used stream) generated by Westlake epoxy plant in Pernis site, in Rotterdam Port (see also Figure 1, brine recycling stream illustrated with light blue). So currently, the brine is treated as waste, and after Westlake generates it, it is processed as such. However, by creating the blue link between Westlake and Nobian the brine is used as input again by Nobian. Instead of Nobian having to produce this brine at the plant site in Delfzijl. According to Xevgenos (2022), this will reduce water consumption by one-third and save 25 MWh of thermal energy and six kilotons of CO2 for full-scale implementation.

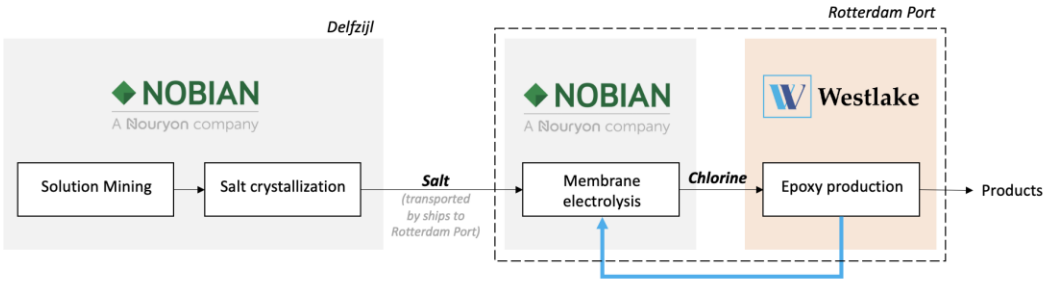

Figure 1: Circularity within the chlorine cluster, Rotterdam Port

Methodology

Within our research, we use a design science approach as shown by (Hevner, 2004). Within design science, two core elements influence each other: the context and the artifact. Artifacts are broadly defined as constructs, models, or methods. A context is often the object of study (Hevner, 2004). Figure 2 shows how our framework for the design science approach looks. We base our approach on the work of Wieringa (2014) and Xevgenos (2021).

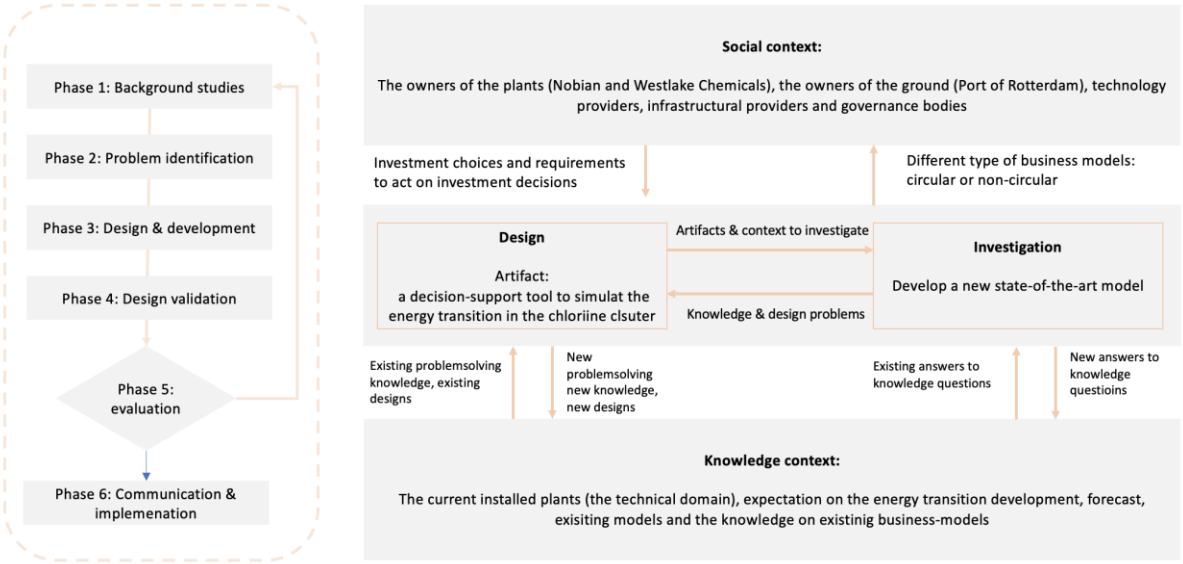

Figure 2: Overview of the design science approach in our research

Preliminary results and discussions

Our first results are derived from the background study (phase 1) we conducted on the existing tools available for the actors in the chlorine cluster to assist them in making investment decisions. We see that these tools are lacking in three key areas. First, most models utilized by businesses themselves (outside of the scientific realm) that are utilized to simulate investment decisions are based on cash flow and thus ignore the physical flow of molecules, which is key to getting fundamental insights into how the system operates. On the other side, inhouse models that include physical flows are highly detailed and thus do not provide insights into the cash flow or are computationally feasible. A prominent methodology utilized in these models is based on Aspen (Haydary, 2019). Second, in most models, investment decisions are exogenous decisions that arise

from the cash-flow analysis; this methodology asks for time series as input for possible investment decisions to be made in the future, as shown in (Cuppen et al., 2021). Third, in industrial clusters, there are models that also endogenously model investment decisions; however, these models optimize these investment decisions (Boix et al., 2015). They do not account for myopic investors that base their investment decisions on limited information. Moreover, these optimization models are not suited to explore the impact of different business models. These models exist outside the industrial sector, mainly in energy, incorporating these elements, thus providing fruitful cross-modeling avenues (Chappin et al., 2017). Lastly, most models are made to look at only a few scenarios or use historical trends. As the energy transition is going to change the system, historical data is not reliable; moreover, only looking at a few scenarios does not significantly increase the confidence in actors. Based on this we conclude that there is a gap in the current existing models utilized in this field (the knowledge context). Due to this reason, there is no decision-support tool (artefact) that is able to produce 'realistic' transition pathways. This in turn leads to a situation where the decision-support tool is not seen as reliable/valuable enough by stakeholders, to influence the implementation of circular business models.

After this, we have identified, co-designed, and validated (phase 2,3,4) the artifact. We started this phase by interviewing over 15 stakeholders, where we focused on understanding their problems in the energy transition and presented our found dilemma regarding the decision support tool. Based on the interviews and our previous literature review, we saw that there was a need for a tool that could consider the following three elements: 1) model that can account for the physical flow in the chlorine cluster, 2) modeling the investment decisions made in the industrial cluster based on imperfect information and different business models and 3) simulate the model under deep uncertainty, account for thousands of equally likely futures (Bankes, Walker & Kwakkel, 2013). This will enable the realistic simulation of transition pathways for the energy transition in the chlorine cluster from the current year till 2050. Figure 3 shows a conceptual flow-chart on realizing this, and how this generates many transition pathways. It shows the logic of the investment choices where a specific investor calculates the profitability of all his investment options based on the configuration of a particular business model and uncertain external factors such as demand, price, policies, or previous investment choices of competitors. This is done for all actors until no more choices are left, and then a new year starts. Figure 3 shows how this generates pathways between 2020 and 2050, where every node in the graph is an investment choice made. Our final goal is to communicate how a certain business model works in all the grey futures and in all the orange futures not. This overview will lead to a generic and systemic level of insight for the relevant stakeholders, through which we hope that actual change is realized.

We are currently deep in phase 3 of figure 2 and are almost finished with the first version of our model and hope to display demos to the previously interviewed stakeholders soon after. Then, based on the stakeholders' feedback, we will develop a second, more defined version. Consequently, we will walk through phases 4, 5 and 6, which will enable us to answer our main research question.

We hope that this decision support tool can showcase how, by elevating the main pain points in the field of modeling industrial clusters, one of the main problems for investments can be removed. This could lead to accelerating the energy transitions in industrial clusters. Moreover, it could showcase for other industries how quantitative studies can contribute to developing new business models if this is explicitly recognized in the quantitative models.

Keywords

Collaborative Business Models, Industrial Cluster Transition, Quantitative Simulation, Myopic Investment and Deep Uncertainty

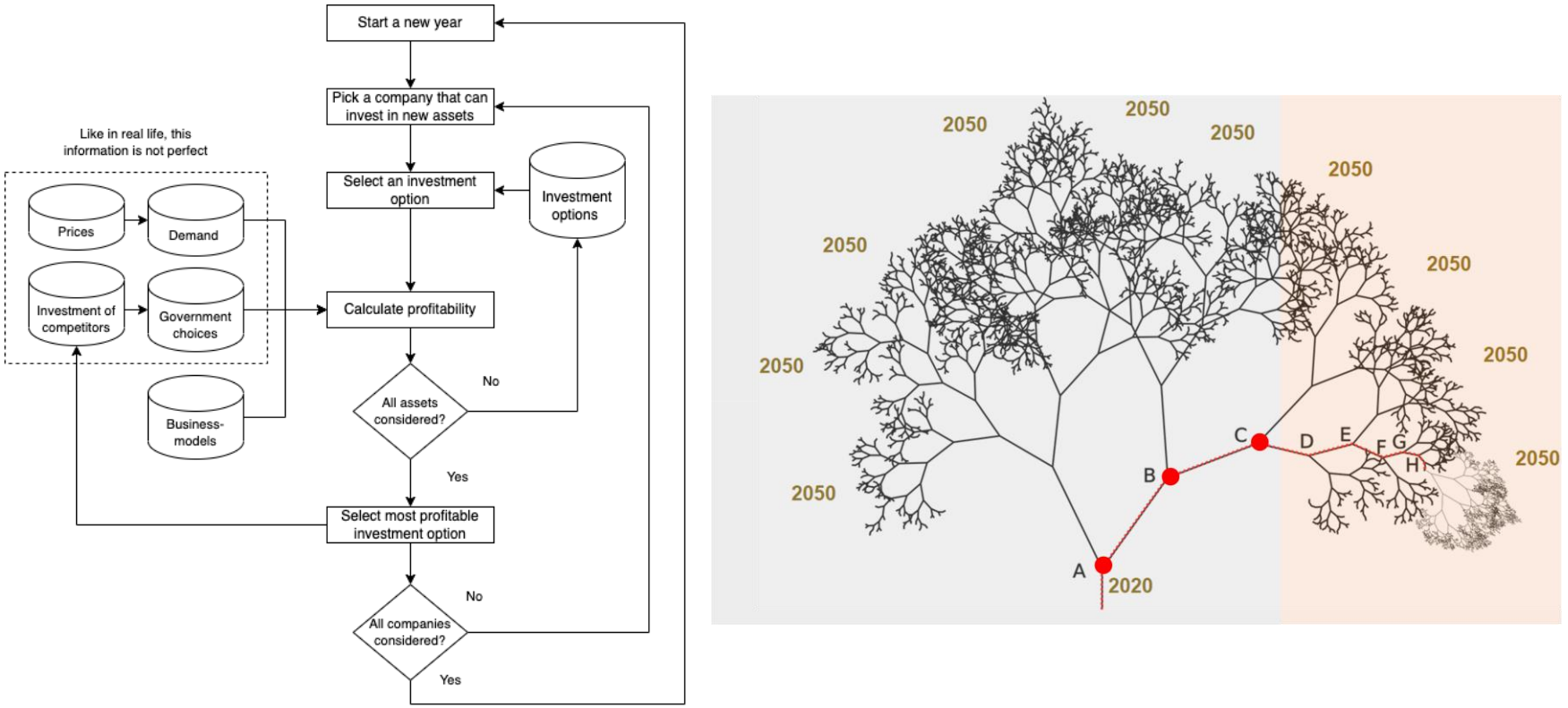

Figure 2: CONCEPTUAL FLOW-CHART (left) and TRANSITION PATHWAYS ON THE RIGHT (ADJUSTED FROM (CUPPEN ET AL., 2021))

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Towards a sustainable energy transition: Exploring collaborative business models in the wind industry

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Abstract

The world is facing an energy transition to keep global temperature increase below to 1.5°C by 2050, where renewable energy technologies will play a key role. However, the deployment of renewable energy technologies through circular and sustainable business models is imperative to minimise resource consumption and negative impacts. The digital transformation, the increasing affordability of energy technologies, and the growing autonomy of energy consumers have led to the emergence of new collaborative business models (COBMs). COBMs can drive the decentralisation, democratisation and decarbonisation of the energy sector. However, research to date has been more focused on exploring COBMs for solar energy, with little attention on the role they can play to support sustainable wind electricity generation. Based on Mendoza et al. (2022), this short paper characterizes two COBMs (community-owned wind parks and aggregation platforms) with application to the wind industry. Mendoza et al. (2022), developed these COBMs based on a systematic literature review of 125 journal papers, business cases and industrial reports, by relying on business model categorization and characterisation approaches. The results show how COBMs can contribute to the sustainable transformation of the energy sector from an environmental (increased efficiency of wind farms), social (community engagement and transparency in decision-making) and economic (new employment and business opportunities) perspective.

Track 1.2 - Ecosystems in Support of Sustainability

Track chairs: *Nikolay Dentchev and Abel Diaz Gonzalez (Vrije University of Brussels, VUB)*

Ecosystem thinking provides insights on how different stakeholders can be aligned, interact and collaborate to gain competitive advantage, boost innovation and increase business productivity. This session focuses the discussion on how to build supportive ecosystems for the new business models, including their new challenges in light of the pandemic.

Papers from the different methodological background are welcome, including literature reviews, theoretical-, conceptual- and empirical papers.

Open Innovation as a Solution to Grand Challenges: The Case of the Open Insulin Project

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Abstract

We present a novel business model applying the concept of open innovation to the production of open source insulin. The motivations for Open Insulin Foundation are the economic complexities surrounding insulin pricing, which renders it inaccessible to many of the neediest patients. Specifically, we are motivated by two issues: 1) insulin prices are higher than can be justified by the logic of necessity related to temporary monopolies, 2) industrial organization in the pharmaceutical industry is such that large players can drive up prices without corresponding welfare gains. Applying Chesbrough and Christensen's seminal work, we propose an innovation, not to the production of insulin, but to the business model by which it generates value for both consumers and shareholders. Our business model is underpinned by the logic of stakeholder reductionism or the elimination of unnecessary intermediaries in the value-generation process. We believe that our organization - and a move to this model more generally - stands to rectify sub-Paretian equilibria resulting from the industrial organization of the pharmaceutical industry, thereby redistributing value from firms to consumers.

Keywords

Open Innovation, Business Model Innovation, Social Entrepreneurship, Ecosystem Emergence, Grand Challenges

Introduction

A particularly pressing grand challenge of today is the adequate distribution of healthcare solutions, especially for the chronically ill (Couture et al., 2021; Jarzabkowski, 2019). These challenges have

caused policymakers, managers, researchers, and theorists to derive new lenses through which to conceive of organizations (Jarzabkowksi, 2019). One particular way to address some of these needs is to import business models from one sector to another (Christensen, 2016). For instance, subscription-based businesses have often supplanted low-level attorneys, accountants, and economists in ways that render their services more accessible (Acemoglu & Autour, 2011; Autor et al., 2003; Christensen, 2009). Similarly, the introduction to the global communities of "platform" businesses allowed new stakeholders to enter businesses as diverse as movie production, in the case of Netflix, and hospitality, by way of AirBnb (Jacobides et al., 2018; Orlikowski & Scott, 2002; Wareham et al., 2014).

In each of these aforementioned cases, industries were restructured with the goal of expanding the ability of consumers to access their products. Moreover, each of these shifts in business models involved importing a business model from the digital world to the material world (Orlikowski, 2000): platforms were initially popularized in multi-sided digital markets and brought to bear on real-estate by way of AirBnb, for instance (Orlikowski & Scott, 2002). A similar shift has occurred regarding open innovation (Chesbrough, 2000; Chesbrough & Rosenbloom, 2002): businesses that specialize in the production of material goods are beginning to allow for distributed ownership in the production and dissemination of their products throughout the value chain. Though the dynamics of this "translation" of open innovation to brick-and-mortar businesses is still being examined (e.g. Mason et al., 2019; Mollick, 2016; Assenova et al., 2016; Sorenson & Assenova, 2016), we believe that this process is a powerful lens through which the observe the process by which organizations re-create themselves to address grand challenges (Davis & Marquis, 2005; Scott & Davis, 2015).

In this paper, we present an initial theoretical model of the process by which this translation takes place. Therefore, the paper is structured as follows: as a first step, we review the literature on complementary dynamics and business ecosystems (e.g., Adner, 2017; Jacobides et al., 2018) as well as open innovation (e.g., Chesbrough, 2003; Chesbrough & Brogers, 2014; Chesbrough et al., 2006) (Section 2). Then, for collecting empirical data, we report on a single case study (Eisenhardt, 1989; Yin, 2015) of a small nonprofit organization that is attempting to disrupt the insulin industry through open source business models. We decided to rely on qualitative data from a case study as this allows us to get first-hand insights from a naturalistic environment in which a company actually strives for open source options in the insulin domain. This case study is relevant to the theoretical challenges of organizations developing new business models in the face of grand challenges because the issue of insulin distribution is non-trivial: more than 50% of those who require insulin cannot access it for various reasons (Cefalu et al, 2018). Thus, this is a societal problem that hitherto lacked an organizational solution but is presently being addressed through open innovation. Following the case study methodology, we then present a process model from observations of a young organization in the insulin industry. Thereby, we shed light on the organization's ecosystem and stakeholders, business model, and expected advantages (Section 3). Afterward, we provide some reflections on the benefits and shortcomings that need to be taken into account when it comes down to open source business models for insulin and also the broader landscape of pharmacy (Section 4). Finally, we conclude with the study by discussing implications and future avenues (Section 5). Ultimately, from a domain viewpoint, we aim to respond to challenges in terms of access and availability of insulin. From a business perceptive, we aim to help inventors and entrepreneurs in their endeavors of following a social mission and contributing to sustainability goals (Lüdeke-Freund et al., 2018; Schoormann et al., 2021), which is important as particularly

health businesses tend to fail due to missing and clear value propositions and strategies for making a sustainable profit (Mettler and Eurich, 2012).

Literature Review

Complementary Dynamics in Business Ecosystems

Business ecosystems are often defined as "the alignment structure of the multilateral set of partners that need to interact in order for a focal value proposition to materialize" (Adner, 2017: p. 40; Jacobides et al., 2018). In particular, this literature emphasizes the importance of complementary products and services. In this context, "complementary" is the economic quality such that, when we have products A and B, greater availability of product B raises the value of product A, and vice versa (Milgrom & Roberts, 1995). A common example of these dynamics comes from the canonical battle between Sony and Betamax (Anthony, 2008). In this case, the DVD was able to become the predominant mode of film recording and distribution because the installed base of DVD players was much higher than that of Betamax players at the time; thus, due to the greater complementarities afforded by another product (DVD players), DVDs were able to provide much greater value than was their rival, Betamax.

This emphasis on complementary dynamics has led management scholars to study the impact of ecosystem dynamics on firms' propensities for innovation (Kapoor & Lee, 2013) and survival (Adner & Kapoor, 2016). Of particular interest in this literature has been an understanding of the complementary products that are required for a firm to be successful, and how a focal firm may marshal their support for their products and services. For instance, Hannah & Eisenhardt (2020) study an emerging solar panel ecosystem in California. They find that a startup's likelihood of success was a direct function not only of their ability to marshal the support of necessary complementors, but also of their ability to marshal the right support at the right time; this latter qualifier is particularly important, given that ecosystems are not static - the value they provide evolves over time, thereby necessitating shifts in the arrangements of firms and complementors.

Though this literature has shed ample light on the myriad ways in which firms interact with their complementors to remain relevant in evolving ecosystems, it has tended to take a narrow view of what constitutes a complementor. In particular, the literature has tended only to look at complementarities in the production process (Adner, 2017; Iansiti & Levien, 2004; Jacobides et al., 2018; McIntyre & Srinivasan, 2017). As an illustration, Adner (2017) studies the challenges faced by Michelin tires as the firm sought to release a new brand of tire that could be driven on while flat. A key challenge they faced was that of independent auto mechanics - a key complementor: none of them wanted to invest in the capabilities necessary to service this product, which created an ecosystem challenge for Michelin. Importantly, these mechanics were essentially co-producers of the tire's value proposition: Michelin manufactured and distributed it, and the mechanics provided after-sales service. Similar instances have been explored in the case of solar panels (Hannah & Eisenhardt, 2020), software platforms (McIntyre & Srinivasan, 2017), and hardware tools (Mitchell & Singh, 1996).

In this paper, however, we will argue that this narrow definition of what constitutes a complementor has led to an incomplete view of ecosystem dynamics, especially as they relate to grand challenges, such as healthcare (Couture et al., 2021; Jarzabkowski et al., 2019). In particular,

we suggest that important ecosystem dynamics are present not just on the production side of products and services, but also on the consumption side. In many industries, the consumer and payer of a product are often different individuals, but the propensity of either to purchase a product will depend on that of the other. Hence, we argue that, in such cases, we will observe complementarities among these parties: more of consumption by one of the two parties (e.g. the payer) will result in more consumption by the other (the consumer), and visa versa (Milgrom & Roberts, 1995). We will outline the dynamics of this process in the context of the insulin industry. In this industry, however, there are at least five key stakeholders - each with complementary consumption habits – that must be satisfied before any of the others will consume. We will also argue that the Edgeworth complementarities previously outlined are operative here. Importantly, we will develop a theoretical framework that highlights how firms may engage in business model innovation (Christensen, 2009; Christensen et al., 2016) in the context of such strict ecosystem dynamics. We begin our exposition of this argument by discussing a trend toward open business models.

Open Source Business Models and Grand Challenges

Open source business models are those in which loosely coordinated individuals realize that they may draw on each other's resources, capabilities, or other services to enhance the value propositions they offer (Chesbrough, 2003; Leone, Faraj, Mantere, 2021; Sandberg & Alvesson, 2021). Such arrangements have allowed for the creation of products and services also product-service systems that provide economic value for consumers at a greatly reduced cost, thereby increasing the ability of consumers to access them (Chesbrough, 2003; Chesbrough & Bogers, 2014). Perhaps even more importantly, however, open-source business models democratize the production process, inviting individuals to derive value from it who ordinarily could not. For instance, crowdfunding has been argued to represent an open form of risk capital; the benefits, in this case, are not only increased efficiency, by also the ability of common individuals (not just venture capitalists) to benefit from the value offered by investing in young firms (Fleming & Sorenson, 2016; Sorenson et al., 2016). These two effects - increased economic efficiency and democratization of the value capture process – have rendered "open" services much more accessible, thereby minimizing hitherto persistent market frictions.

Given that open source business models have the benefit of drastically increasing access to a business's products and services to their markets, we will argue that this paradigm stands to mitigate many of the grand challenges facing us today (Jarzabkowski et al., 2019). Davis & Scott (2005) have suggested that organizations are mankind's most powerful tool for marshaling resources and aligning populations to action, suggesting that they have been at the root of many weals and woes of the 20th century. But, the role that organizations could have in solving grand challenges by "opening up" has not been systematically explored.

A key grand challenge facing us today is access to relevant, affordable healthcare (Weeramanthri, 2015). Many individuals – especially those in compromised conditions and/or plagued by chronic illnesses – struggle to find access to the healthcare they need, which thereby lowers their quality of life. A particular setting where this is observable is in the market for insulin. Given that the commercial market for insulin is dominated by an oligopoly of a few major players (Gallegos et al., 2018 Knox, 2020), the organization of the industry is such that significant welfare losses are present because of producers' ability to increase the prices of insulin without similarly increasing its quality

or accessibility (Bain, 1986; Porter, 1980). This has created a crisis among diabetic patients that has been difficult to resolve with public policy because such measures often move slowly and require extensive support across bipartisan stakeholders (Knox, 2020).

In the balance of this paper, we will argue that an open source approach to insulin production and distribution can help to address the grand challenge of insulin access. In particular, we will argue that this process will broaden access to insulin by both driving down costs and minimizing "gatekeepers" in the production process. However, this process will not be without its frictions: as previously mentioned, healthcare is a sector in which powerful ecosystem dynamics (Adner, 2017; Jacobides et al., 2018) are present and in which complementarities (Milgrom & Roberts, 1995) create "chicken-or-the-egg" problems for firms (Roth, 2015). Hence, we outline an archival case study of a small firm in this space and detail the unique challenges that face firms attempting to "open" ones in the face of these pressures. We contribute to the innovation and strategy literature by suggesting that business model innovation, even when motivated by support across stakeholders (as open innovation is) can be stymied by ecosystem pressures; we also outline recommendations for firms undertaking such initiatives.

Open Insulin Foundation

Diabetes is a chronic condition that affects more than 30 million people in the United States. The condition is treated with insulin, a medicine developed in the 1920s, the price of which has skyrocketed to prices that are unaffordable to many (Cefalu et al, 2018, Knox, 2020). The Open Insulin Foundation (OIF) originally named the Open Insulin Project, began their work to develop a less expensive insulin product in 2015 at Counter Culture Labs, which is a community biology lab in Oakland, California. The Foundation was launched with a crowdfunding campaign that raised about $16,000. The Open Insulin Foundation is currently engineering microorganisms to produce long-acting (glargine) and short-acting (lispro) insulin analogs using standard techniques in biotechnology. Their project includes work with both bacteria and yeast.

Open Insulin Foundation intends, as its first deliverable, to provide an FDA-approved sterile insulin product (glargine or lispro) produced via appropriate GMP registered facilities and available through a predefined supply chain network at greatly reduced prices compared to currently approved insulin products. Insulin will be available in 10mL vial sizes for diabetic patients using indirect injection for the management of blood glucose levels. Longer-term goals will be to expand the network of manufacturing locations and distribution channels while maintaining the cost-competitive nature of the insulin product. Our success with this model will lay the foundation to expand into other medicines.

Ecosystem and Stakeholders

Open Insulin is focused on creating a model for insulin production that centers sustainable, small-scale manufacturing and open source alternatives for production. They are working on developing organizational structures for co-operative based production of medicine, taking inspiration from such precedents as frameworks for health insurance cooperatives, state-level frameworks for producing generic drugs and for cultivation of cannabis for medical use, and other state-level frameworks for activities heavily regulated at the federal level, such as California's Direct Public Offering system for equity crowdfunding. The open source business model allows for a simplified

distribution process with fewer stakeholders. This efficient supply chain has a focus on the 5 P's (patient, physician, provider, policymaker, payer) and the interrelations between these different groups are as follows:

Patients – The type 1 diabetics and their families and caregivers are the primary stakeholders that will have a say in how the problem is solved. The solution should be tailored to the means by which it will be most beneficial to them (e.g. prices they can afford, accessible distribution sites, integrated plans).

Physicians – The physicians want the best possible option that will increase the health of their patients. They have a say in how the problem is addressed because they are key sources of information by which they can recommend the insulin to their patients and give it a source of credibility. They are also important because they advocate for the use of state of the art insulins (glargine and lispro) in order to overcome current influence from pharmaceutical companies. The product will need to be endorsed by physicians in order to increase community trust for the product in comparison to current monopolies in the medical market.

Professional Healthcare Administrators – Want a way to integrate the current insulin pricing strategy with current plans. Administrators still want to make revenue so they won't endorse a product that patients are not willing to buy. They will no longer be used as key gatekeepers but rather will be informed of lower cost options separate from traditional health insurance integration plans.

Policy Makers – Want to have more equitable laws for people of varying socioeconomic backgrounds. They are stakeholders as the problem involves helping disadvantaged patients. In order to ensure monopolization does not continue to occur, policies must be passed. Can impact current healthcare pricing policies.

Payers – Are the ones that have to bear the burden of the problem as they have to be able to keep up with current insulin price increases. They want lower prices so that it is easier to afford the medicine that they need without having to compromise on other aspects of their lives. The direct payment method advocated by Open Insulin would be the most feasible to overcome the current market monopoly.

Business Model

As a non-profit organization, Open Insulin relies on raising money to continue operations and to manufacture cost-effective insulin options. There are several different streams by which Open Insulin can make money. One of the primary methods is through the use of donations from individual and group donors as well as scientific and small business grants. Partnerships with labs and other scientific institutions are another source of money and sales to non-insured patients and others that are financially challenged at the break-even cost. Sales from profit sales are made from a smaller portion of the incoming revenue streams. Donor funding and funds derived from diabetic philanthropic drives will fund the research and development phase under a single coordinated effort. The significant nonprofit potential exists after the product is delivered to the market, which can be used to drive insulin costs even lower.

Distinct Advantage

The open source model is different from the industry standard because it focuses on making insulin accessible rather than purely profitable. Current standard models focus on making pharmaceutical companies the most revenue without regard to patient accessibility. Moreover, the current models prevent smaller companies from entering the insulin market with their dominating and exclusive tactics. However, the open insulin model provides a more supportive and adaptable model to change the insulin market composition into one that is more patient-driven and less profit-focused. With the commonly used freemium model, the company that developed the model has full control over its distribution leading to further monopolization of the medical market. The open source model allows the model to be developed and maintained by a community of independent scientists.

This model provides value because it allows for the production of more cost-efficient insulin that patients from a wide range of socioeconomic levels can access. It also helps to overcome issues with patent evergreening by giving companies a structure to follow that isn't monopolized by current industry members. By providing an open source model for insulin production, one of the major issues worldwide will have a more feasible solution and flexible model for other companies/organizations to adopt. The model allows for lower barriers to entry to the insulin market and provides a solution with a less complex and more effective supply chain to directly provide patients with their medication without middlemen rent-seeking. In addition, the model is to be sustainable and affordable. The model allows for the collaboration of non-profit research efforts under a single open source business model that will make the value chain more efficient as a whole, making the realization of modest profits possible while also alleviating crushingly high insulin prices. The value proposition, value capture, and lower costs will potentially also attract insurance providers to provide open-sourced insulin to their clients, thus providing access to a wider market segment. The introduction of this cheaper alternative into the market will theoretically drive pricing of other analogues downwards, thus readjusting market segmentation.

Current Findings and Contributions

Our current work with OIF has involved a qualitative case study (Eisenhardt, 1989; Eisenhardt & Graebner, 2007) and extensive field work (Yin, 2015). Due to LUMSA's length restrictions, we do not detail all of our findings in their entirety; rather, we present a few key highlights.

First, the desire to re-shape the business model came not from a desire to earn abnormal profits by eradicating market inefficiencies (Kirzner, 1997; Knight, 1921). Rather, the founder who founded the project was motivated to found the firm in order to address what they believed to be a grand challenge (Jarzabkowski, 2019); namely, the inability of needy individuals to access insulin. In this way, the case of OIF is a unique instance of business model innovation: being motivated by social needs, the evaluation criteria employed by both the team and its key stakeholders were often non-financial. For example, while the team was evaluating potential profit formulae (Christensen, 2009), the focus of the conversation was not on costs and margins, but rather on access. In other words, OIF's conversations about financial sustainability were anchored to the question of: "How do we provide the greatest amount of insulin to those who need it most?", not "how can we achieve the highest margins possible?".

This approach to pricing, however, was not uniformly embraced by all of the key complementors (Adner, 2017; Jacobides et al., 2018) in OIF's ecosystem. Like other firms in industries marked by intense ecosystem dynamics, OIF depends heavily on a few complementors to generate value for consumers: there are physicians who prescribe insulin, payers (insurance companies) who pay for the insulin, and distributors like pharmacies that stock the insulin and work with physicians to ensure that patients are aware of their options. The reason was that many of them saw a conflict between their own immediate interests and OIF's broader social mission: supporting OIF often meant lower profit margins for payers and providers. And, given the pressures on payers (especially) to provide returns via quarterly earnings statements, the opportunity cost associated with OIF's business.

A second and related issue concerns the ecosystem emergence challenge (Adner & Kapoor, 2016). Namely, key complementors in OIF's potential ecosystem were hesitant to accept OIF's open source model because doing so would undermine their roles as the sole holders of key resources. For instance, physicians felt that their role as the unique source of expertise in the diagnosis and treatment of diabetes would be undermined by an open-ecosystem approach. Relatedly, physicians were wary of undertaking the learning required for them to truly understand the open source business model; without this learning, however, they would not feel comfortable with prescribing OIF's products to patients. Thus, the ability of patients to purchase OIF insulin - and OIF to become sustainable - was stymied by these and related ecosystem pressures.

Though these ecosystem emergence challenges are not new (e.g. Adner & Kapoor, 2016), they have tended to only be documented in the context of traditional, market-based innovation. For instance, Adner & Kapoor (2016) argue that a key challenge in the early days of the photolithography industry was that there was little incentive for incumbents in well-developed ecosystem to support an emerging innovation that may disrupt their current roles in the existing ecosystem. In this case, however, most ecosystem complementors desire the business model innovation because of social reasons: all of them tend to appreciate the challenge faced by those who need insulin but cannot obtain it. Hence, this emergence challenge is not merely one of economic incentives, but also of a conflict between economic and normative pressures (DiMaggio & Powell, 1984; Meyer & Rowan, 1977).

These preliminary findings suggest that, even when the threat posed by certain grand challenges may be accepted and appreciated, and even when ecosystem players express the desire for a new technological configuration, change can be stymied. In particular, our current case study highlights a key tension between the drive for open source business models (Chesbrough, 2003; Chesbrough & Bogers, 2014) on the one hand, and the entrenched interests of ecosystem complementors on the other (Adner, 2017; Jacobides et al., 2018). What these findings suggest is that, even though open source business models are often advanced as an approach to resolve societal tensions (e.g. Mollick, 2018; Sorenson et al., 2016), they may meet a unique set of challenges. Namely, businesses do not exist in isolation; rather, they exist in complex ecosystems in which complementary sources of value must be coordinated in order to generate a coherent value proposition for a customer (Adner, 2017). Open source business, by bypassing many of the current complementors within an ecosystem and advocating for a new constellation of roles and responsibilities within them, thus face particularly strong ecosystem emergence challenges (Adner & Kapoor, 2016). Hence, and despite the value that open source business models stand to add - especially in the face of grand challenges - they may flounder in settings where ecosystem dynamics are particularly salient.

Conclusion

In this paper, we have outlined some of the preliminary findings involving a case study of a small nonprofit that is attempting to disrupt the insulin industry via an open source business model. Throughout, we have argued that despite the acknowledgment of open-source businesses as a valuable tool for overcoming grand challenges (Jarzabkowski et al., 2019; Mollick, 2015), moving to an open-source business model can be difficult; these difficulties will be exacerbated in contexts where high levels of complementarities between firms lead to tightly linked ecosystem dynamics (Adner, 2017; Jacobides et al., 2018). In particular, our case study of OIF suggests that even when grand challenges are acknowledged by ecosystem players and a shift towards open source distribution is accepted, this transition can be stymied by ecosystem emergence challenges (Adner & Kapoor, 2016).

Our contributions to this literature are threefold. *First*, we highlight the potential challenges that may arise in a particular instance of business model innovation – open-source production. We argue that, even when there is a near-universal agreement of the societal challenge faced within an industry and a concomitant understanding of the value that open-source can provide, innovation may stall because of emergence challenges. *Second*, we highlight that these tensions may arise even when a strong ideological consensus exists among players within an industry. *Finally*, we highlight the ecosystem dynamics that arise on the demand side of the process – between physicians, payers, and patients. This contrasts with prior work, which has predominantly emphasized supply-side ecosystem effects.

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Social Entrepreneurship and the Use of Sustainable Business Models in Developing Countries and the Need for Coherent Intersectoral Collaboration: The Case of North Macedonia

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Abstract

In this paper, we explore the intersectoral collaboration for social entrepreneurship development - a grey area that lacks critical investigation. Social entrepreneurship is directly connected to sustainable business models, fostering partnerships and collaboration while alleviating and mitigating societal issues. Social enterprises are implementing sustainable business models in their operations on the market to achieve the economic and societal impact they are striving for. Social entrepreneurship has intersectoral influence, and consequently, intersectoral collaboration is one of the prerequisites for developing social entrepreneurship that alleviates and mitigates the already made adverse effects on the economy, society and environment. We portray the case of North Macedonia, a developing country, at the beginning of the social entrepreneurship and sustainable business models development through the experience and practice of four pioneering social enterprises. We investigate 'To what extent collaboration across sectors contributes to social entrepreneurship and sustainable business model development?'. The evidence shows that coherent collaboration across sectors is vital for the development of SE. The evidence also shows that in North Macedonia currently, there is an incoherent system of support. The need for coherent moving forward across sectors and levels is highlighted as key to enable effective and efficient social enterprises to deliver on their objectives.

Keywords

Sustainable Business Models, Social Entrepreneurship, Intersectoral collaboration, North Macedonia, Development Factors

Introduction

Sustainable business models (SBM) are the future of socio-economic development (UN, 2014). The overzealous exploitation of natural resources to accomplish economic development and growth negatively impacted the natural environment and harmed society (OECD, 2011; IISD, 2021). It might seem that the short-term results were worth it; however, in the last decade, the world recognised that it is more costly if we devour natural resources without thinking of the long-term consequences. If we want to preserve the liveability of the planet, we must double global circularity from 8.6% to 17% (Circle Economy, 2021). What is also astounding is that 90% of the business leaders imply that the consumers will hold them accountable for their environmental impact, which is an increase of 12% compared to 2018 (Environmental Defence Fund, 2019). Economic growth is no longer achievable without coupling it with social value and lessening environmental impacts. The extensive economic, social and environmental issues that the world is faced with cannot be bridged if we work divided. That is why we need ethical and SBMs to foster partnerships collaboration and be more sensitive to the footprints they leave on the global environment. Nowadays, the companies that adopt SBMs are more likely to succeed (Lingardt et al., 2009), and business sustainability is the single most effective way to ensure longstanding success (Fedeli, 2019).

Social entrepreneurship (SE) is directly connected to the use of SBMs, fostering partnerships and collaboration while alleviating and mitigating societal issues. Social enterprises are implementing SBMs in their operations on the market to achieve the economic and societal impact they are striving for. SE has intersectoral influence and consequently, intersectoral collaboration is one of the prerequisites for developing SE that alleviates and mitigates the already made adverse effects on the economy, society and environment (EP, 2017). Intersectoral cooperation for SE development remains a grey area which lacks critical investigation. We are exploring an area that have huge impact in both academic and practical areas.

In this paper, we seek to respond to the question ‘To what extent collaboration across sectors contributes to social entrepreneurship and sustainable business model development?’ - an explanatory and specific question focused mainly on the added value of support and partnership. We aim to contribute to the SBMs literature and practice by portraying a national case – the Case of North Macedonia.

Intersectoral Collaboration for Social Entrepreneurship

The subject of SBMs is a contemporary topic with continuous and increasing focus, especially for SE (Dentchev et al., 2018). SE directly connects to activities contributing to the economic, social and environmental system.

Waddock (1988) and later on Sagawa and Seagal (2000) described SE as a socially responsible practice of business undertakings engaged in cross-sectoral partnerships. Alvord et al. (2004) stated that SE is a catalyst for alleviating social problems and fostering transformation. For Thompson and Doherty (2006) "social enterprises-defined simply- are organisation seeking business solution to social problems" (p.362). The commonality in most definitions is 'the practice of commercial activities to accomplish social mission' (Boschee & McClury, 2003; Lasprogata & Cotten, 2003; Mort et al., 2003; Hibbert et al., 2005; Cho, 2006; Harding, 2004; Haugh, 2005; Hartigan, 2006; Thompson & Doherty, 2006; Tracey & Jarvis, 2007). Kuratko (2020) provides a more modern definition stating that SE "is a form of entrepreneurship that exhibits characteristics of non-profits, government, and businesses; it applies traditional (private-sector) entrepreneurship's focus on innovation, risk-taking, and large-scale transformation to social problem-solving. (p.459)". Chichevaliev (2020) combines business, innovation and social mission by stating "social entrepreneurship should be understood as an innovative approach to societal issues, not just social, utilising business models and entrepreneurial activities to provide funds to invest into the attainment of social objectives, and provide transformative social change" (p.24).

Reviewing these definitions, we can find indisputable evidence that SE is using SBMs including innovation to provide sustainable solutions that contribute to society's transformation. In order to do achieve its purpose, SE need every sector to pitch in and do their part.

Spear (2006) raises the matter of the significance of intersectoral cooperation for the development of the field. This area has gained increased recognition for SE. It is highlighted in the literature as an imperative to cooperate on a local and national level. Such collaborations and joint efforts create shared goals and values, which are particularly important (Finnis, 2011). Bosma (2005) states that maintaining a close partnership between organisations fuels synergy and mutual learning experiences. Pachura (2021) adds that "interorganizational cooperation and collaboration are based on combining the potentials of different organisations to achieve social goals, active and genuine commitment, as well as the creation, maintenance and taking advantage of lasting and continuous social relationships" (p.5). Dacin et al. (2011), state that SE research requires a more holistic view, seizing the transdisciplinary and multifaced nature of the field.

What we have found in the literature is that many scholars research the institutional environment and the role of the institutions in the development of SE. However, they do not refer directly to intersectoral cooperation and to what extent such collaboration contributes to SE development. It can be concluded that it is a grey area that lacks critical investigation and addressing this issue from the institutional environment perspective seems justified, reasonable and relevant to the research gap that currently exists.

Method

We use the qualitative case study method for this paper by utilizing desk research, semi-structured interviews, video calls, attendance at various events and phone calls as data collection methods (Bryman, 2012). This method was chosen as the most suitable given that we wanted to explore in-depth the experience of social enterprises concerning the collaboration with and the support received from the authorities. It also allowed us to start with an open mind about the themes and

subthemes we need to know about so that concepts and theories can emerge from the data (Bryman, 2012; Adams, 2015).

This method and research strategy have helped us with generalization efforts and the replication possibilities. This research was constructed to be replicated in both developed and developing countries to measure the contribution extent of intersectoral collaboration to SEs development. It provides a replication model that contributes to national and regional comparisons (Bryman, 2012).

We explored and presented a national case study (North Macedonia) through the experience of four social enterprises (Pokrov, HumanaS, Mama Organa and Treebanks) across a period of four years (2017-2021). We chose North Macedonia because it is a developing country at the beginning of its SE development. It provided us with an excellent opportunity to explore the impact of the institutional support and collaboration for pioneering social enterprises at their nascent.

We have conducted four interviews per social enterprise (16 in total). The analysis was completed using the TAMS analyser (Text Analysis Mark-up System), a qualitative coding and analysis program. The coding was done by creating a directory of central themes and subthemes. The main themes were organizational form, experience in the field, social mission, collaboration with institutions and institutional support. The subthemes involved a starting list including level of collaboration (national, local) type of support, best practices and lessons learned.

The cases were chosen based on their experience in the respective fields and for the different levels of support received from the other sectors (government, business, third sector) extended across their different establishment periods and legal forms. They are the perfect example to present an overview of the economic, social and environmental impact made by social enterprises in North Macedonia. All cases are working on a national level with their activities in the following areas:

Pokrov is a pioneer in SE, a therapeutic community supported by the church, working on rehabilitation and reintegration of people suffering from hazards by working in the production process of organic food.
HumanaS is also a pioneering social enterprise that offers a range of social services (e.g., palliative care) and integrates vulnerable populations in the labour market.
Mama Organa is a social enterprise working in a circular economy and helping vulnerable single mothers integrate into the labour market.
Treebanks is a green social enterprise fighting pollution, reducing CO2 emissions by foresting deforested places.

Results and Evidence

We found evidence that coherent collaboration across sectors is vital for the development of SE. Political focus specifies support. Legal support delivers recognition. Institutional support provides the tools, and financial support the means to realise their role as change agents.

The Case of North Macedonia

The evidence also shows that in North Macedonia currently, there is an incoherent system of support. To attest to such evidence, we must overview the country's context and the development of these social enterprises. In the last five years, the country was and still is concentrated on

developing social services that define the political focus (Chichevaliev, 2019a, 2019b). This situation has resulted in the design and adoption of policy and legal documents, including a new Law on Social Protection, National Strategy for Deinstitutionalisation 2018-2027 “Timjanik”, National Strategy for Development of Social Enterprises with an Action Plan and other (Ministry of Labour and Social Policy, 2018, 2019, 2021). However, there is no legal framework for social entrepreneurship, and consequently, the country does not recognise social enterprises as legal entities, which contributed to adopting the hybrid form of operating. The lack of legal recognition of social enterprises fosters hybridity to be eligible for various institutional and financial support. An example of these developments is the Fund for Innovation and Technology Development call to support social enterprises, which was conditioned with establishing a trading company in 30 days if the applicant applied as a non-profit and was one of the winners. Legal framework lacks behind political support for SE in the country: coherent advancement of both SE policy and the law as its extended arm will create a solid positive push to social enterprises and enable those to deliver more to their key objectives.

On an institutional level, the authorities still lack the capacity and options to contribute to the sector's development. They are finding pathways to collaborate with social enterprises, making it difficult to increase the level of cooperation between the actors.

The country's scarce financial support for social enterprises does not facilitate sector development. The funding is mostly comprised of small grants and donations, which limit their capacity, activities and consequently their impact. There is a pressing need to develop financial mechanisms to support social enterprises and provide them with the means to realise their goal.

The support from the business sector remains the most insubstantial contribution to their development. Many businesses recognise the work of social enterprises, but only an insufficient quantity of trade companies get involved in supporting and collaborating with social enterprises.

The third sector remains the sector that supports social enterprises; however, this is expected given that most of the social enterprises in the country are registered as associations and foundations. Their support is primarily seen in advocating for the sector’s development and collaboration.

The scale of the sector remains inconclusive. Many non-profit organizations are declaring themselves as social enterprises and with the lack of criteria and legal framework this information cannot be verified.

The Case of Pokrov

Pokrov is a therapeutic community, a Center for social rehabilitation of persons who use or abuse drugs and other psychotropic substances. The organization provides social services and accommodation in an institution for the treatment and rehabilitation of persons with addiction problems, with a capacity for 30 people (Kamilovska Trpovska et al., 2021).

The social enterprise is a pioneer in the field, working for over a decade on social entrepreneurship development through advocacy and implementation of various projects while helping a vulnerable group of persons.

They are also a hybrid organization with an established trade company and a non-profit organisation. ver the years, they have scaled up and employed the persons who once were

unemployable in their bakery “Bagel”. They work on a complete integration cycle of persons with addiction problems.

Being a pioneer in the field combined with their mission eased the way to receiving political recognition and governmental grant to advance their development. They are also collaborating with the local authorities (municipality Strumica), where most of their operations are.

Pokrov is the social enterprise that has received the most support from the super and hypermarkets, which opened their channels and stores for their products. It is a classic example of what can be achieved if the business sector gets involved and contributes to the development of social enterprises.

The Case of Treebanks

Treebanks is a hybrid organisation with a mission to fight pollution and reduce CO2 emission levels, specifically to produce treebanks a million of trees worldwide. They are pioneers in the environmental area. It is a Social Impact Award winner 2019 and World Summit Awards 2019 nominee in the sector of environment and green energy.

Treebanks use affiliate marketing (links) to fund their tree planting. They have partnerships with travel platforms, including Booking, Kiwi and Agora. The social enterprise plant a tree for each booking made from these sites.

They started as a trade company with a social mission. They are both a civil society organization and a limited liability company.

Treebanks received a grant from the Fund for Innovation and Technology Development by applying to a call for green solutions, proving that political focus is vital for social enterprises' support. Treebanks also collaborates with municipalities to obtain licences for planting trees in deforested places. To ease their way into getting a licence for foresting deforested places, they have been planning their actions and initiatives in accordance with the urbanisation plans of the municipalities.

They have received strong support from civil society organizations and social enterprises, a grant from a governmental institution and collaborate with local authorities for their initiatives. It is a case of an intersectoral collaboration led by Treebanks which resulted in planting more than 15.000 trees with various activists, supporters and constituents. In their latest activity in collaboration with the company Endava they have planted 3.200 trees.

The Case of HumanaS

HumanaS is a social enterprise with a double-fold mission. They offer social services such as palliative care and employ long-term unemployed persons at social risk to become caregivers and assistants. They have an accredited and certified training program to educate and increase the capacity of the persons who want to become caregivers and assistants.

HumanaS is a pioneer in providing the said social services and currently are scaling up on a national level. They were one of the social enterprises at the forefront of solutions during the Covid-19 pandemic, offering their services as volunteers delivering medications, hygiene and other products to the elderly’s home to mitigate the risk of exposure. This activity was conducted in cooperation

with the local authorities (municipality Centar). The municipality and the social enterprise have been cooperating and offering social services for the elderly. Currently, HumanaS services are being offered across the country, hoping to increase its coverage in partnership with local and national authorities.

They collaborate with other civil society organizations offering social services and offer accredited and certified training program to educate and increase the capacity of their caregivers and assistants.

It is a practice that should be replicated if the local authorities are more open to collaborate with social enterprises.

The Case of Mama Organa

The social enterprise Mama Organa is a registered handicraft company. They work in the field of circular economy. It fosters work integration of vulnerable groups of people, focusing on socially excluded single parents and gender equality. They collect food waste and transform it into soil substrates and organic fertilizers.

They have tried to collaborate with the municipalities but have not received any support. It seems that their mission is still not attractive to the local or national authorities despite being multiple award winners (Best Green Business Idea, “Get in the Ring’ startup competition) and a 'Startup Europe Award 2019' special winner in the category "Best Job Growth Startup".

The lack of support from national and local authorities did not stop their progress only hindered it and slowed it down. They currently have a vast portfolio of products, but the most interesting is the antibacterial and biodegradable solution that attracts the attention of EU companies and countries.

They established an online shop during the pandemic, which contributed to their financial sustainability and scaling up. Despite bridging the lack of state support in the early days, now it is essential to be recognized and valorised to ease the way to the next development stage.

Discussion and Conclusion

As evident, vertical coherence across levels is yet to be achieved since it is a vital contributor to the overall intersectoral coherence for SE support.

Intersectoral collaboration to foster SE is a necessary process that requires commitment from all stakeholders. SE is a multisectoral area where all the sectors and enterprises need to play the fundamental role of promoting intersectoral collaboration (Goyal & Sergi, 2015). Working towards alleviating and mitigating social issues is a societal issue that concerns all the sectors and stakeholders and influences social enterprises' operations and the well-being of the population overall. In addition to boosting SE and its key protagonists - social enterprises, intersectoral initiatives are paramount for creating and implementing innovative solutions for societal problems (Matos & Silvestre, 2013; Dembek et al., 2018). Such initiatives go beyond the governmental and market limit. Such evidence is found in both developing and developed countries (Sagawa & Sega, 2000; Snow, 2001; Korsching & Allen, 2004). Intersectoral collaboration is essential for increasing the mutual learning experience, knowledge sharing and technology transfer (Squazzoni, 2009).

Interestingly, international companies have accepted such partnerships, but it is still questionable for the national business sector. Mama Organa has received small-scale support in buying their product to increase revenue. However, this support is insignificant with a view of the bigger picture. Financial and business sectors' support lags behind the politics and policy for SE and leave social enterprises behind the political statements, struggling to find themselves the way forward in a fragmented sectoral environment.

Intersectoral cooperation intensifies and grow social capital which is seen by Squazzoni (2009) "as a catalyst for establishing intersectoral initiative and strengthening self-reinforcing collaboration between participants and across sectors" (p.2). By developing such arrangements, the involved actors can learn best practices and then improve their modus operandi. Austin (2000) and Squazzoni (2008) add that innovation predominantly originates from horizontal partnerships between profit and non-profit, diversified partnerships, and intersectoral initiatives at a regional and community level.

The practices of social enterprises Pokrov and HumanaS show us that with support from the sectors, social impact is very much possible, visible and easily recognizable. The combination and collaboration with business and civil society sectors have increased Treebanks foresting actions by one fifth.

However, for such development to be possible, many factors should be aligned, including:

Political factors (Aldrich and Fiol, 1994; Griffiths et al., 2013;), such as stability (Kaufmann and Kraay, 2007; Klapper et al., 2009), will (Wronka, 2013; Chichevaliev, 2020), culture (Diaz Gonzalez and Dentchev, 2021), behaviour, activity, (Chowdhury, 2007; Heckl et al., 2007);
Legal factors (Nicholls and Cho, 2006; Light, 2006; Fici, 2015), comprising definition (Dees & Anderson, 2006; Light, 2006), identity (Lasprogata and Cotton, 2003; Yunus, 2008; Fici, 2015), rules (Pache & Santos, 2010; Greenwod et al., 2011; Abdulmelike, 2017), judiciary (Frye & Zhuravskaya. 2000; Johnson, 2000; Chemin, 2007);
Institutional factors (Mair & Marti, 2009; Zahra et al., 2009; Dacin et al., 2010; Estrin et al., 2013) involving support (Dacin et al., 2010; Stephan et al., 2014; Hoogendoorn, 2016) and voids (Khanna and Palepu 1997; Danviboon, 2018); and
Financial factors (Dacin et al., 2010) including available sources of funding (Hoogendoorn, 2011; Harris et al., 2013) and access thereof (Rangan et al., 2008).
Each of these clusters represents an additional dimension that can facilitate or hinder the development of SE. However, only a coherent moving forward of those clusters across sectors and levels could enable effective and efficient social enterprises to deliver on their objectives. In North Macedonia, clusters and sectors move at different speeds, which slows even harms the development of a conducive environment for social enterprises.

This paper covers an underrepresented area in an academic sense and presents a starting point in filling the gap in SE literature related to the effects of intersectoral collaboration for SE development. In terms of practical relevance, it shows the practitioners practical examples and experiences to learn from and reminds them that openness to intersectoral collaboration is fundamental to their success. It also provides policy and decision makers with best cases and lessons learned to foster intersectoral collaboration for SE development and growth.

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Using dialogic methods and tools to identify accessible ecosystem actor collaboration pathways between Canadian Ashoka Fellows and Canadian Ashoka Changemaker Campuses.

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Abstract

This paper describes a dialogic prototyping approach for identifying collaboration pathways to enable Canadian post secondary business models to develop new methodologies to maximize the co-creation of socio-cultural value and the co-construction of social infrastructure. Using the workshop outlined in the paper, we offer a preliminary framework for engaging actors in the process, share our inspiration for the convening, and propose where and how the process could be adapted to design a post-secondary business model innovation for system change exercises.

Keywords:

Social Impact, Dialogic Design, Ecosystem Actors, Relational Systems Thinking, Flourishing Business Models

Context Setting

Building social infrastructure is a noble call to action; it offers both a vision and a call to practical implementation. This speculative paper evolved out of the convening of three Canadian ecosystem

actors work within the context of maximizing social impact and social innovation in Canada. The ecosystem actors included a Canadian Ashoka Fellow, two Canadian Ashoka Changemaker Campuses and Ashoka Canada to explore the 'do' in building social infrastructure nationally.

In 2017 the McConnell Foundation, its RECODE program, and Simon Fraser University co-published the white paper *Maximizing the Capacities of Advanced Education Institutions to Build Social Infrastructure for Canadian Communities* (Strandberg et al. 2017). The paper examined 'the social imperative and the business case for accelerated social innovation, by introducing a typology of instruments that could support advanced educational institutions in amplifying social infrastructure capacity for Canadian communities. (Strandberg et al. 2017)

Ashoka Canada is a non-profit that recognizes, supports, and connects a national network of leading changemakers. These changemakers operate within communities as leading social entrepreneurs (Ashoka Fellows) and within advanced educational institutions (Ashoka Changemaker Campuses) as skilled intrapreneurs. In 2020, Ashoka Canada contributed to the *A Milestone Report & Three Year Retrospective Review Maximizing Social Impact in Canadian Post-Secondary* (2020) as an ecosystem actor engaged in national conversations about post-secondary institutions as contributors to societal-well being, conversations that were energized by the 2017 white paper (Strandberg et al. 2017).

Ashoka Canada's interest in hosting this generative collaboration opportunity with key ecosystem actors is anchored in its strategic goals to expand its bridging work through the engagement and activation of trusted relations with Fellows and Changemaker Campuses. Pre-paper all three actors noted above had thematically commented that collaboration across sectors, while promising, is complex and rife with structural and epistemological barriers. There was an agreement that working to dismantle these barriers required shared vision, common language, new tools and trust; all of which necessitated *sacred spaces* in which these relational elements can be seen and understood (Goodchild, 2021).

This paper documents how we used a generative co-design approach to build out a framework for visualizing collaboration pathways, and to actualize the definition of Social Infrastructure as "the organizational arrangements and deliberate investments in society's systems, relationships and structures that enable society to create a resilient, just, equitable and sustainable world. It includes social, economic, environmental and cultural assets." (Strandberg et al. 2017). Our work together started with a shared perspective that ecosystem actors in community, post-secondary, and other sectors are increasingly called upon to design collaborations for solutions to complex social challenges, it was determined by the stakeholders above to use a values-based approach to conviviality (Illich and Lang, 1973) in constructing this framework.

Introduction Through An Overview

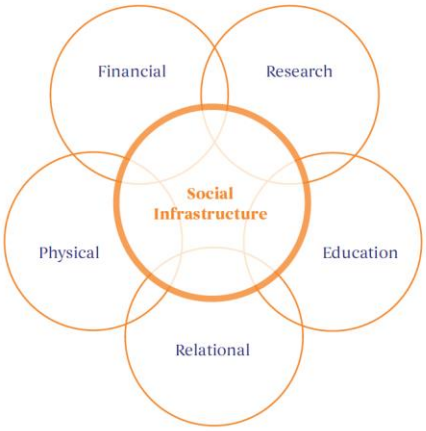
It was the intention of workshop outcomes outlined in this paper and adjacent recommendations of the 2017 McConnell white paper (Strandberg et al. 2017) to open up broader generative dialogues on the future pathways for "post-secondary institutions beyond teaching and research to include their contributory roles in the communities of which they are a part." (Strandberg, 2017).

Within the 2017 McConnell white paper, a historical overview was provided on the higher education Commercialization Pivot of the mid 1990's. This was a movement supported by the Federal Government to adjust academic institutional paradigms towards the Entrepreneurial University. The intent was to increase commercialization outcomes from research funding through collaborations with industry as a strategy to support societal well-being through economic development and measured return on public funding investments

Today, that shift to the commercialization narrative has become the dominant frame in which Canadian Post-Secondary measures contribution to the community. Importantly, the commercialization shift provides precedent that the sector can shift again. With this historical overview as a starting point, it provides the provocation for the 2017 McConnell white paper's typology. The typology covers institutional tools and instruments (Fig 1) available to Post Secondary stakeholders to support *community ambition* for flourishing, once this community ambition has been accepted as a core institutional objective. (Strandberg et al. 2017)

As no definition was provided for flourishing within the 2017 white paper and based upon how Social Infrastructure was described in the text (Strandberg, 2017), we have selected to define Flourishing as cited from *An Ontology for Strongly Sustainable Business Models* (Upwards and Jones, 2015). Upwards and Jones established Flourishing as Strongly Sustainable, pulling from sustainable development and management literature to articulate "a strongly sustainable firm… if it were to exist, an organization that only enabled strongly sustainable outcomes as one that creates positive environmental, social, and economic value throughout its value network, thereby sustaining the possibility that human and other life can flourish on this planet forever (Upwards and Jones, citing Ehrenfeld, 2000a; Willard et al., 2014).

Figure 1. Typology of Instruments for Institutional Engagement (Strandberg et al. 2017)



The 2017 white paper concluded that "Net new funding is not necessarily required to rethink and reengineer an institution's asset base toward social infrastructure benefits. The biggest investment is in fostering the paradigm shift, from which the innovations and impact should follow." (Strandberg, p 26) This was identified by a Continuum of Beliefs (Fig 2) and a Continuum of Practices. (Fig 3) that could provide a preliminary framework for institutional champions to utilize the report's typology (Strandberg et al. 2017) and mobilize a field building movement for Canadian

Post-Secondary Institutions to 1) activate the instruments; 2) further the development of social infrastructure; and 3) prioritize and address critical social issues in Canada. (Strandberg, p 29)

Figure 2. Continuum of Beliefs (Strandberg pg 28.)

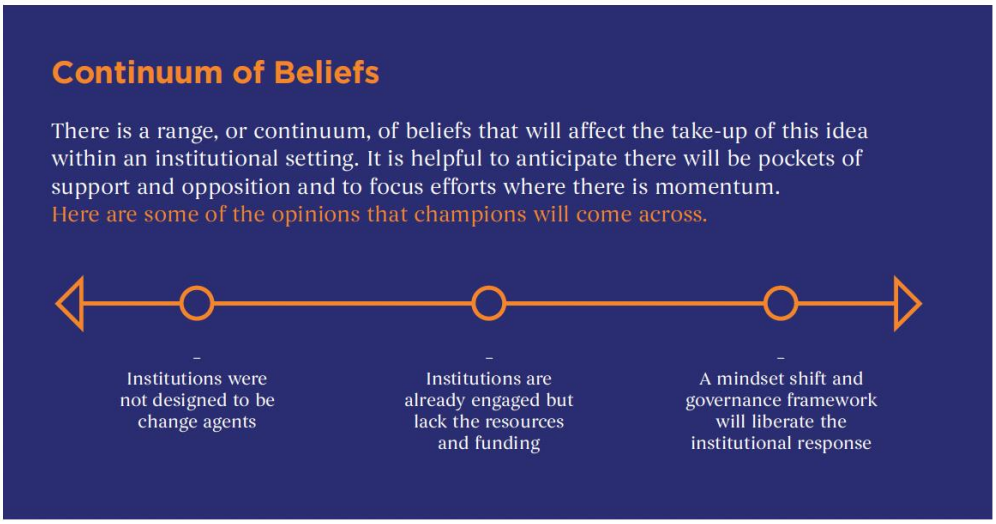


Figure 3. Continuum of Practices (Strandberg pg 26.)

Since 2017, *A Milestone Report & Three Year Retrospective Review Maximizing Social Impact in Canadian Post-Secondary* has been published that outlines developments, "the visions, objectives and (post-secondary) activities of these initiatives arising from the (2017) White Paper's Call to Action" (Dioury, Varga-Toth, Strandberg et al., 2020). Included was the addition of a Social Innovation Pathway (Fig 4) to add to the typology (Fig 1) outlined in the 2017 Whitepaper. The Social Innovation Pathway (Dioury, Varga-Toth, Strandberg et al., 2020) identified key strategic planning elements that post-secondary institutions could leverage to unlock institutional assets and instruments for the greater good.

Figure 4. The Social Impact Pathway (Dioury, Varga-Toth, Strandberg et al., 2020)

Hypothesizing New Value Co-Creation Logics

The 2017 McConnell white paper identified the effort required to make the system change it proposed - transitioning post-secondary institutions' business case to that of systems intervenor (Meadows, 2008) for community social innovation - to be predominantly an investment in fostering a paradigm shift (Strandberg, p 26). It further outlined this paradigm shift could be measured through fostering a Continuum of Beliefs (Fig 2) and a Continuum of Practices (Fig 3), facilitated through a Social Impact Pathway (Fig 3) and inspired by the typology of Instruments for Institutional Engagement (Strandberg et al. 2017)

In consideration of this foundational work, and building on maximizing social infrastructure as a noble call to action, the stakeholders involved in this paper (Ashoka Canada, an Ashoka Fellow and Ashoka Changemaker Campus) determined this as a strong starting point to speculate how the Firm - the post-secondary institution itself - may need to consider what types of business model innovations might happen at each stage of the Continuums. Explicitly, the capability of a post-secondary institution to transform its service offering into a relational systemic value co-creation that "1) activates the firm's instruments; 2) furthers the development of social infrastructure in collaboration with community ambition; and 3) prioritizes and addresses critical social issues in Canada as an actor within a larger post-secondary sectoral environmental, social and economic ecosystem" (adapted from Strandberg, p 29) (Jones and Upwards, 2014).

This paper's stakeholders went on to further inquire how might the post-secondary institution's business model evolution be conceptualized and communicated to non-institutional stakeholders or ecosystem actors - including diverse cultural groups within community - along these continuums (Fig 2 and 3) and; what tools and methodologies might be used to best co-design collaborations between these stakeholders to realize a flourishing future together. (Dioury, Varga-Toth, Strandberg et al., 2020). This inquiry was done through the design of a dialogic workshop that convened actors working within post-secondary institutions, Ashoka Canada and social entrepreneurs working in the community.

Prior to this workshop, as part of the design process and literature review, a three horizon framework (Sharpe, 2015) was used to make meaning of how a 'flourishing future' paradigm shift might evolve. We identified that post-secondary institutions would need to take into consideration social ecologies of culture as the 'community ambition' (Strandberg et al. 2017). Integration of this community ambition would thus require institutions to consider as part of their strategic plans "the future viability of human generations within groups associated by settlements, arts, religion and cosmological beliefs, and the continuity of knowledge practices." (Jones, 2017). This hypothesized value co-creation would need to be a co-designed relationship between ecosystem actors and stakeholders within post-secondary institutions to reposition the post-secondary institution as primarily a socio-cultural actor, as opposed to a socio-economic actor.

The tension of repositioning the post-secondary institution's ecosystem actor role suggested that, if we sought to accelerate social innovation that could contribute to a strongly sustainable future for all, then activation should start with community-based cultural epistemologies. This aligned to the pluralist framework outlined in Melanie Goodchild's Relational System Thinking article (Goodchild et al., 2021) about co-creation of the *sacred space between* systems. In her article, Goodchild, in conversation with Indigenous and Western systems thought-leaders, presents an Indigenous-European dialogical framework that produces visual cultural artifacts "for how healthy relationships between peoples from different 'laws and beliefs' can be established." (Goodchild et al., 2021). Identified as the *Two-Row Methodology*, the concept and spirit has been suggested as a framework or model for simultaneous intellectual co-existence recognizing the independence and interdependence of cross-cultural relationships - specifically in Indigenous-settler relationships. (Goodwin citing, McGregor 2011, 2009 and 2008)

Designing Our Approach

Through its Changemaker Campus network, Ashoka Canada works with social intrapreneurs - "Change Leaders" - staff and faculty who identify as innovative, creative, collaborative, imbued with a sense of public purpose, and with a bias to action. Embedded in the complex bureaucracies of higher education institutions, they are operationally situated at the institution's boundaries, where it meets the community. They deliver their programs and teach and conduct research; and they also develop workarounds to hack processes and policies, overcoming unnecessary barriers to getting resources deployed in service of both community and higher education goals.

Ashoka Fellows are leading social entrepreneurs working with and for their communities on the front line, addressing society's intractable challenges. Many have struggled to establish and

navigate meaningful and useful partnerships with post-secondary institutions. Ashoka has observed what was evidenced in the 2020 milestone report (Dioury, Varga-Toth, Strandberg et al., 2020) that when community social entrepreneurs and institutional social intrapreneurs are successful in establishing collaboration pathways, the benefits are the co-construction of social infrastructure for Canadian communities. (Strandberg et al. 2017).

The efforts needed to establish these successful collaboration pathways though, are often epistemologically difficult and energy intensive for resource strapped stakeholders and generally have no accessible or culturally inclusive place-based roadmap to convene the stakeholders. Ashoka's role as a trusted intermediary and holder of value aligned relationships both with community-based social entrepreneurs, campuses and national funders allows it to be a systems intervenor between these ecosystem actors, who do not commonly engage with each other. It is from this vantage point Ashoka identified it could invite actors from its Fellows and Campus networks to convene and surface, through democratic dialogue and co-created visualizations, the patterns of intersecting interests and values that could ultimately lead to a framework for designing mutually beneficial collaborations for socio-cultural flourishing.

With intention to create a convening event, and inspired by 1) the definition of a Strongly Sustainable Enterprise, (Upwards and Jones, 2015); 2) the ecosystemic repositioning of the post-secondary institution as socio-cultural actor (Jones, 2017) and; 3) the epistemological approach of the *sacred space between* systems (Goodchild, 2021) we selected the following approaches to build out a Connector Workshop between an Ashoka Fellow and several Ashoka Campuses:

Liberating Structures: User Experience Fishbowl - used to facilitate a storytelling dialogue to surface how value is expressed both implicitly and explicitly within each stakeholder's business model. (Lipmanowicz and McCandless, 2013)
Flourishing Business Model Canvas (Fig 5)- used to capture and visualize how Fishbowl participants understand how value co-creation happens in each business model. (Upward and Jones, 2015), (Hoveskog, Norris and Ostuzzi, 2020)
Flourishing Wayfind Cards (Fig 6) - used to sense make new relational pathways for collaboration between stakeholder's business models (Norris, 2019)

Figure 5 - *Proposed* Flourishing Business Model Canvas 2.1 (Upward and Jones, 2015), (Hoveskog, Norris and Ostuzzi, 2020)

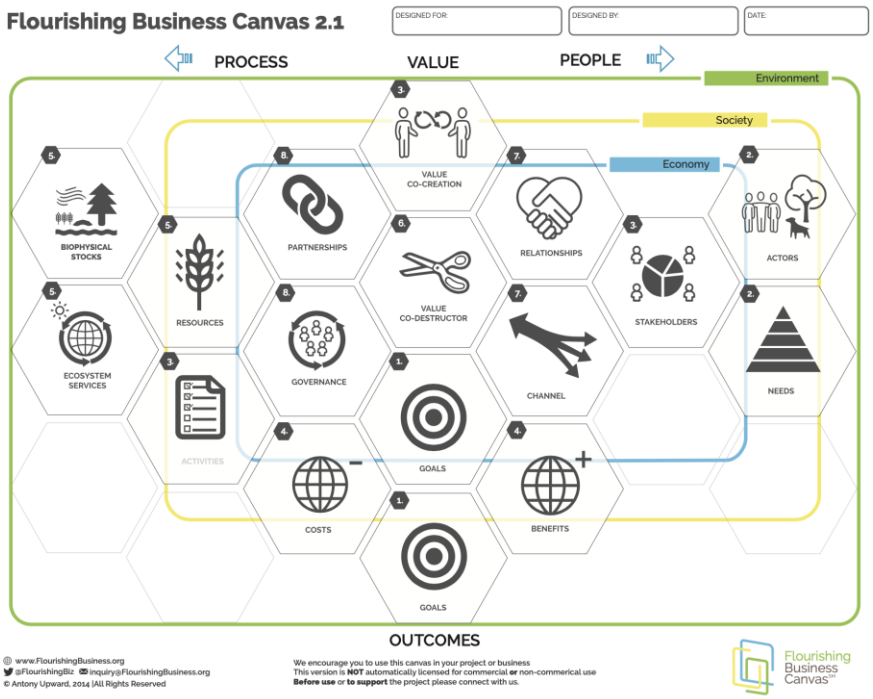


Figure 6 - Flourishing Wayfinding Cards (Norris, 2019)

Convening Actors

The convening itself was designed as a series of fishbowls held within a four hour workshop (Lipmanowicz and McCandless, 2013), leveraging the relationships of trust that existed between Ashoka, community (Fellows) and post-secondary (Changemaker Campus) partners. Ashoka Canada invited participants from its Ashoka Fellows and Ashoka Campus networks, to listen to what conditions are needed for collaborations across two very distinct sectors (community social entrepreneurs and higher education). At the same time, participants were asked to hold space for simultaneous intellectual co-existence, recognizing the independence and interdependence relationships (adapted from Goodchild, 2021).

Our workshop design team of Ashoka Canada, Georgian College (Changemaker Campus) and Life.School.House (Fellow) considered: How could we hold space for people to tell their stories, and for their stories to be seen and heard with curiosity, and empathy? What would enable listeners to find relational meaning in these stories? How might we enable participants to self-inquire about long-held assumptions that actors from community or postsecondary had of each other and even of themselves.

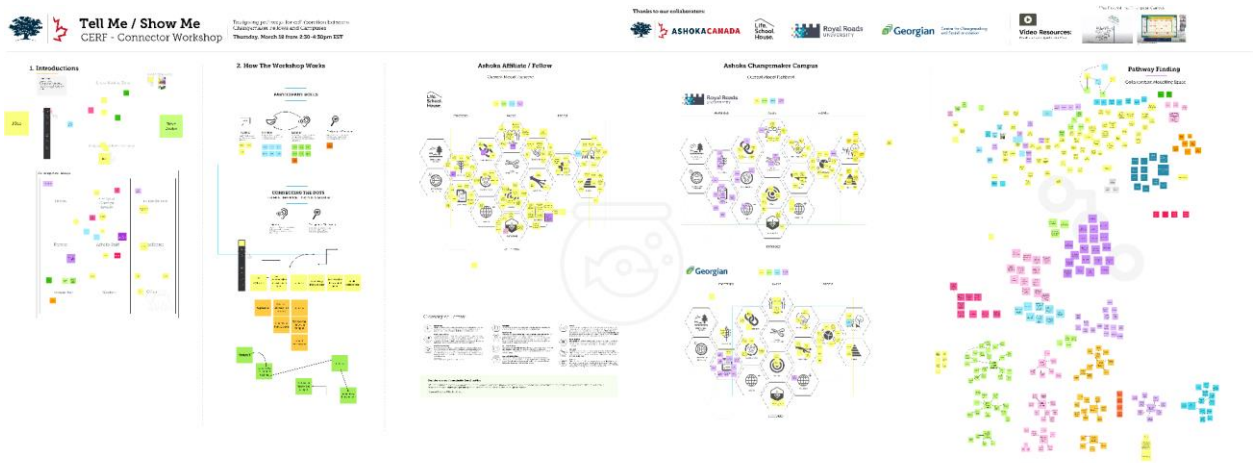
As part of this workshop dialogue our intention was to make implicit narratives explicit, and surface the frustrations to systemic barriers that each actor experienced differently, and the agency (Geels and Schot, 2007) each actor feel they had in affecting the transitional space of moving towards a third horizon of 'flourishing' (Sharpe, 2015). Post discussion participants were then asked to sensemake themes and pathways from the dialogue by visualizing the benchmarks of each actor's landscape including goals, value co-creation, needs, activities and how relationships are developed over time. (Upward and Jones, 2015) (Norris, 2019)

Facilitating The Fishbowl Dialogues

In the fishbowl process, one actor (or actor group) was in the 'fishbowl' at a time. While there, they are asked a series of questions by a facilitator. All other participants were listening. An in-person gathering would see the interviewee and the questioner face to face with other participants seated within a series of expanding circles around them but due to the pandemic our virtual 'fishbowls' were facilitated as online gathering via Zoom and using MURAL (Fig 7). Participants in the workshop who were not "in the Fishbowl" being interviewed were assigned the role of active listener and documentarian. They were instructed on how to use a specific area on the MURAL to capture key questions, insights, and observations from what they were hearing. In this variation the interviewer and interviewee were 'pinned' to the video conferencing screen and all other participants were asked to turn off their videos.

Interview questions were drafted by the facilitation team of Ashoka Canada and Georgian College and were based upon the Flourishing Business Model canvas lexicon and a consultation with the Ashoka Fellow and selected Changemaker Campus Change Leads. The final questions were shared with interviewees several days in advance of the session. Each interviewee was also offered a second pre-workshop briefing session to walk through the process and the tools - Flourishing Business Model canvas and Flourishing Wayfind Cards - to be used in the workshop and ensuring they were comfortable.

Figure 7 - Fishbowl Workshop MURAL Board. MURAL is a digital-first visual collaboration tool, where everyone can contribute equally.



As the Fishbowl interviews were being conducted and the active listeners documented their observations in MURAL, research assistants scanned and clustered the listeners' observations and questions making sense in real-time. Post Fishbowls, participants were then invited to reflect and make sense of themes and perspectives that were captured, showing listeners how their observations were being seen, heard, and respected as well.

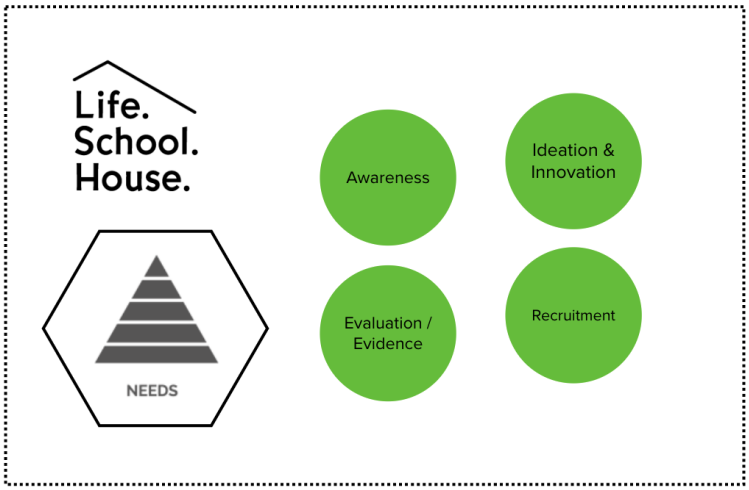
Ashoka Fellow Fishbowl - Life.School.House

The first Fishbowl was intended to represent a community narrative through the Founder of Life.School.House, an Ashoka Fellow. Life.School.House is modelled after a folk school, uniquely adapted to focus on inclusion and connection using a barter-based trade system of skills with a vision to scale as a moment across Canada. Life.School.House was also identified by the Founder as a grassroots organization.

The first Fishbowl surfaced the distinct activities and needs of Life.School.House's model, as well as the value that the model is co-creating in its community (Fig 8). Answers to the interviewer questions were mapped to the Flourishing Business Model canvas as relationships across the canvas. At the same time participants were documenting what they were hearing as the Ashoka Fellow outlined the partnerships they believed would benefit Life.School.House around evaluation and validation of outcomes to further scale the model.

What emerged was a narrative of the grassroots organization's strong desire to partner with higher education; a desire based on a sincere sense of potential for mutual benefit and a struggle to gain access to the typology of instruments as outlined in the 2017 McConnell white paper and outline in Figure 1. (Strandberg et al. 2017) The Ashoka Fellow had sought out partnerships with higher education researchers in the past and had experienced epistemological and socio-cultural barriers. She expressed frustration and confusion about a system in which resources that she valued were not readily accessible to organizations like hers; and required a disproportionate amount of labor and time to access on the community organization side.

Figure 8. Outcomes of Fishbowl #1 the core needs of Life.School.House in collaborating with Post Secondary Institutions.



It became clear that assumptions, hypothesized as barriers to mutual value co-creation, could be behaving eco-systemically as 'Eroding Goals' (Meadows, 2008) for grassroots and community-based organizations. This system archetype might explain how negative feedback loops are hampering the social imperative and the business case for accelerated social innovation for Canadian communities (Strandberg et al. 2017) and offer a place to intervene.

Ashoka Campuses Fishbowls - Royal Roads University and Georgian College

The second and third Fishbowls centered around Ashoka Campus Narratives and featured Ashoka Campus Change Leaders in the areas of Administration, Research and Experiential Learning. Each participating Ashoka Changemaker Campus was asked a similar series of questions to surface promising pathways into post-secondary partnerships from a research perspective at Royal Roads University and experiential learning perspective at Georgian College.

The Campus Fishbowls surfaced the complexity of the post secondary institution's business model. This includes public institutional governance structures for designing, funding and delivering curricular and co-curricular offerings within unionized and academically rigoured constructs. Educators, researchers, staff and program directors - even the most community-engaged - must operate within delineated and codified organizational hierarchies to offer a contribution back to the organization under the dominant commercialization narrative. (Strandberg et al. 2017)

As individual post secondary institutional stakeholders, they also desire to effect meaningful positive change in their communities and express that affinity in all the ways that their institutional structures permit and enable. But the systems they inhabit - 13-week semesters, research grant timelines - limit their ability to show up for a grassroots organization to help them navigate the system in the way in which the Ashoka Fellow identified in Fig 8. This does not preclude meaningful collaborations. It only constrains the cadence and resources forcing post-secondary institutions into a 'Shifting The Burden' archetype (Meadows, 2008) and making it harder to build capacity internally to "prioritize and address critical social issues in Canada." (Strandberg, p 29).

Figure 9. Surfacing of Fishbowl #2 the core activities of Royal Roads University that would benefit community-based organizations and maximize accelerated social innovation for Canadian communities.

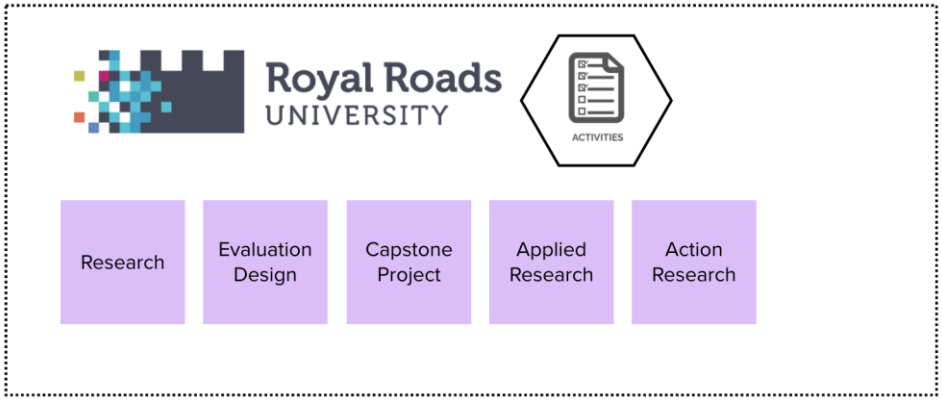
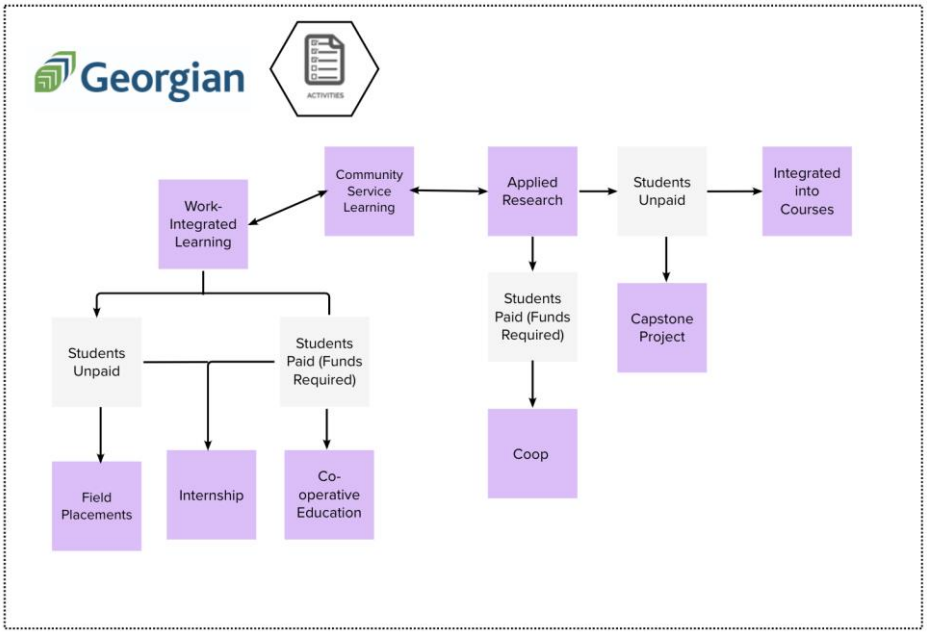


Figure 10. Surfacing of Fishbowl #3 the core activities of Georgian College that would benefit community-based organizations and maximize accelerated social innovation for Canadian communities.



Outcomes

When the Fishbowls were concluded, the entire group of participants was invited to explore the MURAL board and the many different interpretations and reactions documented. This included the outcomes of the real-time clustering that was completed by the Research Assistants and how the information shared was interpreted in the context of the lexicon of the Flourishing Business Model Canvas. Participants were invited to share their interpretations of the clustering, and were encouraged to contribute their own perspectives to the sense-making. This process surfaced a diverse range of perspectives and patterns of convergence and divergence around different pathways or journeys for how Life.School.House, Royal Roads University, and Georgian College could work together to achieve common goals and co-create economic, social and environmental value (Upward and Jones, 2015).

Post-workshop sense-making used the Flourishing Wayfinding Cards (Norris, 2019) to construct stories of how collaboration journeys might unfold through the engagement of an Ashoka Campus' activities (Fig 9 and 10) to respond to the needs of the Ashoka Fellow (Fig 8). This speculative wayfinding can be seen in Figures 11.a and 11.b using the elements of the Flourishing Business Model canvas constructed in a co-creation of 'community ambition' within the business model of the post-secondary institution.

Figure 11.a Sensemaking Clusters for the various Needs of Life.School.House

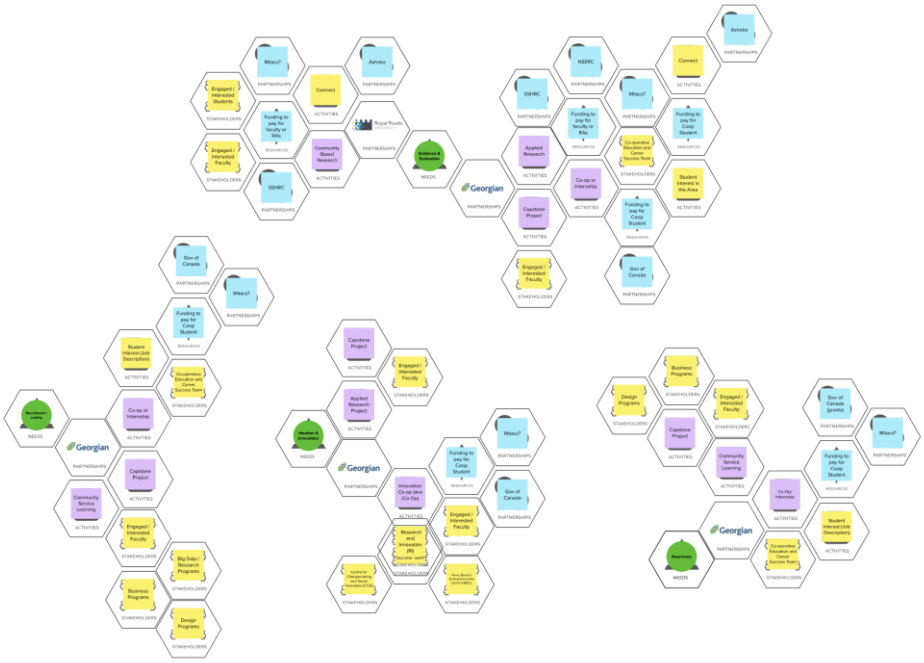
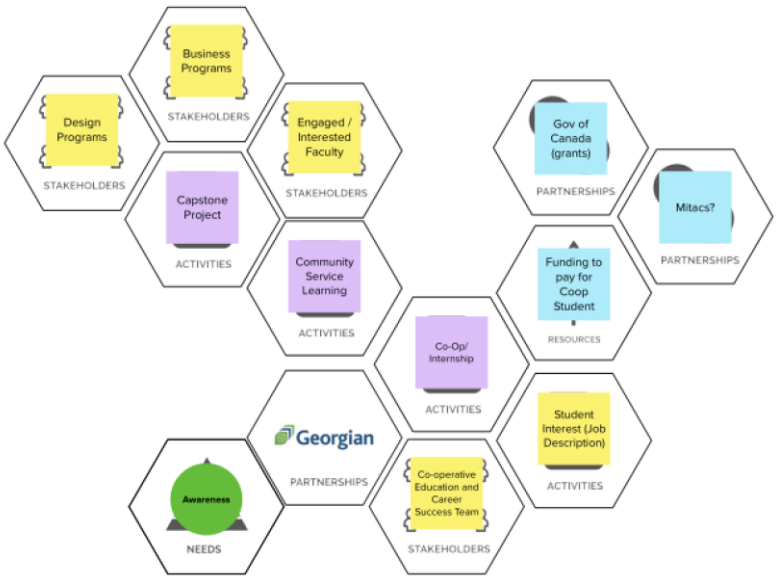


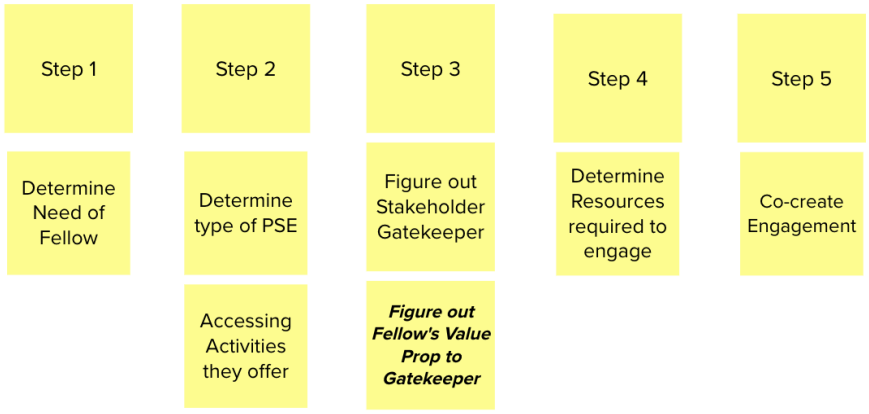
Figure 11.b Sensemaking Cluster - specific to the Life.School.House Need for awareness of the social impact and value co-creation.



Key Insights:

Once the wayfinding journeys were translated using the Flourishing Wayfind Cards (Norris, 2019), a thematic analysis was done to provide the Ashoka Fellow and Ashoka Changemaker Campuses with an overview of what surfaced as a result of the workshop for Ashoka Canada and how this would clarify next steps. This included a preliminary check-list to help a community-based social entrepreneur co-create effective campus-based partnerships. (Fig 12).

Figure 12 - Steps For Ashoka Fellow (Community) to design collaboration pathway with Ashoka Campus (Post Secondary Institution)



Other key insights and conclusions identified by listening participants include:

There is promise in what deep connections between fellows (community) and campuses could bring that could lead to advanced educational institutions building social infrastructure *with and for* Canadian communities.

Community organizations that can clearly articulate their needs are better equipped to engage academic partners. However, this can be a huge reach for many grassroots organizations. They are quite busy "doing" and may struggle to see the value of putting in effort to learn and then use the language required to speak to academic partners or do the research to identify what might even be possible (ie: "capstone projects" hold great potential for community-focused deployment, but if community partners haven't heard of it, they cannot reasonably be expected to seek it out).

Community-focused research holds potential for powerful transformational experiences for undergraduate students.

Bridging collaboration requires complex conversations with complex stakeholders. The Connector Workshop is one way to simplify complexity and bring increased clarity and empathy for participants. While the process appears simple, its delivery requires certain conditions and the people who facilitate it require specific competencies, approaches, and mindsets.

Change-focused research is more effective when characterized by relationship-based co-creation. Where relationships exist, institutions, and the people within them, can hack their system and make something happen (the strong ad hoc community practices mentioned in figure 3, Continuum of Practices). However, the challenge is when a new actor seeks a pathway into a higher ed institution, without the benefit of an existing relationship. An institutional unit or team that is skilled in building

and holding relationships could fulfil the important role of the "concierge/matchmaker": the institutional front door for potential community partners, or a business development office for community stakeholders.

Translation is critical. There is a strong need for someone who can way-find and navigate both systems to find the right fit & the right funder. This is currently a missing piece that is needed to bridge the relational system space as outlined by Goodchild (2020) The characteristics of these *sacred space* stakeholders would need to be moderately fluent in the languages and cultures of each system to which they are connected, feeling a level of affinity for each system, and sincerely caring about the best interest of each. The level to which they may identify personally with one system over the other varies, and ought to. Within post-secondary workforces today, there are fragments of these people or intrapreneurs dispersed across large complex institutions. Their offices or titles include terms like: community engagement, civic engagement, social impact, social innovation, social entrepreneurship, social justice, equity, diversity and inclusion, reconciliation, sustainability, procurement, research etc; The challenge is making those fragments visible and connected to one another within the institutions.

Provide new tools, competencies and resources to design through the messy middle. There is opportunity for Ashoka Canada and/or other intermediary organizations to better bridge between sector actors and offer a ecosystemic value proposition to navigate system complexities.

Conclusion

Based upon the outcomes and insights of the Fishbowls conducted during our connector workshop, post secondary institutions will need to explicitly acknowledge how the Typology of Instruments for Institutional Engagement (Fig 1.) (Strandberg et al. 2017) affords a socio-economic position of privilege within Canadian communities. The inquiry of *how* to make these instruments accessible in place-based contexts, and the methodology to leverage them in a post secondary institution business case for accelerated social innovation, is a gap that needs to be considered within the call to action of 2017 white paper and subsequent 2020 follow-up report.

In completing the connector workshop we were able to explore *'how'* a community-organization (Ashoka Fellow) might access the Instruments for Institutional Engagement (Fig 1) of Research and Education within a Post-Secondary Institution (Ashoka Campus). Through the workshop's Fishbowls we surfaced the question: What organizational self-awareness around the capacity of their strategic planning elements, as outlined in the Social Impact Pathway (Fig 4), are required by the Post-Secondary institution to collectively explore, test and scale [new] higher and [inclusive] impact strategies with the privilege held in current political, economic and cultural system narratives? (Dioury, Varga-Toth, Strandberg et al., 2020)

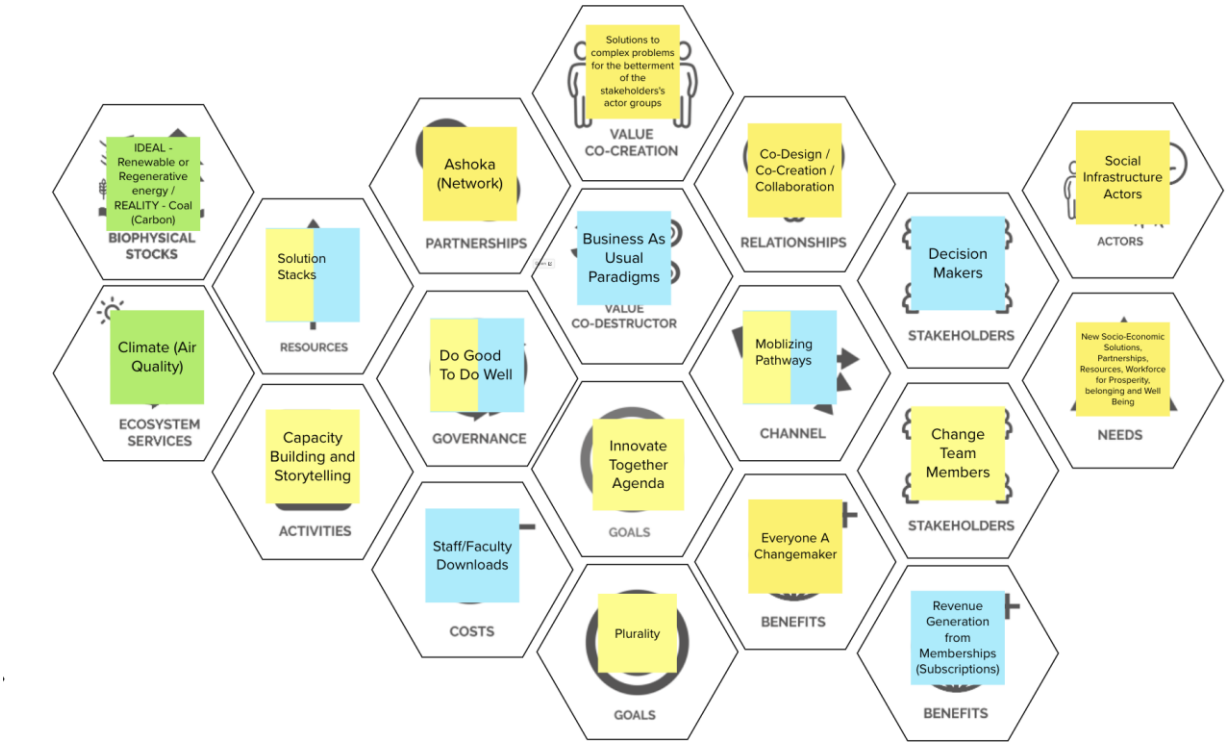
From here our key insights revealed a need for a 'translator' to bridge the relational or *sacred space* (Goodwin, 2020) between ecosystem actors to achieve the types of systems change exercises needed to build social infrastructure. These insights further confirmed these systems change exercises needed to be informed by a sense of place, co-designed and embassaged through trusting relationships with these 'translators.' These systemic translators should have the ability to visualize complex systems change scenarios, inspire post secondary champions to foster social impact capacity and field-build democratic convening within the sector. (Dioury, Varga-Toth, Strandberg et

al., 2020). These activities performed by the translator would require new democratic tools, flourishing capabilities, and culturally inclusive approaches that would enable “the future viability of human generations within groups associated by settlements, arts, religion and cosmological beliefs, and the continuity of knowledge practices.” (Jones, 2017).

Ashoka Canada through its Changemaker Campus Designation framework requires institutions to establish a cross-cutting Change Team to build the capacity of the designated campus to maximize the capacities of its institution to build social infrastructure for Canadian communities with its students, staff, faculty and partners. The connector workshop was a microcosm of the same relationship the Ashoka Fellow identified in building meaningful collaboration pathways with the Ashoka Campuses, as Campus Change Teams have in designing meaningful value co-creation to their institution's current Senior Leadership Teams and key institutional decision makers.

Through the convivial approach (Illich and Lang, 1973) and tools of the Flourishing Business Model Canvas (Upward and Jones, 2015), (Hoveskog, Norris and Ostuzzi, 2020) and Flourishing Wayfind Cards (Norris, 2019) we are proposing that the Change Team identify as an internal Business Model Innovation to the Firm. Using the tools and approach above, the goal would be to provide a model for Ashoka Campus Change Teams with the explicit structure that supports post secondary institutions to build the business case for an accelerated social impact field of practice and sector paradigm shift through solving complex issues in strongly sustainable or ‘flourishing’ ways. (Upward and Jones, 2015)
Articulated as Changemaking As A Service - CaAS (Fig 13), we have conceptualized CaAS as a prototype of the Social Impact Pathway (Fig 4) mapped to the Flourishing Business Model lexicon, to help Change Teams articulate their value co-creation to the institution. Leveraging changemaking as a business model innovation in the service of solving complex problems across the institution itself, the Changemaking As A Service model, proposes to aid post secondary institutions with the capacity to convene system translators under a governance of do good to do well, unlocking more of their assets for the greater good, and accelerating further progress towards flourishing communities, cultures and economies. (Dioury, Varga-Toth, Strandberg et al., 2020)

Figure 13 - A conceptualization of the Social Impact Pathway mapped in a Changemaking As A Service Postsecondary Institutional Business Model Innovation.



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Actors‘ Values and Interests in Sustainability-Oriented Ecosystems

Work in Progress

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Abstract

Sustainability-oriented ecosystems help to address grand challenges. Surprisingly, actors' interests and values are mostly missing. Therefore, the research question is how do interests/values influence sustainability-oriented ecosystems. An embedded case-study design is applied. The findings may show how actors reflect on their interests/values and share them with others. Comparing actors' behavior in situations with (in-)congruence of interests/values will provide new insights.

Keywords

Ecosystem, Interests, Values, Sustainability, Waste

Introduction

"Morale purpose can be a fertile source of innovation in business" (Damon, 2004, p. 8).

Businesses and society become increasingly aware that the world faces complex problems that need complex solutions that single actors will hardly accomplish alone (George et al., 2016; Nylund, Brem & Agarwal, 2021; Snihur & Bocken, 2022). Ecosystems are an essential upcoming research field of digital technology-enabled change that transcends firm and industrial borders (Rindfleisch et al., 2020). Notably, the "study of sustainability in innovation ecosystems is still in its infancy, and much more work is expected in this field" (Nylund, Brem & Agarwal, 2021, p. 33). Waste is a problem that causes various adverse effects on people and the planet, and Sustainable Development Goals 11 and 12 refer to waste. Hence, waste is a recurring topic in public discourse.

The latest examples are the ban on disposable products such as plastic straws in the European Union, the growing awareness regarding microplastics polluting the sea, or China's ban on plastic waste imports. Circular economy questions society's perceptions of waste and spreads the idea to reframe waste as a resource (Geissdoerfer et al., 2017; Neumeyer, Ashton & Dentchev, 2020). These changes in context and perceptions of sustainability enable new business models and related ecosystems that apply technologies in innovative ways to contribute to sustainability.

One central and characteristic assumption of ecosystem thinking is that all participants of an ecosystem share a common goal, e.g., value creation, innovation, entrepreneurial activities (Moore, 1996; Klimas & Czakon, 2022). Surprisingly, ecosystem actors' interests and individual goals are mostly missing in previous research (Lappi, Haapasalo & Aaltonen, 2015). For example, Autio (2021) mentions ecosystem benefits as actors' expectations regarding exchanges or compensations for contributing to the ecosystem. Anyway, he neither discusses benefits in detail nor considers them in the multi-layered ecosystem orchestration framework (Autio, 2021). This framework differentiates between four different layers of ecosystem orchestration (technological, economic, institutional, and behavioral). However, even the institutional layer of ecosystem orchestration that defines roles, resolves conflicts, and seeks a favorable regulation entails no deeper discussion of the individual perspective (Autio, 2021).

Additionally, also the work of Schreieck, Wiesche and Krcmar (2021), which deepens the understanding of relationship-centric activities in ecosystems, remains silent on the topic of individual interests or personal values. Therefore, related perspectives on the impact of interests and values may enrich ecosystem thinking. Indeed, future research should look at value (in-) congruence in stakeholder relationships (Bundy, Vogel & Zachary, 2018) and investigate the "jointness of interests and values" (Kujula et al., 2022). Similarly, Freeman et al. (2010) called for future research on shared values and interaction effects of stakeholders regarding "the jointness of stakeholder interests" (p. 288). Mainly to create win-win solutions in sustainability-oriented ecosystems, it seems promising to deepen understanding of the role of actors' interests and values. Therefore, this study's **research question is how values and interests influence the evolution of sustainability-oriented ecosystems**.

The remainder of this short paper is organized as follows. First, ecosystems and relationship-centric activities such as orchestration and evangelism are introduced. Subsequently, stakeholder theory informs arguments on the stakes and interests of actors. Afterward, values are presented as a distinct theoretical concept. The literature discussion concludes with the consideration of the first pioneering works that address interests and values in ecosystems. Second, the study's methods are described. Third, the expected contributions of this work in progress are briefly outlined.

Literature on interests and values in ecosystems

One well-established perspective on collaborating actors contributing to joint value creation is ecosystems (Adner, 2017; Jacobides, Cennamo & Gawer, 2018; Autio & Thomas, 2020; Bacon, Williams & Davies, 2020). In general, an ecosystem is an emergent structure with multiple actors coordinating their activities to co-create value that includes complex complementarities (Adner, 2017; Bacon, Williams & Davies, 2020). Research on business ecosystems has started in the 90ies with the seminal works of Moore (1993, 1996). Moore introduced the idea of actors collaborating

across industry borders to create innovation and predicted that future competition would occur at the level of business ecosystems. In business ecosystem research, the dominant focus has been either on the coordinated value creation of different actors like suppliers, complementors, and customers (Frow, McColl-Kennedy & Payne, 2016; Dedehayir, Mäkinen & Ortt, 2018; Kapoor, 2018) or ecosystem roles such as orchestrators (Lingens, Böger & Gassmann, 2021; Lingens, Huber & Gassmann, 2021), leaders (Moore, 1993), and focal firms (Adner, 2017). The first research stream focuses on value creation activities and the resulting strategies of the different actors. The second research stream concentrates on capabilities regarding the management of ecosystem structure and ecosystem evolution.

In general, some form of relationship management emerges in an ecosystem. The capabilities concerning relationships are developing because of complex contribution patterns (Schreieck, Wiesche & Krcmar, 2021). Orchestration in business ecosystems is "a distinctive governance challenge that largely arises from the absence of formal 1-to-1 contracts to define relationships among ecosystem participants and their reliance on the voluntarily created inputs by hierarchically independent participants for the co-production of ecosystem-level value offering and for the facilitation of ecosystem benefits" (Autio, 2021, p. 6). Orchestrators can be large established firms or startups (Lingens, Böger & Gassmann, 2021), and even several ecosystem actors can share orchestration tasks (Lingens, Huber & Gassmann, 2021). The central mission of orchestration is building and maintaining relationships between ecosystem actors to enable value co-creation. This idea of orchestration entails the individual benefits the different actors of an ecosystem get for their contribution (Autio, 2021). Another activity regarding relationships in ecosystems is ecosystem evangelism, with the goal "to create a joint vision for the platform ecosystem to incentivize third-party contributions" (Schreieck, Wiesche & Krcmar, 2021, p. 380). According to Schreieck, Wiesche and Krcmar (2021), evangelism in ecosystems manifests as creating a joint vision, a unifying brand image that entails openness, and convincing known actors of ecosystem participation. In the following, I will argue that another relationship-focused activity in ecosystems dealing with individual interests and values represents a helpful supplement for sustainability-oriented ecosystems.

In stakeholder theory, stakes and interests are central but often implicit topics. In this theory, value creation takes place for all stakeholders, and multiple relationships between actors that have a stake in the same activities are the basis of any enterprise (Freeman et al., 2010). Having a stake in activities means the actor can gain or lose through the business activities of the ecosystem. For example, Freeman et al. (2010) mention the financial stakes of owners and investors, jobs and livelihood of employees, or resources for products and services of customers and suppliers. Stakeholder theory claims that the stakes of different stakeholder groups show diverse facets and connections to each other (Freeman et al., 2010; Freeman, 2017). Stakeholder interests result from what is at stake for the respective group or the individual (Sturdivant, 1979; Miles, 2017). Sometimes interest, stake, claim, or risk are used as synonyms (Miles 2017).

In this realm, the jointness of stakeholder interests means actors establish a cooperation system because together, they can create value that none could create without the others (Freeman, 2017). Freeman (2017) assumes that stakeholders neglecting the interests of other stakeholders to fulfill their interests will cause disruptions. Consequently, stakeholders with neglected interests will withhold their co-creation contributions or engage in a competing ecosystem. This assumption makes stakeholder interests an exciting concept to understand ecosystem evolution. Following

Freeman's (2017) assumption regarding the jointness of stakeholder interests, one would expect that ecosystems where interests are congruent could evolve. In contrast, ecosystems could stagnate or shrink when interests are not aligned. In these cases of neglected interests, actors may leave the ecosystem and look for another ecosystem where their interests are considered. Finally, these actors may mobilize like-minded allies and initiate a new ecosystem.

Actors in ecosystems may perceive different things at stake depending on what is valuable to them or society. First, this contains individual preferences. Actors in the ecosystem may perceive specific things, ideas, or resources as valuable compared to other actors. Tsujimoto et al. (2018) introduce beliefs, decision-making principles, or priorities for such individual perceptions of value. Second, actors can also ascribe value to other entities like society or nature. This second aspect questions the behavioral assumption of self-interest (Freeman & Velamuri, 2006). For example, stakeholders can request businesses to implement responsible practices because they value responsibility. Such stakeholder interests may support system change towards sustainability (Freeman & Elms, 2018). For instance, DiVito and Ingen-Housz (2021) introduce an individual's sustainability orientation as one aspect that fosters collective sustainability innovation and the emergence of sustainable entrepreneurial ecosystems.

The idea that sustainable business activities entail a more explicit value consideration is broadly acknowledged, but the operationalization and implementation of different value perspectives are still contested (Dentchev et al., 2018). For instance, environmental values can refer to personal beliefs or informal institutions (in contrast to formal institutions like laws; Shepherd & Patzelt, 2011). In value theory, values form the basis for understanding personal beliefs regarding environmental and social themes (De Groot & Steg, 2008). Values or beliefs describe what actors consider right or good (or respectively wrong or bad) independent from the specific situation (Schwartz, 1994). Schwartz (1994) explains that values can guide behavior because individuals perceive values as personal guiding principles or goals. According to value theory, individuals can develop values in two ways. First, they can adopt values from others through social interactions (socialization). This adoption happens with broadly accepted, i.e., so-called dominant, group values. Second, individuals can also question and change values because of unique personal experiences (Schwartz, 1994).

Recently, studies began to consider values in ecosystem research, such as cultural values (Alba Ortuño and Dentchev, 2020) and sustainability orientation (DiVito & Ingen-Housz, 2021). Generally, individuals who show a sustainability orientation consider environmental protection, preservation, and social justice desirable and may become sustainable entrepreneurs (Kuckertz & Wagner, 2010; Shepherd & Patzelt, 2011; Calic & Mosakowski, 2016). Nylund, Brem and Agarwal (2021) argue, "an ecosystem can become more sustainable as the values of its participants coevolve" (p. 10). DiVito and Ingen-Housz (2021) observed differences between actors of sustainable ecosystems. First, actors representing for-profit firms could show a sustainability orientation, but this orientation caused complex challenges for the actors to integrate social, economic, and ecological perspectives. Second, actors of non-profit organizations with a sustainability orientation are motivated to change the institutional status quo.

Stakeholder interests are an established research field (e.g., Freeman, 1984; Reynolds, Schultz & Hekman, 2006) and research on values from psychology may further inform stakeholder theoretical arguments (Johnson-Cramer et al., 2021). In addition, stakeholder research supports the positive impact of shared normative values on cooperation (Freeman and Velamuri, 2006) and firm

performance (Martin & Philipps, 2021). Finally, as sustainable innovations in ecosystems are expected to support the preservation and regeneration of natural and social resources (Snihur & Bocken, 2022), a deeper understanding of interests and values in sustainability-oriented ecosystems is instrumental in addressing the grand challenges.

Methods

As ecosystem emergence and evolution entails complex interdependencies between actors and the context dimension, an embedded case study is best to gain a detailed insight into the impact of values and interests (Gehman et al., 2018). Furthermore, an embedded case design allows combining strengths of single cases with advantages of multiple comparative cases. On the one hand, classic single cases concentrate on gaining deep insights into one organizational context, comparisons within this context, and telling a detailed and illustrative story to inform theory building (Dyer Jr & Wilkins, 1991). On the other hand, multiple case selection allows cross-case comparisons that show patterns and complementarities combined to form a more nuanced picture and inform strong theory building (Eisenhardt, 1991; Eisenhardt & Graebner, 2007).

The cases of this study constitute actors in one ecosystem. All cases (ecosystem actors) share the same context but differ in their processes. The case selection follows the idea of theoretical sampling. However, theoretical sampling is not random; instead, case selection concentrates on finding cases that help understand constructs and their effects (interests and values) (Eisenhardt & Graebner, 2007). This study's idea is to select actors that were part of the ecosystem simultaneously and faced similar initial conditions (e.g., societal developments). Eisenhardt (2021) characterizes this case selection strategy as "racing" and explains it is "in effect, a natural experiment which dovetails will with the recent interest in causal identification" (p. 150).

The ecosystem chosen for analysis is labeled "waste as a resource". The waste ecosystem seems especially fitting for this research purpose for several reasons. First, waste is one big challenge for society to become more sustainable, and well-known sustainability concepts like circular economy, recycling, and innovative materials affect this ecosystem (Neumeyer, Ashton & Dentchev, 2020). For example, the idea to reduce waste or recycle and reframe waste as resources questions established business logic in this context (Geissdoerfer et al., 2017). Second, the ecosystem consists of diverse actors such as for-profit business firms, municipal organizations, communities, households, etc. These various actor categories help rule out alternative explanations in light of theoretical sampling as they represent theoretical replication (Yin, 2018). The case selection follows no strict replication logic. However, these differences are essential to understanding the mechanisms inside the ecosystem. Third, the societal discourse on waste issues (like the ban on disposable products such as plastic straws and bags in the European Union, the pollution of the environment with microplastics, or China's ban on imports of plastic waste) may also raise the awareness for corresponding interests and values regarding the impact of waste on the environment.

The data collection builds on interviews with ecosystem actors following the described sampling strategy and additional public available documents for triangulation (Yin, 2018). The interview guidelines apply general interview design principles (Rowley, 2012). Interviews will be recorded and

transcribed. All available qualitative data form the basis for qualitative data analysis to create case descriptions and comparisons between the cases.

Expected contribution

The findings are expected to enrich our understanding of relationship-centric activities in sustainability-oriented ecosystems. First, actors may undertake activities to reflect on their interests/values and share them with others. Second, there may be situations with interest/value congruence and incongruence. Exploring actors' behavior in these situations will provide fresh insights into the emergence and evolution of sustainability-oriented ecosystems and open up new opportunities for future research.

Research on values and interests is still incomplete. Are all stakeholders aware of their values? Are actors in sustainable-oriented ecosystems guided by their values/interests? Or does classic profit logic dominate? How do actors communicate their interests and values to current and future collaboration partners? How do actors perceive the values and interests of others? Which behaviors in the ecosystem are influenced by values and interests – and how? This work in progress may spark exciting discussions on values and interests and their effects in sustainability-oriented ecosystems. The interviews will start in spring 2022; the first preliminary results are expected during the first half of 2022.

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Eco-retribution as a new tool to boost Circular Business Models experimentation and upscaling

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Abstract

In this article, we describe how, in addition to their traditional eco-design tool, namely eco-modulation, Producer Responsibility Organizations (PRO) can now rely on a new tool, called eco-retribution, in order to create supportive business ecosystems that boost experimentation and scaling of circular business models in an efficient way.

Key words

Circular Business Models, Supportive business ecosystem, Extended Producer Responsibility, Eco-modulation, eco-retribution

Addressed problem and first elements of literature review

In this article, we analyze how Producer Responsibility Organizations (PRO) involved in Extended Producer Responsibility (EPR) systems can create ecosystems that stimulate experimentation and scaling of circular business models in an efficient way. More specifically, we conduct a comparative analysis of two tools respectively called eco-modulation and eco-retribution. The former is the most common differentiating fees mechanism used by PROs to promote eco-design in various countries (Eunomia, 2020), while the latter is a new tool, which was developed and launched in 2021 by the French furniture PRO Eco-mobilier. Instead of focusing solely on product design, it specifically aims to scale up the circular business models of the actors that are part of the PRO's ecosystem.

The concept of EPR was introduced in Europe in the late 90's (Lifset, 1993; Lindhqvist, 2000). It is based on the "polluter-pays" principle. The purpose is to internalize the cost of waste disposal into the cost of the product, theoretically meaning that the producers will improve the waste profile of

their products, thus decreasing waste and increasing possibilities for reuse and recycling. Its significance and implementation have constantly evolved since then. To fulfill their responsibility, producers can either implement an individual system or join a collective organization. For economies of scale motives in collection and treatment activities, in most cases producers opted to share their responsibility by joining a Producer Responsibility Organization. PROs are collective organizations that play a major role in the implementation and management of EPR systems. Although their role has varied widely, one of their main traditional objectives is to create, coordinate and monitor on a day-to-day basis ecosystems of actors that will be able to achieve the specific waste collection, recycling and reuse targets set by law. EPR schemes have been increasingly used since the last decades, to the extent that they have become a key policy instrument at the European level (Micheaux et Aggeri, 2019 ; Micheaux, 2019).

The traditional funding method for EPR schemes is a fee paid by consumers when they purchase new products to cover the costs of end-of-life treatment. In collective systems, this fee is collected by manufacturers and retailers and transferred to the PRO. With these funds, the PRO can compensate stakeholders for their collection, sorting, preparation for reuse or recycling services.

Eco-design of products, which aims to improve their environmental impact and facilitate their reuse or recycling, is a fundamental objective of the EPR system (Laubinger et al., 2021). To achieve this objective, some EPRs in some countries differentiate fees according to eco-design criteria (Eunomia, 2020). In France, this mechanism is called eco-modulation. Products that meet specific eco-design criteria benefit from a reduced fee, thereby reducing the financial burden on the manufacturers and retailers involved (Micheaux et Aggeri, 2021).

Nonetheless, while focused on waste management activities, EPR schemes have been criticized for their lack of incentive to change manufacturers' product design (Tojo, 2004; Walls, 2006; Van Rossem, 2008; Mayers et al., 2013) and business models, and the efficiency of the eco-modulation mechanism has been debated (Micheaux et Aggeri, 2021). Related administrative burdens have been highlighted as a critical point (Laubinger, 2021).

In response to these debates, the French furniture PRO Eco-mobilier launched in 2021 a new tool called eco-retribution, as an alternative way to modulate fees (Eco-mobilier, 2021). As an organization in charge of building a supportive business ecosystem for furniture circularity, its goal was to experiment a new tool to try to be more effective in scaling up circular business models based on recycling activities.

It represents a triple paradigm shift for PROs. First, PROs usually have a product-based approach targeting eco-design through the modulation of fees, instead of business model and organizational approaches. Second, its main objective is to encourage economic actors by transferring the administrative burden to the PRO. Third, this new eco-retribution mechanism incentivizes the manufacturers and the retailers who use recycled materials, by proposing them a credit on the fee that they pay to Eco-mobilier for each ton of material bought, with the explicit goal to make recycled material producers' business models more competitive compared to their virgin material competitors. Historically, PROs focused on the previous linkages of recycling value chains, namely collection, massification and sorting, and not recycled material production and use (Aggeri et al., 2019). Nonetheless, increasing the use of recycled materials at the ecosystem level is an essential condition for scaling up the corresponding circular business models (Beulque et al., 2018).

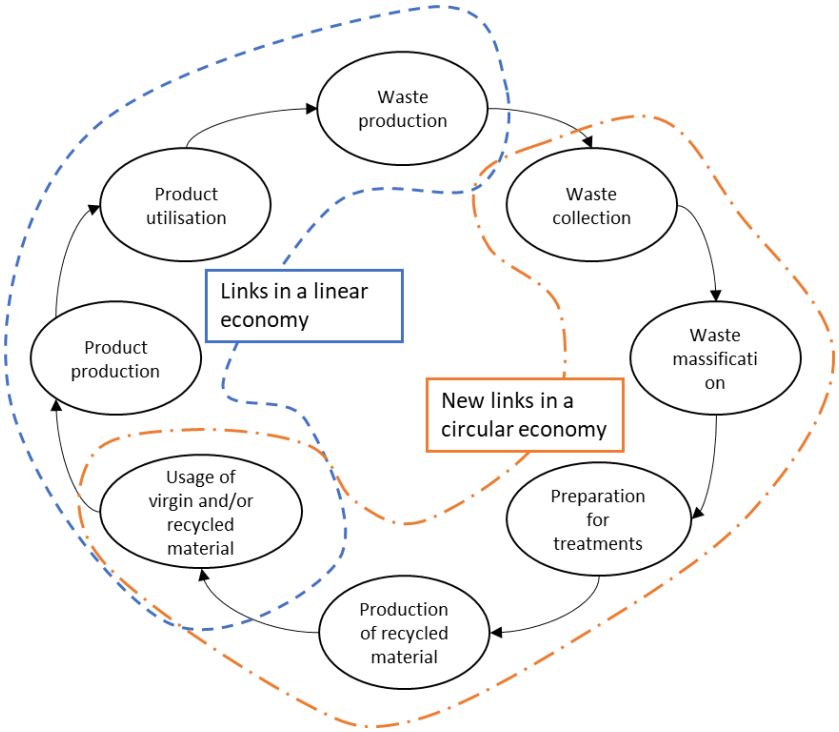

Figure 1: Linkages of recycling value chains (Aggeri et al., 2019)

In this article, we carry out an empirical comparative study of these two mechanisms.

By doing so, we aim at participating in key research paths of the literature on both circular business models and Extended Producer Responsibility to shed light on the organizational conditions and policy instruments required to set up ecosystems that drive producers to implement circular business models (Dentchev et al., 2018; Laukkanen & Patala, 2014; Evans et al., 2017; Peña-Vinces et al., 2021; Tsagarakis et al., 2021). There is an extensive literature on EPR systems that seeks to evaluate their effectiveness in order to improve their performance. Debates are essentially about the lack of incentive for eco-design in a collective model (Tojo, 2004; Walls, 2006; Van Rossem, 2008; Mayers et al., 2013). In this sense, some authors have proposed individualized cost allocation mechanisms based on mathematical models (Mayers et al. 2013; Pires et al. 2015). However, the matter lacks empirical studies. Other research deals with the tension between recyclability and waste prevention objectives (Huang et al. 2019) or the effect of competition between PROs. By discussing two mechanisms, one new and one tested for more than a decade in France, we provide key insights about how to promote eco-design and stimulate circularity business models in Extended Producer Responsibility collective schemes that lack incentives.

From an empirical perspective, this debate has a key importance for practitioners and policy makers (Laubinger, 2021). As evoked, Extended Producer Responsibility is increasingly used as an environmental policy instrument and since 2018, the revised version of the Waste Framework Directive (2018/851) includes fee modulation amongst the general minimum requirements of any EPR scheme. This topic has been much debated during the consultation process launched by the European Commission (European Commission, 2020).

Methodological approach

From a methodological perspective, we base our work on two longitudinal case studies carried out with two French PROs. The first one is Eco-mobilier and deals with waste produced by the furniture sector, and the other one is ecosystem, which is responsible for the EEE (Electronic and Electrical Equipment) sector in France.

We have chosen to conduct a longitudinal analysis as it is well adapted for case studies, allowing us to explore "the contexts, content, and process of change together with their interconnections through time" (Pettigrew, 1990).

Regarding Eco-mobilier, one of the authors carried out a four-year longitudinal action research in Eco-mobilier's Innovation Department, with the mission to promote material recycling and End-of-Life products reuse. One of his missions was to imagine new incentive mechanisms to promote related markets and business models. As such, he spent four years imagining, designing and implementing the eco-retribution scheme. As part of this process, he conducted 76 interviews and working sessions with key stakeholders. Another author has spent over five years studying ecosystem and the French model's governance, carrying 68 interviews and participating in workshops with many stakeholders on major issues facing PROs, such as the modulation of producers' fees. In parallel, the three authors undertook additional interviews with a set of key stakeholders.

As advised by Howard-Grenville (2020), and in continuation of our previous work on circular business models, we adopt a multilevel perspective that combines analysis of system and organizational levels.

Amongst the key stakeholders that have been interviewed, the authors exchanged with several firms that are members of PROs and launched eco-design initiatives in order to understand the effects of the eco-modulation mechanism (Micheaux et Aggeri, 2021). Indeed, both eco-modulation and eco-retribution are ecosystem level tools, since they are implemented by all the firms of a given country that belong to the sector under an EPR scheme and that they can impact all the recyclers of the related industries.

However, these mechanisms need also to be analyzed at an organizational level. As a matter of fact, they are implemented by the PRO itself, as well as by the recyclers, manufacturers and retailers who are members of the scheme. At this level, we proceed to a thorough study of how these two mechanisms are concretely implemented in firms, through organizational processes and data management systems that impacts several of their departments.

First results

In this section, we highlight the key differences between eco-modulation and eco-retribution.

First, as evoked, these mechanisms do not target the same objects. Eco-modulation aims at improving product eco-design. On the other hand, eco-retribution aims at increasing recycled materials use by manufacturers and retailers. In doing so, it seeks to increase the size of the market for recycled materials in order to stimulate the growth of secondary material producers' sales, allowing them to expand their business models. In this optic, eco-retribution provides a financial incentive to manufacturers and retailers for each ton of recycled materials that they buy. As such,

as implemented by Eco-mobilier, for each ton of recycled polyurethane that a producer would use in a mattress, he would receive 50 €.

The second key difference relates to the organizational implications of these two mechanisms. Therefore, in this section, we also describe the organizational challenges that hamper the efficiency of eco-modulation as a tool that can boost eco-design in an efficient way, and the organizational characteristics that make eco-retribution attractive to manufacturers and retailers.

Fees are an additional price paid by customers to manufacturers and retailers when they buy products and they are used to finance the end of life of the products. Within each given EPR scheme, different families of products are identified by specific codes, which are created by the PRO and are composed of a dozen digits. Each manufacturer, a member of the EPR scheme, needs to associate these codes to each of its products and components, and to the different internal codes that enables him to identify them, within its design, manufacturing, sales data management systems. Inside each firm, a single component – or product – has different codes in each data management system. The same operations must be carried out at the level of the retailers' management systems.

As a result, changes in a PRO's eco-modulation policy are generally not welcomed by its members, if not opposed altogether. Indeed, it causes an extensive recodification work, which is considered to be a costly and time-consuming administrative burden. This characteristic often leads PRO teams to abandon proposed changes, since these changes must be validated not only by their board of directors, but also by their administration council, which is composed of the country’s major manufacturers and retailers.

It is on the basis of this analysis that the eco-retribution was proposed, with the main objective of creating a tool in which traceability would not be ensured by manufacturers and retailers, but directly by the PRO, as a collective organization in charge of creating and managing the whole ecosystem.

As evoked, in this mechanism, manufacturers and retailers receive financial assistance based on the number of tons of recycled materials they buy. Therefore, they have very limited information to provide in order to identify their suppliers, and the quantities they have bought over a given period of time. The last additional information to know is the percentage of recycled material that is contained in the material that they bought from each of their suppliers.

In this section, we will highlight how, thanks to their collective nature, PROs are in a key position to create this knowledge and control its veracity. Indeed, through the collection network that they monitor, they know the amount of End-of-Life products collected in a given country. One of their missions is to recycle the materials that compose them thanks to a network of recyclers. Therefore, they also know the amount of sorted materials that are sold by these actors to the producers of recycled materials.

Nonetheless, if eco-retribution appears to be able to alleviate manufacturers and retailers’ administrative burden, its implementation raises other traceability and confidentiality challenges. In this section, we will describe them thoroughly.

Preliminary conclusions

In this article, we contribute to key research paths of the literature on both circular business models, business ecosystems and Extended Producer Responsibility. This is especially the case regarding the role of public actors in the design of policy instruments supporting the development and diffusion of sustainable business models (Dentchev et al., 2018; Laukkanen & Patala, 2014; Evans et al., 2017).

At first, we will enhance the current comprehension of the organizational challenges that hamper eco-modulation's effectiveness as a tool that is designed to promote eco-design. We also identify eco-retribution as a new mechanism to boost experimentation and scaling up of circular business models based on recycling activity, and as a complementary tool to eco-modulation in order to stimulate eco-design and increase circularity in EPR schemes.

Nonetheless, our work still faces limits at its current stage. Indeed, more time is needed for definitive conclusions, since eco-retribution was only launched in 2021. Moreover, this mechanism has initially been launched primarily to boost circular business models based on recycling activities, which is the last strategy according to the waste management hierarchy. Therefore, its ability to promote other circular targets and business models (reuse, eco-design, product as a service, etc.) still remains to be proved.

Summary

In this article, we analyze how Producer Responsibility Organizations (PROs) can create ecosystems that stimulate experimentation and scaling of circular business models in an efficient way (Dentchev et al., 2018). More specifically, based on the two case studies of the French PRO ecosystem and Eco-mobilier, we conduct a comparative analysis of two tools respectively called eco-modulation and eco-retribution.

The former is the most common one. However, its efficiency has been debated and its administrative complexity pointed out (Mayers et al., 2013; Laubinger, 2021). As a response, the latter was proposed in 2021 by the French furniture PRO Eco-mobilier. Its main objective is to create a tool in which traceability related administrative work would not be ensured by manufacturers and retailers, but directly by the PRO, as a collective organization in charge of creating and managing the whole ecosystem. Instead of product design, it specifically targets to scale up the circular business models of the actors of the ecosystem.

Through this article, we contribute to key research paths of the literature on circular business models, business ecosystems and Extended Producer Responsibility. At first, we enhance the current comprehension of the organizational challenges that hamper eco-modulation's effectiveness as a tool that is designed to promote eco-design. We also identify eco-retribution as a new mechanism to boost experimentation and scaling up of the circular business models, and as a complementary tool to eco-modulation in order to stimulate eco-design and increase circularity in EPR schemes.

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Circular Economy Ecosystem Coordination

A comparative study of two sectoral cases

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Abstract

Circular solutions require a systemic approach involving multiple actors within and across industrial sectors. This has implications for the structure and dynamics within geographically bounded entrepreneurial ecosystems. Actors within the entrepreneurial ecosystem assume the role of 'system coordination' but very little is known about this role. As circular solutions and transformations cannot be realized in isolation, a better understanding of this coordination role is pertinent, which actors perform it and the strategies they use to overcome challenges. We conduct a comparative study of two sectoral cases in the Netherlands. Our preliminary findings from the case on circular textiles shows that coordination is distributed among several and diverse ecosystem actors to close technical material flows, whereas our preliminary findings in agri-food show that coordination is concentrated among actors that explicitly assume the coordination role to close biological material flows. We intend to make novel contributions to the literature on circular economy business transformation and entrepreneurial ecosystems as well as provide insights on the system coordination role for policy makers and practitioners.

Keywords

Circular economy, entrepreneurial ecosystems, ecosystem coordination, circular startups

Introduction

The circular economy is increasingly becoming a top priority for many national and local governments. For example, the European Union has adopted The Green Deal, which aims to reduce carbon emissions and decouple growth from resource use (European Commission, 2021). Many European governments have also devised plans to transition from a linear take-make-dispose model to more circular and closed loop production and consumption systems. Among these, the Netherlands, Denmark, United Kingdom, to name a few examples, have initiated nationwide goals to achieve circularity in several key sectors by 2050. Additionally, recent legislation on extended producer responsibility, plastic and textile waste has been introduced in countries like Sweden,

France, and the Netherlands (Vermeulen et al., 2021). Related to these developments, entrepreneurial action oriented towards the circular transition of key sectors, such as energy, food, and textiles, has grown. New ventures, termed circular startups (Henry et al., 2020), and incumbents alike have begun to experiment with technology and business models that transform linear business as usual to circular solutions and has sparked an emerging literature on the circular economy, circular business models, and circular strategies (Brown, Bocken & Balkende, 2019; Konietzko et al., 2020). Scholars of the circular economy point to the systemic nature of circular solutions and innovations and posit that an ecosystem perspective is needed to advance our understanding of the circular economy (Kanda, Geissdoerfer & Hjelm, 2021).

Entrepreneurial ecosystems are holistic systems that involve diverse actors in innovative and entrepreneurial activity. Defined as "a dynamic community of interdependent actors (entrepreneurs, suppliers, buyer, government, etc.) and system-level institutional, informational and socioeconomic contexts" (Audretsch & Belitski, 2017, p. 4), entrepreneurial ecosystems manifest on various levels (e.g. local, regional, national) and cross industrial and geographic boundaries. Entrepreneurial ecosystems consist of actors and mechanisms (such as accelerator programs, incubators, competitions) that encourage and support entrepreneurial action and realization of opportunities (Isenberg, 2010) and regional development and growth (Etzkowitz & Klofsten, 2005).

Recent work has begun to incorporate sustainable-related entrepreneurship, the fourth wave of entrepreneurship research (Volkmann et al., 2021), into the concept of entrepreneurial ecosystems. Sustainable entrepreneurship is argued to differ in substantial ways from traditional entrepreneurship, where the role of societal activism, entrepreneurial motivations and collective outcomes influence the constellation of entrepreneurial ecosystems (Cohen, 2006; Mair & Marti, 2006; Dean & McMullen, 2007; Autio et al., 2018). A sustainable entrepreneurial ecosystem is defined by Cohen (2006, p.3) as "an interconnected group of actors in a local geographic community committed to sustainable development through the support and facilitation of new sustainable ventures." The nascent and emerging work on sustainable entrepreneurship ecosystems (SEEs) highlights the interdependency of actors and co-evolution of opportunities (DiVito & Ingen-Housz, 2021; O'Shea et al., 2021), contextual factors (Pankov, Velamuri & Schneckenberg, 2021) and outcomes (Wagner et al., 2021) of sustainable entrepreneurial ecosystems.

Within the broader context of sustainable entrepreneurship, there is a growing interest in understanding circular innovations, circular business models and circular transitions. Circular strategies refer to 'closing the loop' whereby natural resources are reduced, reused, or regenerated. As such, the circular economy holds promise for addressing growing ecological devastation while at the same time offering sustainable entrepreneurial opportunities. However, entrepreneurial ventures focused on circular solutions cannot 'close the loop' in isolation. Prior work on circular business models and circular strategies argues that circular businesses and solutions are systemic and require coordinated efforts that involve multiple actors within and across industries and geographies (Kanda et al, 2020).

We argue that entrepreneurs and actors pursuing circular opportunities need coordination mechanisms within the entrepreneurial ecosystem. There is scant knowledge about the role of system coordination in entrepreneurial ecosystems. For circular-oriented entrepreneurs, it is imperative that circular opportunities are not only identified in collaboration but also realized and

maintained in long-term cooperative relations. In this regard, circular-oriented entrepreneurship differs from traditional and sustainable entrepreneurship; it raises questions about which ecosystem actors assume the role of coordination and the strategies they use to overcome challenges in coordinating diverse ecosystem actors. In the literature on entrepreneurial ecosystems to date, the role of ecosystem coordination is ambiguous and unclear. We aim to contribute to this gap in the literature and bridge work on entrepreneurial ecosystems and circular entrepreneurship.

We investigate circular entrepreneurship in two sectors – textiles and agri-food – uncovering the actors within the entrepreneurial ecosystems that coordinate entrepreneurial action towards realizing circular solutions, innovation, and industrial transformation. We gathered data from in-depth interviews, field observations, and archival documentation over a two-year period. We comparatively analyze the role of entrepreneurial ecosystem coordination and highlight differences and similarities in how intermediaries facilitate interaction between new entrants and incumbent firms. We find that the coordination role is concentrated among key actors within the ecosystem. We develop a conceptual framework that illuminates the boundary conditions of the entrepreneurial ecosystem coordination role. We make important contributions to the sustainable entrepreneurial ecosystem and circular economy literatures. Our study also has important implications for circular-oriented entrepreneurs and policy makers in that it provides insights into mechanisms that support circular ventures, business models and industry transformations.

Method

We conducted an inductive, exploratory, multiple case study of two entrepreneurial ecosystems in the Netherlands that are experiencing growing momentum to transform from linear take-make-dispose models to circular models that close resource loops. We draw on an engaged scholarship approach which allows for a closer examination and participation in the phenomenon being studied (van de Ven, 2007). The exploratory nature of our question and the scant knowledge about entrepreneurial ecosystem coordination and circular startups call for methods that allow for deeper insights and understanding of how events unfold over time (Langley et al., 2013).

We focused our inductive study on two sectors in the Netherlands where extensive entrepreneurial activity in circular solutions and transformation is taking place, namely the textiles industry and the agri-food industry. These cases provide insights into distinct contexts. The Dutch textile industry is in the midst of a circular transition that involves many local, regional and international actors along the textile value chain. Several circular-oriented initiatives and startups have emerged in the entrepreneurial ecosystem. The textile case includes two embedded cases, one focused on a regional initiative and the other on an accelerator platform in Amsterdam that operates in an international context. The value chain actors include organizations such as the waste collectors and sorters, ecosystem support organizations, circular startups, and local policymakers.

The agri-food industry is also in the middle of a circular transition since conventional agriculture requires many (artificial) inputs, has biological material leakage (e.g., high nitrogen emissions), and significantly impacts water levels and quality. Our agri-food case revolves around a Dutch organization that promotes the recovery of the Dutch peat meadow landscape through nature inclusive- and regenerative agribusiness supported by sustainable business models. They will coordinate this transformation from conventional agriculture to regenerative agriculture for 20

years (i.e., the minimum amount of time it takes for ecosystem to recover and to transform conventional agribusiness into a regenerative one). To achieve this system transformation, farmers act as innovative entrepreneurs, while the foundation functions as an accelerator, connector, and guide for the wider entrepreneurial ecosystem. By doing so, their coordination allows for the emergence of an entrepreneurial ecosystem that experiments with circular- and regenerative innovations, develops business cases for scaling these, and ultimately closes biological material flows.

We use qualitative methods to gather data and are currently in the process of gathering field data. So far, we have conducted in-depth, semi-structured interviews with various actors in the entrepreneurial ecosystems, including founders, project managers and experts. We also gathered data from archival documentation such as news items, web sites, and reports to triangulate our data sources. All interviews are recorded and transcribed. As we proceeded with data collection, we analyze each interview for emerging insights and code our data using a coding scheme informed from previous literature. The process of data collection and analysis is integrative and iterative, where the analysis guides the subsequent data collection, refining and elaborating on emerging insights (Sinkovics & Alfoldi, 2012). We aim to complete our data collection and analysis in the spring of 2022.

Preliminary findings

Our initial and preliminary findings show that the role of system coordination is temporal, fluid, and distributed, moving between ecosystem actors that share coordination responsibility. We see that circular-oriented actors in entrepreneurial ecosystem coordination are interdependent, where the realization of circular opportunities is dependent on the long-term interaction and partnerships of constituent actors. Closed-loop circular solutions cannot be realized in isolation. Entrepreneurial ecosystem coordinators not only bring together actors to recognize circular opportunities, but they facilitate the long-term relations that are needed to realize fully circular transitions. We devise a framework that outlines the boundary conditions and characteristics of entrepreneurial ecosystem coordinators that are specifically focused on circular startups and transformations. Focusing specifically on circular-oriented actors in entrepreneurial ecosystems, we elucidate the role of coordination, which actors assume the role and the mechanisms used to facilitate coordination. We posit that entrepreneurial ecosystem coordination is a necessary condition for the realization of circular-oriented entrepreneurial opportunities and circular transformation of industries and countries.

Expected Contributions

Our study will make several important contributions to academic literature. First, we aim to contribute to the emerging literature on circular economy and circular economic systems (Kanda et al., 2021). Except for the study from Kanda and colleagues (2021), there are few empirical studies that use an ecosystem approach to understand circular transformations. In line with their study, our preliminary findings show that firm level circular entrepreneurship is dependent on system level integration. We will also contribute to the literature on entrepreneurial ecosystems and the nascent literature on sustainable entrepreneurial systems (Volkmann et al., 2021). As circular-oriented entrepreneurship is related to sustainable entrepreneurship and ecopreneurship, we extend our knowledge about how sustainable entrepreneurial ecosystems support and facilitate actors

focused on circular entrepreneurial opportunities to overcome barriers (Tura et al., 2019). Our study will also have implications for practitioners and policymakers. For circular entrepreneurs, we provide practical insights and mechanisms about the support and coordination mechanisms available in ecosystems. Given that governments have placed a high priority on circular transitions, our findings will inform policymakers in devising schemes that support entrepreneurial ecosystem coordination to encourage and facilitate new entrants and incumbent firms to pursue circular innovations and solutions.

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Digital platforms as innovation catalysts for sustainable business model innovation

The case study of "Too Good To Go"

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Abstract

In this work, the business model of "Too Good To Go" is analyzed through the lens of dynamic performance management, an approach that combines system dynamics and performance management principles. Thus, the circular causality behind how a digital platform can help transition towards a more sustainable economy is explored.

Keywords

sustainable business model, digital transformation, food waste, system dynamics, dynamic performance management

Introduction

Sustainability issues are increasingly asking to redesign modern economic systems, realizing a transition toward the sustainability paradigm (De Bernardi and Azucar, 2020). Since they control the majority of both resources and capabilities, companies are considered central actors to address these issues (Porter and Kramer, 2011) and "important and necessary social change agents" (Aguilera *et al.*, 2007, p. 857). Therefore, reconceptualizing modern economic systems implies the redesign of business models around new ways of creating, delivering, and capturing value (Kjaer *et al.*, 2019; Shams *et al.*, 2021; Urbinati *et al.*, 2017). Environmental goals can be achieved through maximizing material and energy efficiency, substituting with renewables and natural processes, and closing resource loops. Social-oriented goals, instead, can be achieved by leveraging functionality rather than ownership, adopting a stewardship role, and encouraging sufficiency. These goals can be achieved more easily by engaging a varied ecosystem of actors (Pieroni *et al.*, 2019) who collaborate through vertical (collaboration with suppliers and consumers) or horizontal

partnerships (collaboration with universities and research centers) to develop new technologies and innovative solutions. Moreover, the ongoing transition towards a digitized society, further boosted by the COVID-19 pandemic (Bertello *et al.*, 2021), is radically encouraging organizations to develop new products/services, redesign new processes, and disrupt their way of doing business, relying on participatory architectures and openness-based collaborations (Bertello *et al.*, 2021; Forliano *et al.*, 2020; Scheidgen *et al.*, 2021).

Against this background, digital platforms have become relevant to enable connections among people, organizations, and resources in order to enhance valuable interactions between different stakeholders (Gawer and Cusumano, 2014). Advancements in information technology, mobile technology, social media, and, more recently, the spread of cutting-edge IoT technologies have dramatically changed the ease and nature of information flows, making multi-stakeholder collaboration almost imperative (Bogers *et al.*, 2018). However, the literature investigating digital platforms' business model is still scarce and there is a need to shed light on what are the drivers that can ensure the sustainable growth of such businesses and their broader ecosystem (Bivona and Cosenz, 2021; Täuscher and Laudien, 2018).

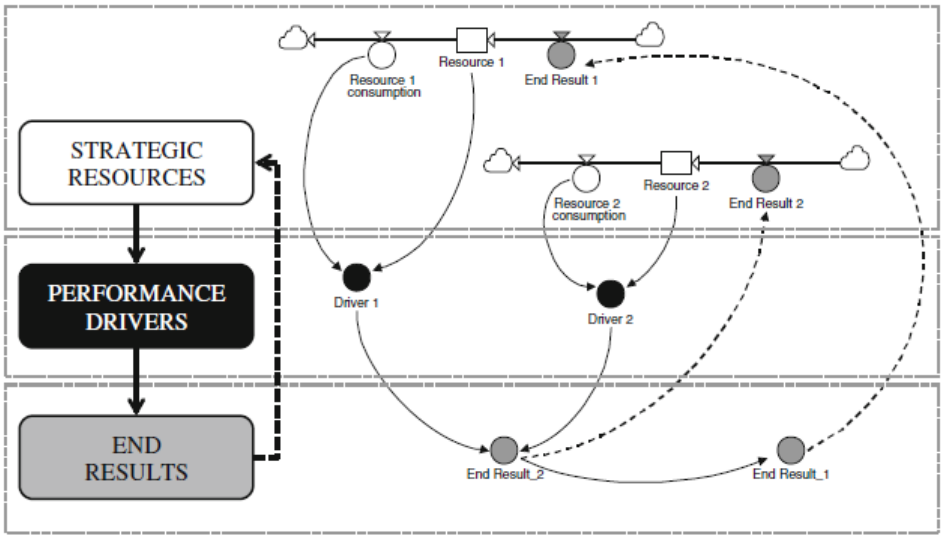
The call for engaging with multiple stakeholders when sustainability issues are at stake arises from the need to deal with complex issues that are characterized by non-linear dynamics and multiple criteria of worth (Ferraro *et al.*, 2015). Therefore, through digital platforms, stakeholders can contribute to sustainable business models rather than being exclusively affected by them. They can thus contribute to extending the resource and the product value (Bocken *et al.*, 2016) through experimentation and learning processes aimed at combining sustainability solutions at the level of firms' business models with system-wide change (Velter *et al.*, 2020). Investigating the case of "Too Good To Go" (TGTG), a digital platform fighting food waste, this paper aims at filling those gaps by contributing to the conference track "Ecosystems in Support of Sustainability".

Methods

Based on a rich document analysis and 5 semi-structured interviews with TGTG's CEO, Education Area Manager, and Italian Business Developer, this exploratory study adopts a dynamic performance management (DPM) approach (Bianchi, 2016) to frame the relationships between the main end results, performance drivers, and strategic resources characterizing the TGTG's circular business model.

DPM arises from the cohesion between the system dynamics (SD) methodology (Forrester, 1961) and performance management in order to support decision-makers to evaluate performance under a systemic perspective (Bianchi, 2016). More precisely, DPM enables decision-makers to highlight short-term end-results (i.e., output) and long-term end-results (i.e., outcome) by opportunely leveraging performance drivers (or intermediate results), activated, in turn, through the deployment of the strategic resources owned. Finally, these strategic resources usually accumulate or deplete based on the change rates of the end-results themselves (Figure 1).

Figure 1. The DPM framework.

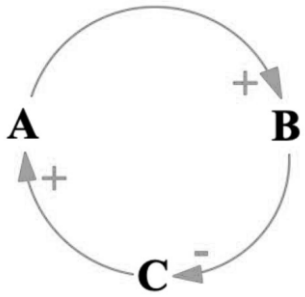


Source: Bianchi (2016:p.73).

The resulting interconnections constitute a system, namely "a regularly interacting or interdependent group of items forming a unified whole" (Merriam-Webster, 2022). Over time, those system components positively or negatively affect one another based on diachronic or synchronous interrelationships that constitute the so-called feedback loops (Gnoffo, 2021). In SD, the latter typically shape the model structure, while the way through which they develop over time constitutes the system behavior (Sterman, 2000). Accordingly, this paper makes use of primary and secondary data to build a DPM chart depicting the structure of the causal mechanisms linking the end-results, performance drivers, and strategic resources underlying the successful TGTG's circular business model.

To better visualize the feedback structure thus identified, we also depicted an SD model in the form of a causal loop diagram. Indeed, causal loop diagrams are particularly useful to visualize the circular logic that defines the connections between distinct variables that compose systems characterized by multiple feedback loops (Richardson, 2011). Figure 2 offers an example of a causal loop diagram, where A, B, and C represent the system's variables, while the arrows connecting them represent causal relationships. These causal relationships can be positive or negative (Sterman, 2000). Positive links mean that there is a direct causal relationship between two variables. For example, if A increases (decreases), also B will increase (or decrease). Differently, negative links mean that the causal relationship is inverse. So, if B increases (decreases), C will decrease (or increase), thus showing an inverse behavior. Feedback loops that include null or an even number of negative links are defined as self-reinforcing (usually labeled with an "R") and associated with exponential growth or decay behaviors. Feedback loops that include an odd number of negative causal links, as in Figure 2, are defined self-balancing (usually labeled with a "B") and associated with a target-seeking behavior.

Figure 2. A simplified representation of a causal loop diagram.

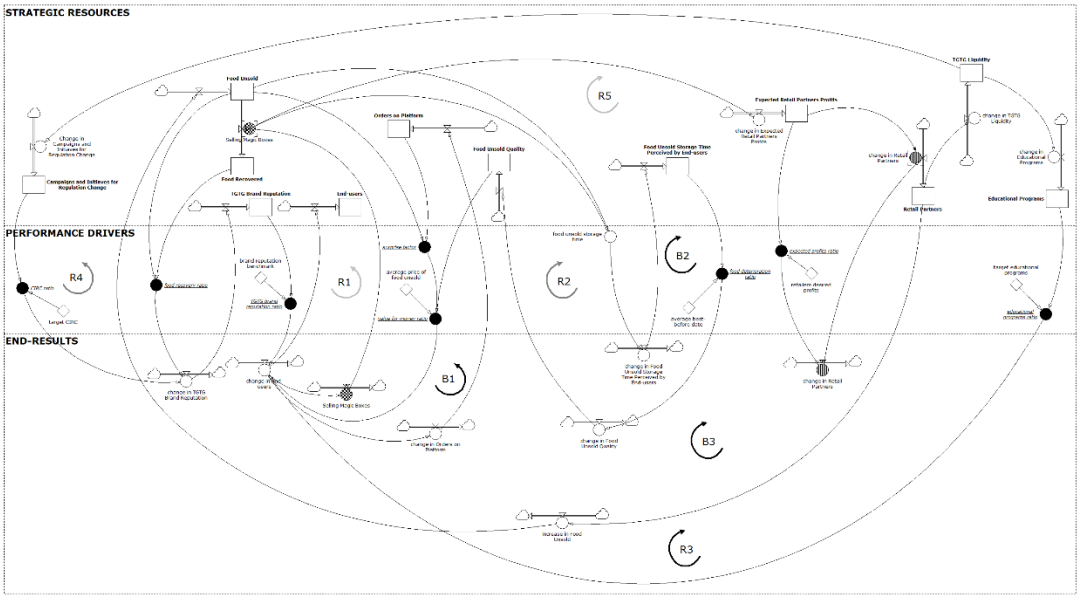


Source: own elaboration.

Results

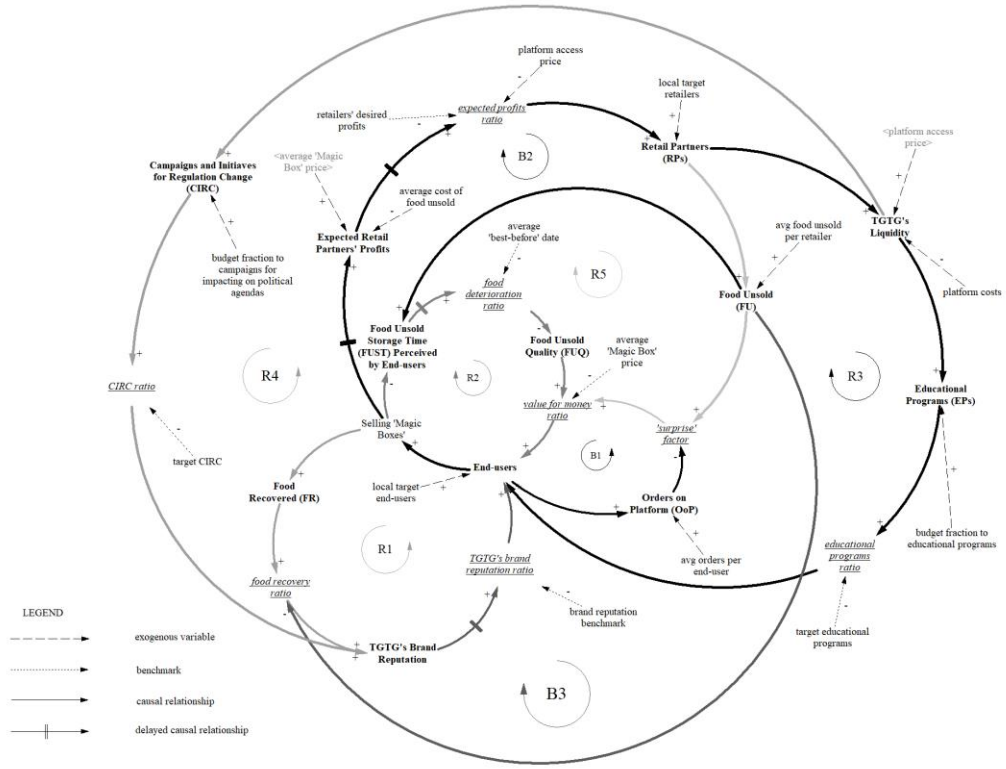
The dynamic cause and effect relationships underlying the model are shown in the DPM chart in Figure 3 and the causal loop diagram depicted in Figure 4. In the following sections, each of those causal relationships is presented and discussed in detail.

Figure 3. The DPM chart of the causal relationships underlying TGTG's circular business model.



Source: own elaboration

Figure 4. The causal loop diagram of the causal relationships underlying TGTG's circular business model.



Source: own elaboration

Too Good To Go and the reduction of food waste

The accomplishment of the TGTG's primary mission to reduce food waste at the retail stage of the supply chain (De Bernardi *et al.*, 2021) can be measured by the intermediate result "food recovery ratio", indicating the social performance driver of the overall TGTG's project. Particularly, it compares the amount of food recovered to that of food unsold and positively impacts TGTG's brand reputation as food recovered equals food unsold. In turn, brand reputation, related to an opportune benchmark (e.g., the best-in-class company's or the desired reputation level), measures the network effect that contributes to broadening the demand-side user base as a result of the enhancement of the main stakeholders' perceptions of competitive and social positioning of TGTG, thus fostering the food recouping itself; and vice versa (Loop R1).

With this aim, TGTG allows retail partners to sell their still-consumable food unsold at a competitive price (Cane and Parra, 2020). Food exchanged on the platform typically encompasses all those edible products within the timeframe of the "best-before" date (Aschemann-Witzel *et al.*, 2015). Consumers' reservation price of products with visual or organic flaws is generally lower than intact food (Yue *et al.*, 2009). In addition, when they "perceive dates on foods as an indicator of freshness [… they] are willing to pay more for the food […, meaning that] the willingness to pay for a perishable product decreases throughout its shelf life" (Aschemann-Witzel *et al.*, 2015, p. 6462).

Therefore, when the perceived food unsold storage time does not exceed the average 'best-before' date, the performance driver "value for money ratio" generally assumes an acceptable level for consumers. This further improves the perceived food quality, fostering app usage, increasing sales on TGTG's platform, and reducing the food unsold storage time perceived by end-users (Loop R2).

This is consistent with the results of six focus groups conducted by Van der Haar and Zeinstra (2019). Demand-side users have had diverse reactions and expressed differentiated judgments about the quality and the mix of edible products found inside the magic boxes, ranging from total enthusiasm and satisfaction to disappointment regarding packaging, product type, and expiration dates. The study relied on perceptions and experiences of people with heterogeneous personalities, mindsets, knowledge, beliefs, and bases of values. Thus, positive or negative feedback mainly depended on personal preferences, opinions, habits, and convictions about the 'best-before' date. Nonetheless, most of their experiences were considered positive, and rarely food was wasted from the magic box.

Too Good To Go and educational and political campaigns

In addition to food unsold quality, also the "education programs ratio" is a fundamental component of the platform's service system. TGTG continuously budgets and promotes educational pathways against food waste for schools and universities, aiming to mitigate the tendency to care more about value for money instead of the actual rationale of the so-called "circularity brokerage" (Ciulli *et al.*, 2020). This effort represents one of the four pillars sustaining the TGTG's ambition to reduce food waste by "teaching the next generation how to value our resources and to protect our planet" (Too Good To Go, 2021a), thus purposefully reawakening the people's inherent driving power of ethical purchase choices detected by Watson and Meah (2012). As a result, launching educational programs against food waste has allowed TGTG to attract new end-users, enhancing the "expected profits ratio" and, in turn, encouraging their access to the platform (Loop R3).

Previous research detected how consumers' ability to properly understand the meaning of the expiration date on product labels (Van Boxstael *et al.*, 2014) is one of the most significant variables influencing the decision to use or throw "sub-optimal" food away (Aschemann-Witzel, 2018). In this regard, TGTG has started to foster policies aimed at making labels more transparent and comprehensible for everyone across all of their marketplaces. Indeed, product labeling generates a great impact on the consumers' perception of the food expiration date (Aschemann-Witzel *et al.*, 2016), which is generally understood as the exact best-before one (Williams and Wikström, 2011). With this aim, TGTG has committed "to work hand in hand with governments and policymakers to change regulations that currently cause food waste [... so as] to impact the political agenda in at least 5 of [their] key countries through [their] own campaigns and initiatives with fellow partners" (Too Good To Go, 2021b). Hence, the budget fraction devoted to campaigns and initiatives for regulation change constitutes the social and environmental driver (i.e., "CIRC ratio") of the TGTG's business model, which positively affects its brand reputation and the app usage. Thus, it encourages new retailers to join the platform, sustaining the self-financing source for novel campaigns (Loop R4).

The surprising factor and the three self-balancing feedback loops

The content of a magic box can randomly vary in quality and product type, depending on what retail partners' customers buy or not each day. TGTG has made this potential business weakness, linked to uncontrollable market dynamics, one of its strong points. Indeed, the "surprise factor" stimulates individuals to purchase and discover products they might not have ever known otherwise (Cane and Parra, 2020), becoming one of the drivers for the company's value creation. Surprisingly, as it emerged from the exploratory study conducted by Van der Haar and Zeinstra (2019), who conducted an online survey reaching 611 respondents, the surprise factor was the second driver spurring users to use the app. Indeed, while 35% of respondents installed the app to fight food waste, 26% did it due to such a factor. This is coherent with Caillaud and Jullien (2001), stating that "the value of an

intermediary for a buyer relates to the number of goods and sellers that can be reached through this intermediary, as the value for a seller depends on the size of the demand it will face with it" (p:798). Hence, the amount of food unsold offered on the platform should be enough to address the expectations of the demand-side users, who in turn shape the demand size attracting new retail partners (Ciulli *et al.*, 2020). On the one hand, it means that the more retail partners are present on the platform, the more it will be the surprise factor and the subsequent likelihood to find various and diversified products inside each magic box (Loop R5). On the other hand, the greater the number of orders on the platform, the less the surprise factor will be due to a broader demand to satisfy, balancing its positive effect on value for money (Loop B1).

It follows that the number of still-edible products should actually be demanded on the platform (Ciulli *et al.*, 2020). Otherwise, a side effect may arise: as the stock of food unsold increasingly becomes available on the platform, it approaches or passes the best-before date (i.e., "food unsold storage time" increases). This reduces value for money, the demand-side users, the following expectations on profits of potential retail partners, and, so, TGTG's capability to attract new sellers on the platform. Consequently, the unsold food amount will compromise itself (Loop B2). Although an amount of unsold food exceeding that of recovered food may generate adverse brand reputation outcomes (Loop B3), it represents the underlying assumption behind TGTG's existence, as well as the main aspect of its own mission.

Conclusion

Despite the great success of TGTG, finding a sustainable equilibrium between each of the three pillars of sustainability has turned out to be not easy. A more widespread usage of the app may allow overcoming the crucial aspect of customers' preeminent attention on value for money at the extent to which it may reduce the length of food unsold storage time (Loop R2) and attract new retail partners to balance supply and demand (Loop B2). Such an effort requires stressing the importance of the social performance of TGTG by means of performing effective educational programs and promoting campaigns and initiatives for regulation change. Indeed, both activities have been proved essential to improve people's awareness of food waste implications, better understand the actual purpose of the platform, and stimulate their conscience on what still needs to be done to cope with such a 'wicked' problem as fighting food waste. Hence, addressing complex issues characterized by multiple feedback loops and non-linearities like food waste requires multi-stakeholders engagement and collective efforts from a broad plethora of actors. In this sense, this study tried to shed light on digital platforms, investigating the case of TGTG, as catalysts to spur inter-organizational relationships within widespread ecosystems that include food providers, users, universities, schools, investors, and public authorities (Zucchella and Previtali, 2019) while contributing to the 3Ps of sustainability (i.e., people, planet, profit). Adopting a systemic approach, we proposed a DPM chart and a causal loop diagram that helped us to frame the circular complexity characterizing such ecosystems and a business model based on sustainable innovation. Thus, we could capture both the virtuous or vicious feedback loops encompassing it and identify the different strategic resources, performance drivers, and end-results adopting an outcome-based perspective. So, the study offers theoretical contributions to the literature streams on sustainable business models (Bocken *et al.*, 2016; Velter *et al.*, 2020) and digital platforms as part of broader ecosystems (Ciulli *et al.*, 2020; Zucchella and Previtali, 2019). In addition to that, the application of DPM enables to offer valuable insights on what resources can support the success of a company's business model or be leveraged

to prevent a business failure (Bianchi, 2016; Gnoffo, 2021). By doing so the study can offer several implications also to practitioners and decision-makers.

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The emergence and development of sustainable entrepreneurial ecosystems

A comparison of three European regions

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Abstract

Research on entrepreneurial ecosystems acknowledges that entrepreneurship is a local phenomenon with a reciprocal relationship to the context in which it is situated. However, this research remains atheoretical and broad, with the majority of empirical studies aiming to establish a macro-level understanding of these ecosystems for fostering high-growth entrepreneurship in metropolitan settings. At the same time especially non-metropolitan regions increasingly turn to entrepreneurship as a means to ignite economic development. Since these regions are structurally different from big cities in terms of demographic factors, infrastructure and networks, the findings from research on high-growth entrepreneurship in big cities are hardly transferable. The relevance of the entrepreneurial ecosystem concept for non-metropolitan regions, as well as how these ecosystems can be a force for good to contribute to the Sustainable Development Goals, remains largely unexplored. With our study, we investigate and compare regional sustainable entrepreneurial ecosystems in three non-metropolitan European regions which aim to foster sustainable entrepreneurs. While we identify particular challenges of smallness, power dynamics and conflicts as well as resistance to change, we also delineate enabling factors that can – in accordance with the emergence and development stage of sustainable entrepreneurial ecosystems – overcome such challenges. Overall, our theoretical contribution encompasses a novel micro-level understanding of ecosystem emergence in non-metropolitan regions based on the actions and interactions of regional actors and in the context of sustainable entrepreneurship.

Keywords

Entrepreneurial ecosystems, Sustainable entrepreneurship, Sustainability, Co-creation, Collective sustainable innovation

Introduction

Sustainable entrepreneurship addresses environmental (York & Venkataraman, 2010) and social challenges (Zahra et al., 2009) through a viable business (Schaltegger & Wagner, 2011). Despite new and existing ventures increasingly recognizing the need to adopt sustainable practices (Elkington, 2006), the institutional environment, such as the perceived lack of financial resources and start-up information or the complexity of administrative procedures, is a barrier for sustainable entrepreneurs (Hoogendoorn et al., 2019) to address sustainable development challenges at scale. Therefore, better support structures are needed to help sustainable entrepreneurs form and grow their businesses. Overall, entrepreneurship is considered an important contributor to (regional) society (Mitra, 2019; Szerb et al., 2019) and the understanding on its dependence on regional properties is growing (Müller, 2016). In light of this, knowledge on entrepreneurial ecosystems, defined as "the union of localized cultural outlooks, social networks, investment capital, universities, and active economic policies that create environments supportive of innovation-based ventures" (Spigel, 2017, p. 49), is rapidly developing (Autio et al., 2018; Spigel & Harrison, 2018; Stam & van de Ven, 2019).

Despite the growing research interest in entrepreneurial ecosystems, the theorizing of a sustainable entrepreneurial ecosystem is at the nascent stage with inconsistent conceptualization, resulting in scattered empirical insights (Bischoff, 2021; Cohen, 2006; O'Shea et al., 2021; Theodoraki et al., 2018; Volkmann et al., 2021). Given the state of the research, we see two major research gaps that we address in this article. First, drawing on the entrepreneurial ecosystem literature that is primarily based on urban settings (Colombelli et al., 2019; Kapturkiewicz, 2021; Mack & Mayer, 2016), research on entrepreneurial ecosystems emergence in non-urban settings is scarce. Second, because the focus of entrepreneurial ecosystem studies is often on supporting high-growth entrepreneurship centered around commercial values (Audretsch & Belitski, 2021; Spigel, 2018; Stam & van de Ven, 2019), we identify the role of entrepreneurial ecosystems in supporting sustainable entrepreneurship, which is driven by social, environmental, and commercial values, as under-researched.

Elaborating on the knowledge gaps, there are only few studies that focus on non-metropolitan areas or on how these entrepreneurial ecosystems can be a force for good to foster sustainability and overall well-being as outcomes (Moggi et al., 2021; Thompson et al., 2018; Volkmann et al., 2021). These studies have established the need for investigating the entrepreneurial ecosystem concept for sustainable entrepreneurship (Volkmann et al., 2021), examined the role of different stakeholders (Bischoff, 2021) and the ways in which a sustainable entrepreneurial ecosystems can form through everyday interactions (Thompson et al., 2018), as well as how entrepreneurial ecosystems can become sustainable (DiVito & Ingen-Housz, 2021). However, extant research still lacks a detailed understanding of different actors' roles to the emergence and development of

sustainable entrepreneurial ecosystems in the context of non-metropolitan regions (Cho et al., 2022).

Small cities and less-populated regions increasingly turn to entrepreneurship as a means to ignite economic development and improve well-being (Audretsch & Belitski, 2021; Audretsch & Keilbach, 2004; French, 2022; Welter et al., 2008). However, these cities and regions are structurally different from metropolitan areas regarding their key challenges, economic, socio-cultural, and resource characteristics (P. Roundy, 2017; Walsh & Winsor, 2019), and community assets (Reynolds, 2022) which implies the need for different ecosystem building approaches compared to urban areas. For example, entrepreneurship research from non-metropolitan contexts have coined the term 'countryside capital' (Garrod et al., 2006), to value the "landscape, biodiversity and other material features that make up a rural area" (Muñoz & Kimmitt, 2019, p. 845). Existing theorizing of entrepreneurial ecosystems is therefore neither applicable to the context of non-metropolitan areas nor for advancing sustainable entrepreneurship. Consequently, we believe it is beneficial to advance the field of entrepreneurial ecosystem research (Alvedalen & Boschma, 2017) to investigate those undertheorized mechanisms in non-metropolitan regions. Furthermore, given the significance of the Sustainable Development Goals (United Nations, 2018) for regional development, it is important to develop a theory of sustainability-driven entrepreneurial ecosystems to explore the mechanisms that drive sustainable entrepreneurial ecosystem emergence and development.

To develop the theory of sustainable entrepreneurial ecosystems, we address the following research question: *Why and how do sustainable entrepreneurial ecosystems emerge and develop?* We employ a multi case study of the non-metropolitan regions of Friesland in the Netherlands, Uckermark/Barnim in Germany, and Ostrobothnia in Finland. Building on interviews, focus groups and observational data, we detail the actions of individual and collective actors who collaborate across their organizational boundaries to develop an entrepreneurial ecosystem around sustainable entrepreneurship. In addressing the outlined research question, we want to contribute to the debate around the phenomenon of entrepreneurial ecosystem evolution. Our theoretical contribution encompasses a novel micro-level understanding of entrepreneurial ecosystem emergence in non-metropolitan regions. We offer a process perspective and framework on how collaborations emerged and developed. In that vein, our study follows a call for more qualitative research in regional entrepreneurship to challenge the idea of entrepreneurship being primarily an urban event driven by only economic motivations of the entrepreneurs (Dodd et al., 2021; Sternberg, 2021).

In the following, we introduce our theoretical background, expanding on entrepreneurial ecosystem emergence and development, before we introduce more information on methods and the selected cases. In the findings section, we introduce our process model. We end our article with a discussion and conclusion in the light of the current state of the literature.

Theoretical background

The entrepreneurial ecosystem concept is based on the agency of entrepreneurial actors that can shape their own context (Feldman, 2014) and it has been adopted fast. So much that some even regard it as "The New Industrial Policy" (Startup Genome, 2020), leading to a situation where policy is leading research, as compared to being informed by it (Stam & Bosma, 2015). Most research to

date has focused on the actors and factors of entrepreneurial ecosystems (Isenberg, 2011; Stam, 2015). In this line, research has grouped entrepreneurial ecosystem categories into material, social, and cultural attributes (Spigel, 2017) and structured entrepreneurial ecosystems into structural, cognitive, and relational dimensions using a social capital perspective (Theodoraki et al., 2018). Yet, entrepreneurial ecosystem research remains largely atheoretical and static, and only recent contributions stress their contribution to a more sustainable future (Theodoraki et al., 2021; Volkmann et al., 2021).

This novel stream of research on sustainable entrepreneurial ecosystems explores how geographically bound institutional networks can foster sustainable entrepreneurship (Cohen, 2006; Volkmann et al., 2021). Such an ecosystem has been defined as "the interconnected set of entrepreneurial stakeholders in a regional entrepreneurial environment that directly focus on fostering engagement in sustainable entrepreneurship to contribute to the transition to a more sustainable regional environment" (Bischoff, 2021, p. 2). In contrast to conventional entrepreneurial ecosystems, the main actors within sustainable entrepreneurial ecosystems are committed to sustainable development through supporting entrepreneurship that creates social, environmental, and economic value(s) (Cohen, 2006). Bound by a common vision, these actors offer tailored support to foster sustainable entrepreneurship (Bischoff & Volkmann, 2018). To the knowledge of the authors, empirical research about how these types of entrepreneurial ecosystems are formed and relevant prerequisites is scarce.

Overall, little is known about how entrepreneurial ecosystems emerge (birth stage) and develop (growth stage) (Cavallo et al., 2019). Entrepreneurial ecosystems are suggested to follow the lifecycle stages of birth, growth, sustainment, and decline (Mack & Mayer, 2016) but existing explanations vary in the role assigned to anchor organizations (Colombelli et al., 2019). Others indicate that entrepreneurial ecosystems emerge based on uncoordinated, semi-autonomous (P. T. Roundy et al., 2018) or collective action (Thomas & Ritala, 2021). Literature suggests that both top-down and bottom-up approaches to entrepreneurial ecosystem emergence are possible (Colombo et al., 2019), but more knowledge is needed on the processes during which diverse stakeholders develop into a close-knit community with shared goals that are idiosyncratic for sustainable entrepreneurial ecosystems. The top-down approach which oftentimes aims to duplicate other successful entrepreneurial ecosystems is likely to fail (Mason & Brown, 2014) because it disregards the context of such ecosystems, reflected in the region's history, culture, and values (Pittz et al., 2019). On the other hand, the bottom-up approach leads to issues of appropriability (Pitelis, 2012) and collective action (Spigel, 2018) as entrepreneurs have to invest significant resources into building the ecosystem, while pursuing their own endeavors at the same time. This approach also disregards governmental organizations that play an important role in sustainable entrepreneurial ecosystems (Bischoff & Volkmann, 2018). Both top-down and bottom-up approaches can set apart the emergence and development of a sustainable entrepreneurial ecosystem in comparison to entrepreneurial ecosystems.

Wurth et. al (2021) distinguish between the ontological and epistemological conceptualization of entrepreneurial ecosystem emergence. The ontological perspective talks about entrepreneurial ecosystem emergence, allowing us to speak of them 'being' there. Studies using this lens employ established theories, such as institutional (Stephens et al., 2019), evolutionary (Colombelli et al., 2019), or complex adaptive system theories (P. T. Roundy et al., 2018) to study processes of ecosystem emergence. Epistemologically, entrepreneurial ecosystems emerge within economic

systems which can enable or constrain entrepreneurial activity to create new value as an emergent property of the system (Wurth et al., 2021). To understand the emergence and development of sustainable entrepreneurial ecosystems, in this article, we aim at offering an ontological conceptualization.

In line with recent contributions on entrepreneurial ecosystem emergence and development that build on institutional entrepreneurship and work (Auschra et al., 2019; Kapturkiewicz, 2021), our investigation also employs an institutional lens. Institutional entrepreneurship and social movement theory (Thomas & Ritala, 2021) are concerned with the purposive actions of actors aimed at institutional change (Lawrence & Suddaby, 2006) and offer a useful lens when analyzing sustainable entrepreneurial ecosystem emergence based on actors' agency. Research on institutional entrepreneurship acknowledges that these change processes can result from a collective process, as compared to individual heroic achievements (Battilana et al., 2009), based on the distributed agency of actors (Garud et al., 2007). Similarly, social movement theory explains how groups of individuals change institutions through collective action (Weber & King, 2013). Yet, the question of why and how distributed actors, as the case with sustainable entrepreneurial ecosystems, can promote system-level change for sustainable outcomes remains open (Ferraro et al., 2015).

In summary, literature on sustainable entrepreneurial ecosystems leaves many questions unanswered. To some extent it becomes clear that ecosystem emergence and development relate to three levels of analysis. First, it relates to the collective agency of diverse regional actors (O'Shea et al., 2019). Second, and related, it links to how these multiple actors collaborate and coalesce in forming shared intentional action (Bratman, 2014). Third, contextual conditions, such as institutional infrastructure (Kapturkiewicz, 2021) and place-specific assets (Mason & Brown, 2014), play a role in that they may or may not nurture the individual and collective efforts. Our empirical exploration focuses on all three, aiming to increase our understanding of sustainable entrepreneurial ecosystem evolution building on different cases in non-metropolitan areas.

Methods

This study uses a multiple case study design to develop an in-depth understanding of a real world phenomenon to reveal how the emergence and development of sustainable entrepreneurial ecosystems can unfold (Yin, 2018). It employs an inductive approach that aims to build theory from cases, which is argued to be appropriate to address grand challenges such as sustainable development (Eisenhardt et al., 2016). An inductive research approach is chosen to allow for an in-depth exploration of why and how different regional stakeholders collaborate to establish sustainable entrepreneurial ecosystems which has not yet been explored empirically. By comparing different cases in similar contexts, we aim to shine light on the various factors at play in sustainable entrepreneurial ecosystem emergence and development. Reflecting on our epistemology, this study assumes the social construction of reality in which we regard our informants as knowledgeable agents (Berger & Luckmann, 1966). As we integrate the information of our informants to a process of sustainable entrepreneurial ecosystem emergence and development, our endeavor follows a rather constructivist paradigm (Levers, 2013).

Sampling We conducted purposeful sampling (Patton, 2014) and selected information-rich cases on the emergence and development of sustainable entrepreneurial ecosystems in Europe. In that

vein, we selected the cases according to the following criteria: (1) the case meets the definition of a sustainable entrepreneurial ecosystem (Bischoff, 2021; Cohen, 2006); (2) the case is situated in a non-metropolitan region based on the World Bank data (data.worldbank.org); (3) the researchers have access for data collection. Such sampling criteria led to the province of Friesland in the Netherlands, Uckermark/Barnim in Germany, and Ostrobothnia in Finland. In Table A1 in the appendix, we describe our cases in more detail.

Data The data collection followed a multi-stage procedure: 1) exploratory interviews to obtain a general overview of the ecosystem and its' actors, 2) focus groups to generate case-based timelines (Bagnoli, 2009) and to determine the ecosystems lifecycle stage (Mack & Mayer, 2016) based on our participants perception, and 3) semi-structured in-depth interviews to refine our understanding of stakeholder cooperation and organization for sustainable entrepreneurial ecosystem emergence. Corresponding to the access to data, the first three authors took the lead in data collection in the three different cases. Focus group participants have been identified based on exploratory interviews, internet searches, and referrals, and based on the criteria that they had involvement in the formation of the ecosystem. For the purpose of group constellation, close attention was paid to diversity, in that groups were comprised of individuals from both the private and public sector to allow for a variety of perspectives and opinions to emerge. The size of the focus groups was limited to 3 or 4 people which is deemed appropriate when participants have specialized knowledge or experience to discuss in the group setting (Krueger & Casey, 2015). Interview participants were then selected on the basis of both the milestones identified as part of the focus group sessions and the analysis of prior interviews. We also participated in events organized by and for ecosystem stakeholders, observed interactions and gathered field notes. Secondary sources such as documents and public reports provided additional information on the case setting. In Table 1, we present the data sources and uses.

Table 1: Description of Data

Data types (and dates)	**Amount and location**	**Use in Analysis**
Primary data		
Exploratory interviews	6 in Friesland, 2 in Uckermark/Barnim, 2 in Ostrobothnia	Identify entrepreneurial ecosystem stakeholders who influence ecosystem emergence and development
In-depth semi-structured interviews	9 in Friesland, 7 in Uckermark/Barnim, 8 in Ostrobothnia (lasting between 45 and 75 minutes)	Identify strategies and actions of ecosystem stakeholders undertaken for entrepreneurial ecosystem development
Focus groups	2 in Friesland, 1 in Uckermark/Barnim, 1 in Ostrobothnia	Create a timeline of ecosystem emergence
Observations	1 in Uckermark/Barnim: Year-end event of public funded innovation ecosystem development project	Yielding insights into ecosystem stakeholder communication and collaboration, topical issue and assess

	1 in Ostrobothina: Vaasa EnergyWeek 2022, annual event that gathers stakeholders, startups and talents meet with international investors and executives	lifecycle stage of entrepreneurial ecosystem maturity
Seconday data		
Reports from entrepreneurial ecosystem stakeholders / various newspaper articles	Friesland: Leeuwarden-Ljouwert's application for European Capital of Culture 2018: Criss-Crossing Communities: Iepen Mienskip (2018) / Innovatiepact Fryslan Beleidsplan 2020 (2020) Uckermark/Barnim: IW Consult (2019): Recode Uckermark 2030, OECD Local Entrepreneurship Reviews (2006): Entrepreneurship in the Districts Uckermark in Brandenburg, and Parchim in Mecklenburg-Western Pomerania Ostrobothnia: Ostrobothnia in transition regional report - Roadmap for sustainable development and circular economy (2020)	Triangulate exploratory interviews to identify ecosystem stakeholders, add information for timeline construction

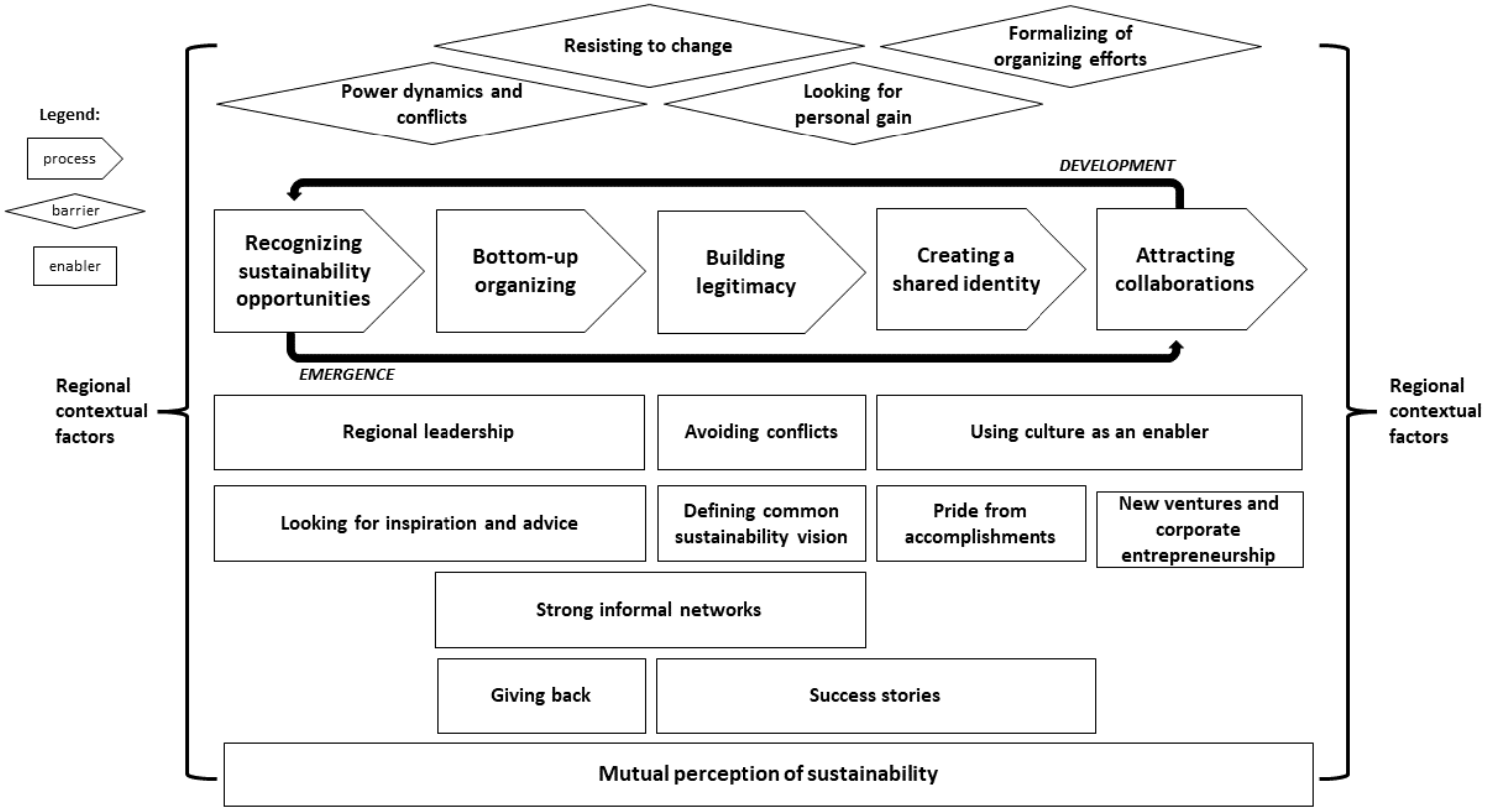
Analysis The focus groups and interviews were transcribed by the data collecting researcher. For the data analysis, we used Atlas.ti. After coding and drafting an intitial coding-structure for our initial case of Friesland, the resulting coding paradigm was discussed and critically reflected upon by the case-uninvolved authors. In this light, we applied a grounded theory approach and utilized both (analytical) theoretical sampling and the constant comparison method throughout the study (Charmaz, 2014; Strauss & Corbin, 1998). In pursuing grounded theory (Strauss & Corbin, 1998), we first developed open, informant-centric codes which was followed by axial and selective coding, and facilitated by memoing. This approach allowed us to explore the enablers and mechanisms of sustainable entrepreneurial ecosystem emergence and development in the form of a process model which has not been explored empirically to date. The process model draws on a substantive ontology that regards the process as evolution and aims to trace the path of change over time through events, activities, and choices (Fachin & Langley, 2018). The corresponding data structure is provided in Figure A1.

Findings

Based on the data analysis, the study finds that the emergence of sustainable entrepreneurial ecosystems follows the process of developing sustainability opportunities, bottom-up organizing, creating a shared identity, building legitimacy, and attracting collaborations, which in turn triggers developing sustainability opportunities. Such process of sustainable entrepreneurial ecosystem emergence and development is enabled by a mutual perception of sustainability and influenced by

the regional contextual factors of both the history and sense of place. Figure 1 presents the process model of sustainable entrepreneurial ecosystem emergence and development.

Figure 1: A process model of sustainable entrepreneurial ecosystem emergence and development



Having a mutual perception of sustainability across different stakeholders is a fundamental enabler for sustainable entrepreneurial ecosystem evolution. This involves that these stakeholders regard sustainability as contributing towards sustainable development and realize the importance of supporting sustainable entrepreneurship as a means to foster sustainable innovation.

> *"Well, what does sustainability mean to you? That's actually an Earth, which can continue, which is sustainable in a way that we don't take more than what the Earth is producing itself. So that means if you. For me it's a kind of a way of life, it has become a way of life. In that case I look to clean, healthy, and, happy. And if we can combine that, we developed a complete vision around those three themes, I would say." (F11)*

The empirical study has shown that ecosystem emergence is most successful in a bottom-up manner. This involves that regional leaders, mostly from the business community and who are deeply embedded in their economic and socio-cultural context, actively look for sustainability opportunities.

"If the government isn't willing to pay, they will take it themselves and they will do it and it will be even better. The spirit of [sustainable] entrepreneurship…is very strong in this area." (O4)

Mode of action	Evidence from Friesland case	Evidence from Uckermark/Barnim case	Evidence from Ostrobothnia case
Opportunity seeking	"So there was a strong personal motivation, and yeah, then in this field of searching, looking to the profile of Friesland, could it be one of the first regions that is very much focused." (F8)	And I call it Grassroot now because it was about doing small projects with little effort to make an impact. So that means budget, little organization and just get going. There's then, for example. Ah, I don't know - we built the first cargo bike with very few resources in some garage, with people from Berlin as contacts and as knowledge carriers, but in principle we started from scratch. (UB4)	"Ostrobothnia are very industrious. So that's something that connects the all of these people. They have a strong spirit of doing stuff. If the government isn't willing to pay, they will take it themselves and they will do it and it will be even better. That's the basic idea. And the spirit of [sustainable] entrepreneurship I think is very strong in this area." (O4)
Inspiration seeking	"Also is a very well developed ecosystem. Well, there was also certain kind of inspirations that we needed to do it in a scale that fits in the Frisian system." (F8)	"We now also have exchanges with other campuses ... So we also think that it's good to have a coworking or also a makerspace. For example, we know from Coconat, which is also in Brandenburg, that there have been 10 spin-offs there by now, just due to the collaboration in coworking alone." (F_UB_3)	"We have a really high standard of doing things here in the Nordic countries, like taking care of the waste or reusing all kinds of things that might be able to reuse. And, that is something that along the way they [entrepreneurs] haven't been able to tell the story to the customer, that we have solar panels on the roof, and we are buying green electricity, and we are taking care of the waste management, so we have zero waste, and so on. And this is about branding, I would say, that they [entrepreneurs] are not good at this." (O6)
Crafting visions	"And what we did is that we put all the agendas over each other, and that we developed a vision on the region, and also the perspective from where we want to head for and what we did afterwards, which is aligning all the programs among the business, among the education institutions, and they come from among the government, just to	"[T]hey held workshops on which topics could be particularly exciting. That was probably quite an act, and they also brought in a moderator. Partly because it was such a conflict-ridden process as to what they wanted to focus on. And we ended up with three fields of action, also supported by the area of sustainable economy, namely agriculture and food, services of general interest and infrastructure […]. And the third	"We envision ourselves as a platform for local innovative companies to test out ideas and help them and connect them also to places and people and companies that might be of interest." (O4)

	align those so that so everybody could develop their own actions, in which they could add energy to the flywheel." (F11)	topic was sustainable tourism." (UB2)	
Alliance building	"So, I think why are there so many [networks]. It's I think dealing with the history of our province, in our province, we have a saying that things happen within op z'n elfendertigst, en op z'n elfendertigst [extremely slow and cumbersome] is dealing with the 11 cities of the province, and dertig is referring to the 30 municipalities. And in Friesland you had to talk with the 11 cities and the 30 municipalities to get commitments. And well, it's logical that that that amount of participants takes a lot of time." (F10)	"I wasn't there yet, was in 2017, when the HNEE [regional university] and about 30 actors from the region got together and thought about what could be written into an innovation strategy." (UB2)	"Then we realised that we have lots of knowledge in this region. But we haven't told the story, so to speak. And then we decided we need to brand this somehow and then we started to think about how to do that. So, collectively, within the EnergyVaasa brand is nowadays 160 companies doing (renewable) energy related business." (O2)
Collaborating	"So first of all, we created a strategy where everybody can contribute to the strategy. So everybody had the same position. There were no politics on the table." (F14)	Or if I have young entrepreneurs here, 23 years old, and then say: Watch out, there is the regional pilot. And there are special programs for young entrepreneurs. Young Companies. Sometimes I call right away and say: Hello Young Companies, Hello Migrant Pilot Service, I have someone here, then sometimes an appointment is made right away and if I don't reach anyone, I give them the contact details they can turn to. (UB1)	"Our region has the most experience and longest experiences in this [circular economy] and cooperated very much with high schools and universities and projects with Swedes and in Finland and so on. Still very many projects to find from the biowaste and biogas plants and such things." (O1)
Formalization	"It was till now an open process. And because of the growth and the common and mutual agenda, we now develop the next phase of the governance. So that process is more formalized." (P14)	"So a great deal has happened, […] and the current status in the House with a Future is that we now have the house there. The University for Sustainable Development uses this house to allow students to be creative in the form of a living lab. We have announced a space scholarship and have now also found the scholarship holders." (UB6)	"We have the world leading companies, sub subcontractors, entrepreneurs already within the region here, but they are still increasing in numbers, increasing in size. Overall I would say we are still in a very strong growth phase." (O8)

These individuals feel strongly about their region and are driven by an emotional culture perspective to protect and preserve the region. As such, they have an intrinsic interest in supporting the regions' sustainable development.

"Basically, the vision behind arcadia is that we said, okay, our main challenge right now as a region, is the question of how we will be a good ancestor? How will we give this region to the generations that come after us as a great country to grow up in and to have a good climate, good ecology, an open society, etc." (F12)

It is especially in this early phase of ecosystem development that individuals assume a leadership role to take and organize initiative. These individuals are willing to take risks and look for inspiration to find ways in which they can develop and advance their sustainable entrepreneurial ecosystem.

"We visited YES!Delft, for instance. Also is a very well developed ecosystem. Well, there was also certain kind of inspirations that we needed to do it in a scale that fits in the Frisian system." (F8)

They also realize that an ecosystem approach is needed to capitalize on these opportunities and they organize in a bottom-up manner by leveraging their strong informal networks to build a coalition of the willing. This initial group of people believes in the cause and is motivated by supporting the sustainable development of the region but they also recognize a long-term benefit for their own organization from engaging in these activities.

"I think that one of the main success factors was that the early adaptors are the first group innovators, they, they were an inspired group, they were a group of a coalition of the willing, but also a coalition of people who had who had entrepreneurial skills." (F10)

After a coalition of the willing is found, they collectively organize and involve other stakeholders, notably from the spheres of industry, government, and academia and engage in activities related to creating a shared identity. In doing so, they organize to discuss and formulate a joint sustainability vision for the region which is then translated into the different organizations' agendas.

"And what we did is that we put all the agendas over each other, and that we developed a vision on the region, and also the perspective from where we want to head for and what we did afterwards, which is aligning all the programs among the business, among the education institutions, and they come from among the government, just to align those so that so everybody could develop their own actions, in which they could add energy to the flywheel." (F11)

Furthermore, creating a shared identity is aided by both drawing on the unique aspects of regional culture which is used to create a common sense of community, as well as by instilling pride through achieving regional accomplishments.

"The idea was to use culture as a driver for social change for sustainable, sustainability actions. So it wasn't.. it was always the idea to use culture as a driver for something else. And that something else was mainly that shared goal of this area that it's just good to live in." (F6)

The importance of creating this shared identity is influenced by people's sense of place. For instance, people from the province of Friesland may have the perception that they are on the *"outskirts of the Netherlands" (P13)* or have the feeling that *"you don't count, that you're at the periphery" (P12)* which, coupled with the history of the province, has led in the Frisian case how to be self-sufficient and solving their own problems. However, this also resulted in many closed-off Frisian networks which is an impediment to collaboration.

"So, I think why are there so many [networks]. It's I think dealing with the history of our province, in our province, we have a saying that things happen within op z'n elfendertigst, en op z'n elfendertigst [extremely slow and cumbersome] is dealing with the 11 cities of the province, and dertig is referring to the 30 municipalities. And in Friesland you had to talk with the 11 cities and the 30 municipalities to get commitments. And well, it's logical that that that amount of participants takes a lot of time." (F10)

In order for people to be willing to collaborate across organizational and regional boundaries, it is therefore necessary to open-up these networks and create a mutual story that everyone can identify with. In Friesland, this has been achieved in the process of becoming the European Capital of Culture 2018 which had the slogan of 'iepen mienskip', where 'iepen' is the Frisian word for open and 'mienskip' represents the sense of community.

"So mienskip is a very relevant thing for the Frisians. We are proud of our mienskip, we think our mienskip can be something a little bit different than other mienskips. That is partly true and partly not true. For us, mienskip is not only a sense of community, it's also something very active. It's something you do, you practice. But we also realize that this mienskip can be very closed. So our challenge is to open that mienskip up. And part of our story is to open up that mienskip for European future." (F12)

Another step in the emergence of the sustainable entrepreneurial ecosystem is that of building legitimacy. This involves that regional leaders convince other stakeholders of why the opportunity is worthwhile to pursue and invest in. Ultimately, it is essential that governmental actors are included in these discussions and convinced to support the sustainable entrepreneurial ecosystem as they can provide funding, create markets for sustainable products and services, and include long-term sustainability targets in policies. While envisioned change towards new ways of organizing for sustainability will naturally lead to resistance by some, commitment can be obtained best if the ecosystem building activity is not in conflict with other initiatives or organizations and when the process is open so that everyone can contribute. The achievement of external recognition through success stories facilitates the building of legitimacy but multiple bottom-up initiatives may be required until enough stakeholders are convinced.

"So first of all, we created a strategy where everybody can contribute to the strategy. So everybody had the same position. There were no politics on the table." (F14)

Once there is perceived legitimacy around sustainable entrepreneurship, described by a wide acceptance and embracement of the desired future vision, more collaborations are attracted for its' materialization. These collaborations are comprised of actors from industry, government, and academia and aimed at further developing the ecosystem but they also reinforce the mindset of

stakeholders of belonging to an ecosystem which acts as a positive feedback mechanism. At this stage, formalization of agreements occurs to put in place a structure for long-term cooperation.

"It was till now an open process. And because of the growth and the common and mutual agenda, we now develop the next phase of the governance. So that process is more formalized." (F14)

Once the ecosystem has emerged, the next step is to develop it further and make it resilient. Thus, the process will return to recognizing sustainability opportunities and iteratively repeat to develop the sustainable entrepreneurial ecosystem. The main output of this ecosystem can be sustainable entrepreneurship in the form of both new ventures and corporate entrepreneurship. In particular, the Frisian case has shown that business leaders from more established companies that have been pursuing sustainable entrepreneurship for some time can be in the lead of developing a support structure for emerging sustainable entrepreneurs. Furthermore, the above described process is strongly influenced by the history of place. As such, resistance to change and regional power dynamics can serve as barriers. Regional actors from any sector, often representing smaller organizations, may resist change and are unwilling to take risks as they mostly look for personal gain and don't recognize or expect long-term benefits. Some of these actors may have significant power in decision-making processes and can act as gatekeepers to ecosystem development. Lastly, the liability of smallness from being a rural region can provide a background for action in that it sets limits on the resources or entrepreneurs available but it can also serve as a motivating factor, for instance when tackling challenges such as brain drain.

"So as we know, as a region, we do not have enough entrepreneurship, and how do we stimulate it? Well, we try to stimulate by becoming a startup ecosystem, because that is the best way to build sustainable companies." (F3)

This liability can be overcome by identifying and leveraging the regions assets. However, it will start with a few inspired individuals that believe in the possibility and necessity of building a sustainable entrepreneurial ecosystem and that have the skills required to create a movement around sustainable entrepreneurship.

Discussion and Contributions

This research makes several theoretical contributions to entrepreneurial ecosystem literature. First, our research develops sustainable entrepreneurial ecosystems theory by offering new theoretical insights into the causal mechanisms of why and how such ecosystems emerge and develop in regions. While prior studies take either the incubator (Theodoraki et al., 2018) or an innovation project within an industry cluster (DiVito & Ingen-Housz, 2021) as the unit of analysis, we have focused on the process, dynamism, and influencing factors at the regional level. In doing so, the regional element of entrepreneurial ecosystems that hosts the actors and factors, as stressed by Stam (2015), takes center stage again and we can explain why and how geographically bound stakeholders from different spheres of society establish the ecosystem.

Second, we have highlighted how a bottom-up approach to sustainable entrepreneurial ecosystem emergence and development can unfold. While the top-down approach has received increased attention among policy makers (Bell-Masterson & Stangler, 2015; Mason & Brown, 2014), we show

how regionally embedded individuals can take a leadership role and organize wider stakeholder support to create institutions around sustainable entrepreneurship in a bottom-up approach. This adds insights to the importance of leadership in entrepreneurial ecosystems (Stam, 2015; Stam & van de Ven, 2019) and how it affects other ecosystem elements. Entrepreneurial ecosystems exhibit some form self-organization from their complex adaptive nature (P. T. Roundy et al., 2018) but it has been acknowledged that this still requires coordination (Miles & Morrison, 2020). While it is argued that entrepreneurial ecosystems should be entrepreneur-led, with only a limited role assigned to the governments (Feld, 2012; Stam, 2015), we observe a more distributed approach to leadership to discover and develop opportunities. These stakeholders pursue both self-and collective interest in that they believe in a joint vision and are driven by altruistic motives such as commitment to place (McKeever et al., 2015) but also realize that running in packs with other collaborators will ultimately benefit themselves and create an entrepreneurial community (Van de Ven et al., 2007). As such, entrepreneurial leaders provide an important stimulus for the emergence of the entrepreneurial ecosystem through recognizing and developing sustainable opportunities. The concept of opportunity recognition has been established in sustainable entrepreneurship literature in the context of sustainable businesses (Enthoven, 2021; Patzelt & Shepherd, 2011) but we show that it also holds relevance for sustainable entrepreneurial ecosystems. While it may not be surprising that entrepreneurial actors take the lead at this stage as these likely possess most of the action-enabling elements of entrepreneurial agency needed for structural transformation (McMullen et al., 2021), these actors also realize that they must convince other stakeholders from industry, government, and academia.

Third, we identified concrete activities performed by regional leaders to mobilize collective action for sustainable entrepreneurial emergence and development. In doing so, we complement the work on business and innovation ecosystem emergence by Thomas & Ritala (2021) in that we see process of ecosystem legitimacy and identity construction in action in the context of sustainable entrepreneurial ecosystems. The organizing efforts of regional leaders benefit from a mutual understanding of sustainability which is framed around the notion of a circular economy. We do not find one dominant orchestrator in facilitating the process of building legitimacy and creating a shared identity. Rather, there are multiple actors that assume different roles for emergence and development processes that affect both social and cognitive aspects of identity (Polletta & Jasper, 2001). Literature stipulates that collective action is necessary for collective identity to emerge (King, 2008) and that an identity is a process as compared to a thing (Patvardhan et al., 2015). However, contrasting Thomas & Ritala (2021) who state that an ecosystem identity facilitates a mutual understanding of the ecosystem value proposition, we find that this can also be the other way around in which the process of defining the ecosystem value proposition of contributing towards sustainable development facilitates the creation of an ecosystem identity.

During ecosystem emergence, business actors play a prominent role as they look for sustainable business opportunities, convince other stakeholders, and organize a coalition of the willing comprised of different societal actors, whereas the government plays a more supporting role with providing financing. Through discourse, the overall vision is defined by aligning different programs from business, government, and academia. For ecosystem development, processes are already more formalized and an independent platform organization has emerged that facilitates discussions among triple helix actors who have the same position. This also coincides with a change away from semi-coordinated and distributed ecosystem leadership towards a servant leadership model

(Russell, 2001), with the platform organization serving as a neutral foundation for strategic decision-making. While these practices relate to the cognitive dimension of feeling connected to a broader community with the same mission (Polletta & Jasper, 2001), we also find that the feeling of a sense of community is instilled by both civil and governmental actors that coordinate to build a common story and create cultural cohesiveness. Both the cognitive and cultural aspect of identity work are especially important during ecosystem emergence but must continue throughout ecosystem development. The creation of artefacts to communicate the common story, as well as achieving more success stories represents identity work that aims to reinforce ecosystem commitment in this phase.

Fourth, we observe how contextual factors influence the emergence and development of sustainable entrepreneurial ecosystems. While studies on innovation systems highlight the role of the triple helix model for regional development (Etzkowitz & Leydesdorff, 2000), and more recently embraced the quintuple helix model as an approach in line with sustainable development (Carayannis & Campbell, 2010), these have largely failed to include the entrepreneur as a core innovator due to their macro-level focus (Brannback et al., 2008). Our model offers insights into how context influences the intentions of individuals and shapes the interactions between industry, government, and universities to foster sustainable entrepreneurship. Through these triple helix collaborations, regional governments can act more entrepreneurially and facilitate the co-creation of markets for sustainable innovations (Mazzucato, 2011). We observe that these interactions do not only facilitate the creation of new ventures, as stressed in current entrepreneurial ecosystem research (Wurth et al., 2021) but also in the form of corporate entrepreneurship, which is novel.

Our study does not come without the typical limitations of qualitative studies. As the case with interpretive research, the question of credibility, transferability, dependability, and confirmability generally arises (Lincoln & Guba, 1985). We have addressed these issues and provided a thick description to let readers assess the transferability of our findings. While ecosystem emergence and development may be highly context-specific, we believe that the processes discovered will also have relevance for other cases. Furthermore, the limitation of a recall effect that is inherent in retrospective studies (Mills et al., 2010) can be minimized by the fact that first-hand information could be obtained from those respondents that had direct involvement in ecosystem milestones that lie in the recent past.

Conclusion

We have put forward a theory of sustainable entrepreneurial ecosystem emergence and development. Despite the concept of entrepreneurial ecosystems having attracted significant interest from academics and practitioners, the majority of studies have focused on high-growth entrepreneurship, with a particular focus on metropolitan areas. With our study, we contribute to the understanding of how less-populated regions that have different challenges, resources, and ambitions from metropolitan areas can build an ecosystem around sustainable entrepreneurship. The comparative approach has allowed for a more diverse and comprehensive understanding of factors that lead to sustainable entrepreneurial ecosystems. Besides the theoretical contributions, this study also offers both practical insights and avenues for further research.

First, we have found that such ecosystem emergence and development can unfold in a bottom-up manner in which regional stakeholders take a leadership role and organize collective action. These stakeholders are driven by the motivation to help their own organization but they also want to serve the collective interest of contributing to the sustainable development of the region. The organizing efforts are most effective when such stakeholders are embedded in their economic and socio-cultural context and as such, have strong networks with other regional actors to identify and engage other entrepreneurs and innovators.

Second, sustainable entrepreneurial ecosystem emergence and development is only possible if policy makers play an active role. This means that they realize that entrepreneurs should take center stage for the sustainable regional development. As such, they not only provide financial means to ecosystem building activities but also participate in the formulation of a regional proposition that is reflected in concrete action plans. This requires that such stakeholders must not only align on their intentions but also have a mutual understanding of sustainability.

Third, sustainable entrepreneurship does not emerge or develop in a vacuum. It takes actors from all spheres of the triple helix that must show commitment and actively collaborate to develop the institutional infrastructure to support sustainable entrepreneurs. These different actors understand the regional challenges, organize resources needed to address such, and measure progress. They are committed to supporting the region, willing to explore new ideas, and they pursue sustainable opportunities by identifying and leveraging the regional assets. While their interaction may be more informal and uncoordinated in early phases, it must formalize into more permanent structures in later stages, while still remaining open and flexible.

Fourth, is imperative that a sustainable entrepreneurial ecosystem identity emerges. This identity is closely is intertwined with the ecosystem value proposition and provides the background for action. This involves engagement with the wider public and creating a narrative that people can identify with. The achievement of success stories aids this process as it can create regional pride and help achieve to legitimacy through external recognition.

From an ontological perspective, one can observe a sustainable entrepreneurial ecosystem once there is a close community that is actively supporting sustainable entrepreneurship. We found that this support can materialize in both sustainable entrepreneurship initiatives of existing businesses but also in the form of newly founded sustainable ventures. Future research can build on our findings and assess their relevance for entrepreneurial ecosystems in other contexts and at different development stages. This can include established conventional entrepreneurial ecosystem that are starting to build a culture and infrastructure around sustainable entrepreneurship. Since our study has been of retrospective nature, we recommend pursuing longitudinal process research to study interactions in real-time as they develop.

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Figure 1: A process model of sustainable entrepreneurial ecosystem emergence and development

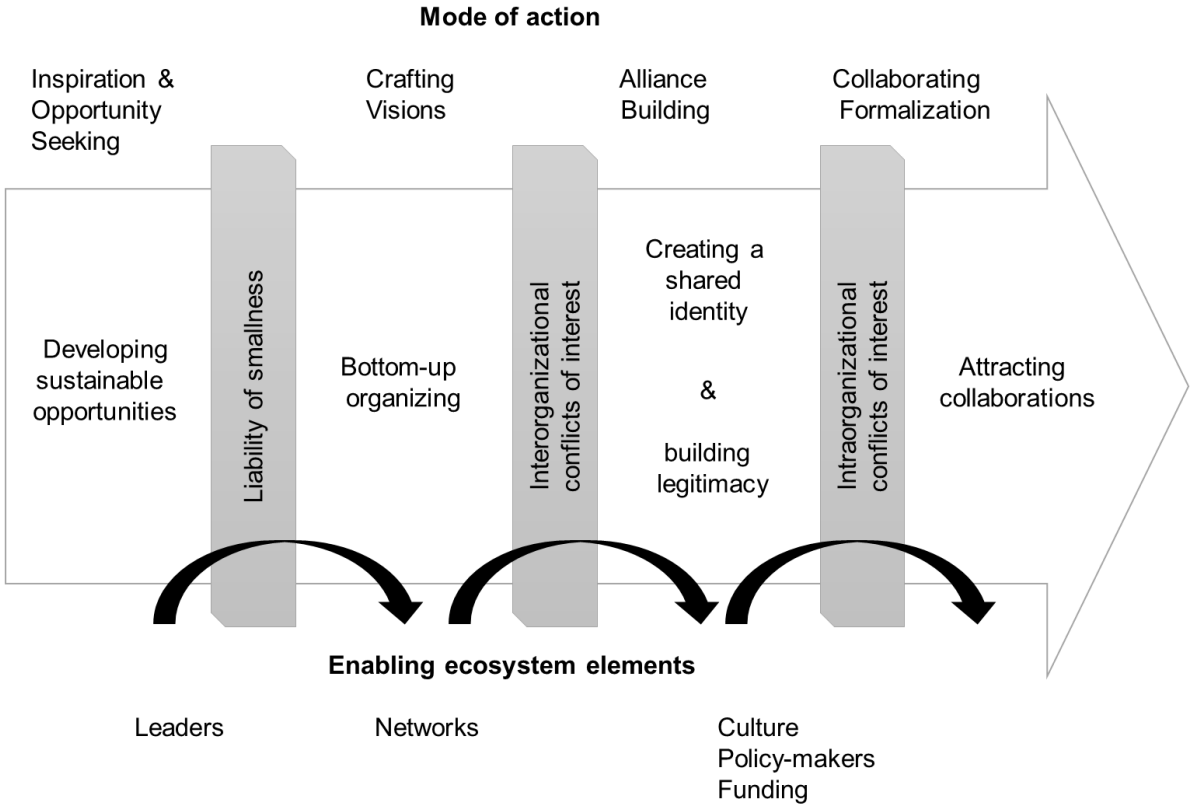
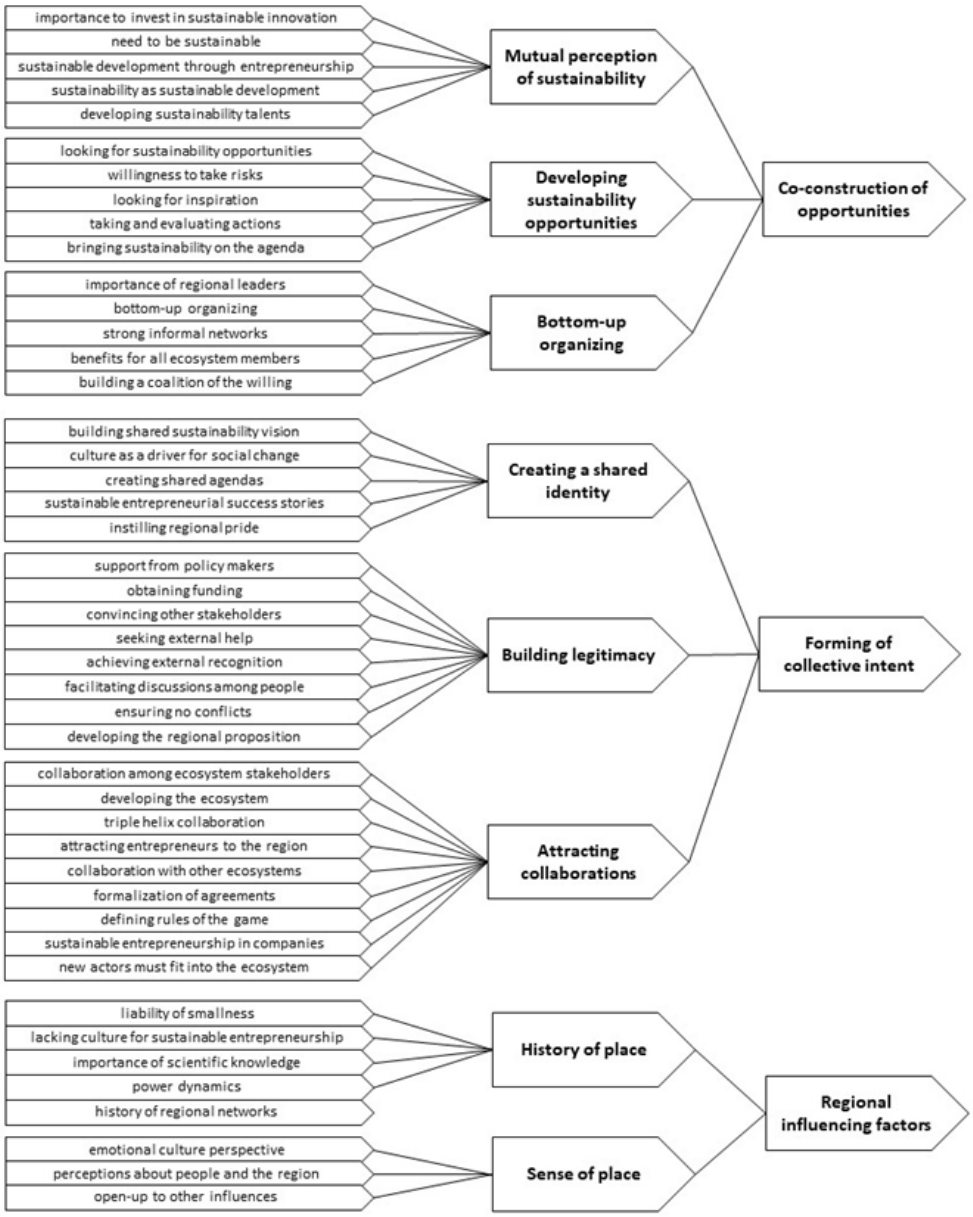
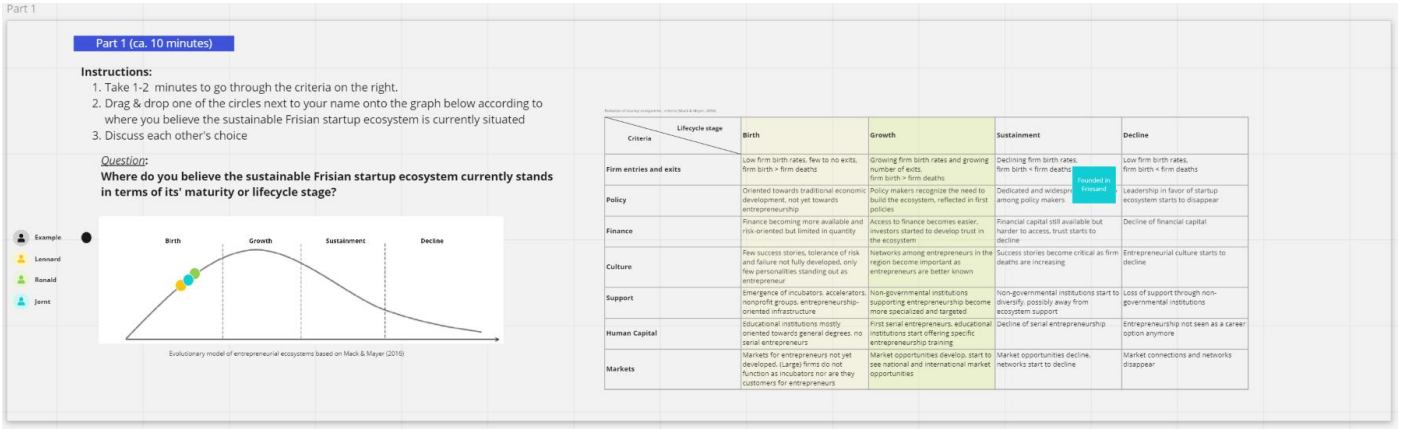


Figure A1: Data structure

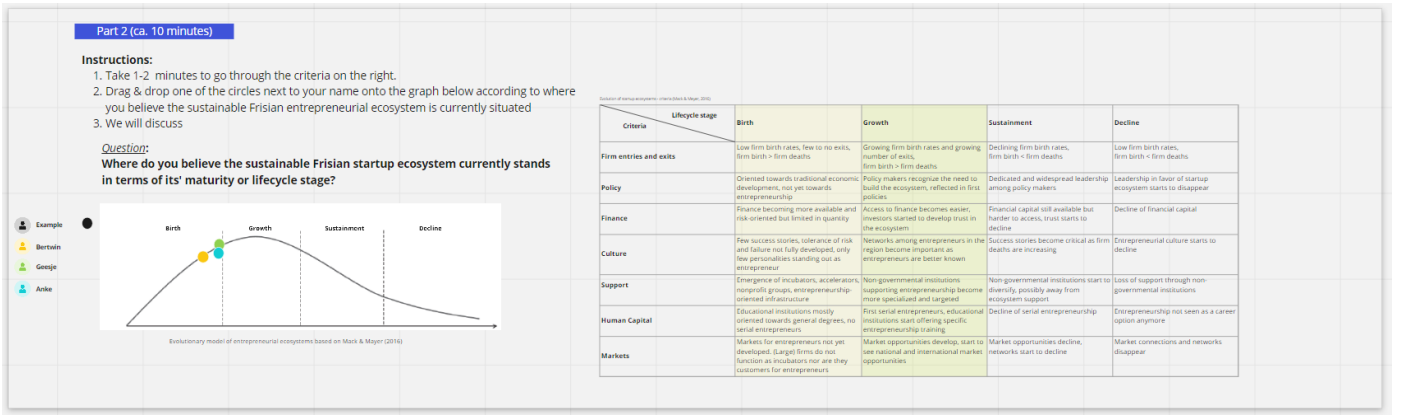


Appendix A

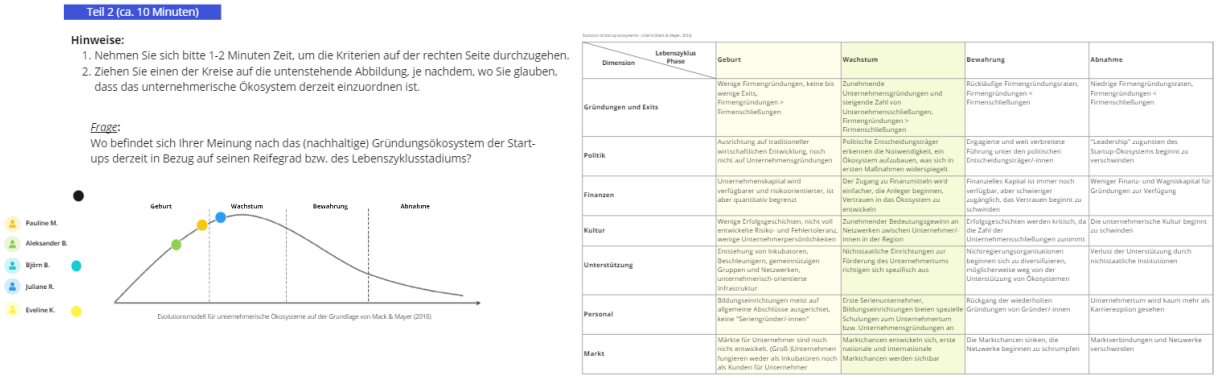
Friesland Entrepreneurial Ecosystem maturity Focus Group 1



Friesland Entrepreneurial Ecosystem maturity Focus Group 2



Uckermark/Barnim Entrepreneurial Ecosystme maturity Focus Group 1



Ostrobothnia Entrepreneurial Ecosystme maturity Focus Group 1

Table A1: Case description and context information.

Friesland	**Uckermark/Barnim**	**Ostrobothnia**
Friesland is a rural province in the Northern Netherlands that is defined by its eleven-city structure and its various streams, lakes, and canals. It is a minority language region and there is a relatively strong regional identification of firms in Friesland with their region and Frisian identity (Van Langevelde & Pellenbarg, 2001). The Frisian economy is mostly devoted to agriculture and it largely consists of small to medium-sized enterprises. While Friesland performs low on economic indicators, it scores high on numerous welfare indicators, such as happiness, which has been labelled the 'Frisian paradox' (Pennewaard, 2018). Furthermore, Friesland is at the forefront of the transition towards a circular economy, striving to become the most circular region in Europe by 2025 (Circulair Friesland, 2021). The focus group discussions have established that Friesland is in an advanced birth stage of entrepreneurial ecosystem development (see Appendix A).	The Uckermark/Barnim Entrepreneurial Ecosystem is located between the metropolitan areas of Berlin, the capital of Germany, and Stettin, a Polish border town. While the OECD LEED programme attested to the Uckermark the existence of (1) support for business start-up, (2) initiatives to promote entrepreneurial culture, and (3) observed examples of in-migrating entrepreneurs (Potter, 2006), the observed entrepreneurial activity is today average or below. While more than two-thirds of the companies participating in the business survey for Recode-Uckermark consider the local start-up scene and the start-up-related framework conditions to be important or rather important for their own company, they are in majority dissatisfied or less satisfied with the regional start-up scene and start-up-related framework conditions. New initiatives like the meBEST campus or Stadt Land Oder aim to step into the void and – with the support and based on the initiatve of regional stakeholders – aim at enabling more sustainable entrepreneurship.	Ostrobothnia is a region in western Finland consisting of 15 municipalities with the city of Vaasa as the regional center (Regional Council of Ostrobothnia, 2021). Ostrobothnia has good prerequisites for developing into a sustainable society where business is based on sustainable development goals and the circular economy (Vaasa Region Development Company, 2021). The development of the region's sustainable entrepreneurial ecosystem is at the growth stage because there is a growing perception among regional policymakers about the need to build a sustainable entrepreneurial ecosystem; there is growing support of sustainable entrepreneurship from support organizations; there is also a growing number of sustainability-driven new firms and sustainability initiatives among existing firms. This has been confirmed by the focus group discussion that has established that Ostrobothnia is in an early stage of entrepreneurial ecosystem development (see Appendix A).

	The focus group discussions have established that Uckermark/Barnim is – according to the stakeholder perspectives – between birth and growth stage of the entrepreneurial ecosystem development (see Appendix A).	

Framing the Social Innovation Ecosystem

A systematic literature review

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Abstract

Social innovation (SI) is increasingly attracting the interest of scholars, institutions, and practitioners due to its potential to tackle societal challenges. Literature on the topic appears highly fragmented and scattered among different fields of research. In the attempt of systematizing contributions so-far published, we've performed a systematic literature review with the aim to enhance our comprehension about ecosystems facilitating social innovative activities. In doing so, we describe the key attributes and features of the context and the conditions under which SI is developed.

Keywords

Social Innovation (SI), Ecosystem, Social Innovation Ecosystem (SIE).

Introduction

Social Innovation (SI) has recently emerged in entrepreneurship and management literature as the "mean" to provide "new solutions to meet social goals" (Mulgan et al., 2007). Seeking to empower SI and make these solutions scalable, scholarly research has recently suggested the need to adopt an ecosystem perspective, which could be particularly useful in highlighting the interdependence between different actors in co-production and co-creation of value. In this scenario, some authors suggest studying SI as an "innovation process" - focusing on "who" can do it, and "how" and "where" it is done (Edwards-Schachter et al., 2012; Edwards-Schachter & Wallace, 2017) - involving multitude of actors (Phillips et al., 2015) and knowledge resources (McElroy, 2002).

In this respect, the Social Innovation Ecosystem (SIE) should enable socially innovative initiatives by providing actors the opportunities, the possibilities, the means and the authorities, i.e. governance mechanisms, that allow access to resources to pursue their innovative activities (Pel et al., 2020; Terstriep et al., 2020; Galego et al., 2021). Most of the academic literature agrees about the relevance played by the context, categorizing social innovation as "highly context-sensitive" (Moulaert et al., 2007; Kaletka et al., 2016; Asheim & Gertler, 2005). Even though SIEs entail - as

"Innovation Ecosystems" (Granstrand & Holgersson, 2020), "Regional Innovation System" and "National Systems of Innovation" (Terstriep et al., 2020; Rao-Nicholson et al., 2017) - some attributes such as the institutional infrastructure supporting innovation, they also enclose some elements of novelty. First, it has been recognized that SI brings the ambition of overcoming the local context and extending its processes to make them inclusive for the population (Unceta et al., 2016). Accordingly, SI initiatives have been analyzed as embedded systems of collective actors all involved in "dynamic arenas" of development (Jørgensen, 2012). Finally, the social goals driving all the relations among actors distinguish the SIEs from generic innovation ecosystems.

The main challenge for scholars within this field of research, is to retrieve the key features of the existing initiatives supporting SI, to build a shared framework that could help in identifying critical underlying conditions and common solutions to tackle societal challenges. Despite the progress recently made in this direction, our comprehension about ecosystems facilitating social innovative activities remains vague and ambiguous (Terstiep et al., 2020) and there is still a need for further analysis that investigates the key findings of the literature in the SI field of research adopting a holistic/ecosystem perspective.

In this respect, this study represents a preliminary contribution to extant literature by answering the following two research questions: 1) Which are the relevant themes so far identified in the SI literature adopting a holistic/ecosystem perspective?; 2) Which are the key elements that characterize Social Innovation Ecosystems? In the attempt to provide an answer to these questions, we opted for a systematic approach to review the literature on the topic.

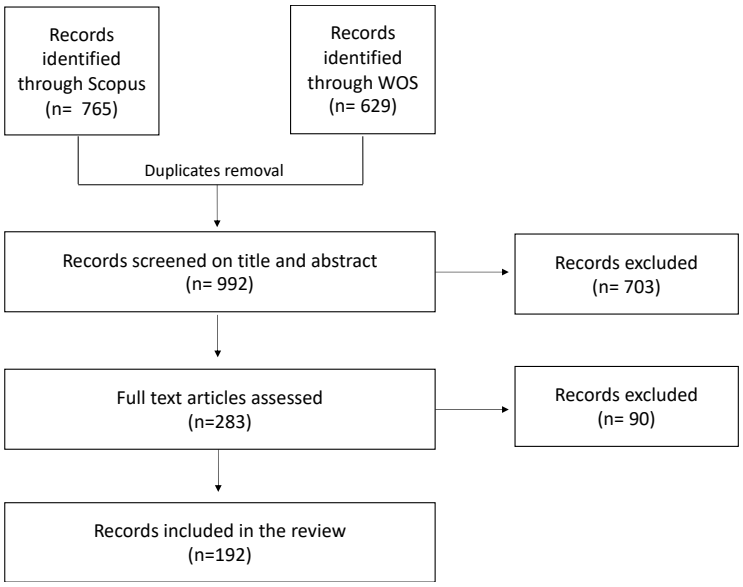
Method and data

As said, preliminary research showed a fragmentated literature scattered among different research areas. To provide a systematization of the contributions on the topic under investigation, we perform a systematic literature review (SLR) by following Tranfied et al. (2003) guidelines.

The keywords were selected based on the pre-acquired knowledge (Howaldt & Kopp, 2012; Nicholls et al., 2015; Domanski et al., 2020) and a brainstorming within the research team. Scopus and Web of Science were chosen as database of records. We conducted our search on title, abstract and/or keywords using the following terms: "social innovation" and "ecosystem" or "system" or "framework". To obtain publications embracing a holistic view of the social innovation phenomenon we also included the terms "system" or "framework" as synonyms of ecosystem. The bibliographic research was conducted according to the following limitation criteria: i) only articles in the "business", "management", "economics" and "social sciences" categories; ii) only articles written in English, to facilitate comparison of different works; iii) only articles published in academic journals.

We retrieved 765 articles from Scopus and 629 articles from Web of Science, in total 1394 articles. We first identified and removed 402 duplicate articles and then, initiated the screening phase (see Figure 1). We first screened these documents through their abstracts and then, by reading the full text articles, we excluded all the contributions that were unrelated to our research objective. We ended up with 192 articles (see Table I in the Annex) which have been coded according to bibliometric information, methodology and main objective/research goal.

Figure 1: SLR flow diagram



Results

"Which are the relevant themes so far identified in the SI literature adopting a holistic/ecosystem perspective?" and more specifically "Which are the key elements that characterize Social Innovation Ecosystems?" are the main questions guiding the systematic literature review performed in this study.

We performed, as a first step, some descriptive analysis of the selected contributions that reveal a substantial "growth" of the literature about SI and ecosystem related features over the years. Specifically, in the past six year, scholars are increasingly devoting their attention to contextual-related ("ecosystem", "system" and "framework") aspects/factors to study SI processes. In addition, by categorizing studies according to the adopted methodology, we identified that empirical studies account for two third of the selected contributions (single case studies are the most adopted, followed by multi setting case studies, while only a small percentage is based on quantitative study or mixed methods). The remaining articles are based on theoretical or conceptual methodology.

The content analysis performed on the selected contributions reveals that research on SI and Ecosystems' related features could be categorized mainly into four major areas: i) areas of intervention; ii) context features; iii) key involved actors and their relations; and iv) the role of technology as key resource. We devote one paragraph to each of the four dimensions above-mentioned.

Areas of intervention

This category includes the SI-related activities and their goals (Table 1). Some authors (Tracey & Stott, 2016; Wittmayer et al., 2019; Pless et al., 2021) point out that the social areas of intervention are represented by "social and societal challenges". Society itself represents the most common target to achieve, when dealing with SIE. More specifically, the initiatives can be directed to achieve

diverse societal outcomes. A first group of objectives is related to the end of any forms of poverty (Marakkath & Attuel-Mendes, 2015; Chiodo, 2021; Uzsayilir & Baycan, 2021), a second one to achieve food security (Edwards & Mercer, 2010; Rover et al., 2016; Prost et al., 2019), followed by the warranty of healthy lives (Ballard et al., 2017; Ahmed et al., 2021), and the reduction of inequalities (Weinzierl et al., 2016; Svidronova et al., 2017; Otten et al., 2021), such as gender disparities (Kluvánková et al., 2019). Based on the reach of the intervention, social innovations can either tackle a specific social issue affecting a small group of individuals or major structural issues affecting a vast group of people with large-scale effects (Tabaklar et al., 2021).

Table 1: Areas of intervention – Key findings

Main topic	Key aspects	Main references
Areas of intervention	To achieve diverse "social and societal challenges", the literature describes the areas of interventions with a: •Focus on outcome, as based on the SI-related goals: end of any forms of poverty achievement of food security warranty of healthy lives reduction of inequalities •Focus on development scale, as based on the reach of the interventions: local global	Adham et al., 2018; Aksoy et al., 2019; Andion et al., 2021; Arocena & Sutz, 2021; Baker & Mehmood, 2015; Bittencourt & Ronconi, 2016; Chatzichristos & Nagopoulos, 2020; Chiodo, 2021; Cornet & Barpanda, 2020; Coulson & Woods, 2021; Dahlke et al., 2021; Dayson, 2017; Farmer et al., 2021; Guerrero & Urbano, 2020; Hart et al., 2015; Hebinck et al., 2019; Hiteva & Sovacool, 2021; Jensen & Brandi, 2018; Kruckenberg, 2015; Lombardi et al., 2020; Ludvig et al., 2021; Maher & Hazenberg, 2021; Malek & Costa, 2015; Marchesi & Tweed, 2021; Ornetzeder, 2001; Parziale & Scotti, 2016; Pel & Kemp, 2020; Peter, 2021; Prost et al., 2019; Ravazzoli et al., 2021; Rhodes et al., 2021; Schröer, 2021; Sept, 2020; Super et al., 2021; Svidronova et al., 2017; Tracey & Stott, 2016; Unceta et al., 2020; Uzsayilir & Baycan, 2021; Warnecke, 2016; Widyaningsih & Van den Broeck, 2021.

Source: own elaboration

Context features

As expected, by approaching the SI topic under the holistic/ecosystem perspective, the vast majority of the selected articles focus on context-related issues. In other words, the "context" is used as a general framework to understand the origins of SI practices/interventions (Table 2). According to van Wijk et al. (2019), the context can have an institutional connotation and include wide societal level of institutions as democracy, capitalism, poverty, and exclusion. Within the institutional context, socially innovative processes can be fueled and hindered as in a dynamic arena (Onsongo, 2019; Živojinović et al., 2019; Agostini et al., 2020). Social innovation is described as a social shared competence that is dependent on the context, which refers to changes in the agenda and the agency of the institutions, and which leads to a better inclusion of groups and individuals

who are marginalized in various fields of society at various scales of organization (Flores & Zapata, 2018; Guerrero & Urbano, 2020).

SIE interventions are frequently associated to a particular local area or region. Very often, they are negotiated on a local level by agents and organizations with a strong sense of place (Sarala, 2014; Kluvánková et al., 2018; Sept, 2020; de Fátima Ferreiro et al., 2021; Edwards & Mercer, 2010). However, sometimes they can have a national breadth of application (Nemec et al., 2016; Windrum et al., 2016), or they can overcome the national borders to get an international impact (Charalabidis et al., 2014; Van Rensburg et al., 2019; Ruszkai et al., 2021).

Table 2: Context Features – Key findings

Main topic	Key aspects	Main references
Context features	To approach the context as a "framework" to understand the origins of SI practices and interventions. The context itself can be characterized by: •Institutional connotation, including wide societal levels of institutions •Social connotation, referring to individuals and groups in various fields of society •Territorial connotation, pointing out a specific local, national, or international level	Agostini et al., 2020; Andion et al., 2020; Anggahegari et al., 2018; Batle et al., 2018; Bittencourt & Ronconi, 2016; Bosworth et al., 2016; Bozic, 2021; Canestrino et al., 2019; Chatfield & Reddick, 2016; Chiodo, 2021; Cipolla et al., 2021; Cornet & Barpanda, 2020; Cristofalo et al., 2019; de Fátima Ferreiro et al., 2021; Edwards & Mercer, 2010; Flores & Zapata, 2018; Gallouj et al., 2021; Kadyrova, 2021; Kranzeeva et al., 2021; Lindberg et al., 2016; Lubberink et al., 2019; Ludvig et al., 2021; Marakkath & Attuel-Mendes, 2015; Morelli et al., 2017; Nicolopoulou et al., 2021; Novikova, 2021; Parahoo & Al-Nakeeb, 2019; Petersen & Kruss, 2021; Rao-Nicholson et al., 2017; Rizzo et al., 2021; van Wijk et al., 2019; Živojinović et al., 2019.

Source: own elaboration

Key involved actors and their relations

SIEs involve a wide constellation of actors. We identified the following categories of actors: public sector, civil society, and private sector (Table 3). The first category comprises mainly government, public administrations, local and national authorities, and academia; the second group involves citizens, social movements, NGOs; the third includes corporations, SMEs, and startups. Actors are at the heart of SI initiatives, since they are the main initiative's developer, i.e. the ones who conceive and implement social solutions.

Through the provision of public services at the national and local levels, government has typically played a significant role in the creation of societal value. Public policies are considered a tool for achieving this aim (Romanelli & Zbuchea, 2021; Ludvig et al., 2021). Universities also actively participate in SI activities. They are described as the drivers of knowledge sharing and experimental learning (Belcher et al., 2021; Greene, 2021; Mdleleni, 2021).

Table 3: Key involved actors and their relations – Key findings

Main topic	Key aspects	Main references
Key involved actors and their relations	To identify the "macro categories" of: •Involved actors Public sector (Government, public administrations, local and national authorities, academia) Civil society (Citizens, Social Movements, NGOs) Private sector (Corporations, SMEs, Startups) •Their relations Public Private Partnerships Cross Sector Partnerships Strategic Alliances	Agostini et al., 2020; Ahmed et al., 2021; Alijani et al., 2016; Amanatidou et al., 2021; Arocena & Sutz, 2021; Avelino et al., 2019; 2020; Ballard et al., 2017; Bayuo et al., 2020; Belcher et al., 2021; Bellandi et al., 2021; Benneworth & Cunha, 2015; Ber & Branzei, 2010; Bigger et al., 2016; Biggs et al., 2010; Bright & Godwin, 2010; Broad & Ortiz, 2021; Bublitz et al., 2021; Cacciolatti, 2019; Carayannis et al., 2021; Castro-Spila, 2018; 2021; Chatzichristos & Nagopoulos, 2020; Chin et al., 2019; Correia et al., 2015; Cossetta & Palumbo, 2014; de Fátima Ferreiro et al., 2021; Desa & Koch, 2014; Diniz & Leitão, 2016; Farmer et al., 2021; Gasparin et al., 2021; Greene, 2021; Guerrero & Urbano, 2020; Gupta et al., 2016; Harrisson et al., 2012; Henderson, 1993; Holmström Lind et al., 2020; Jing & Gong, 2012; Kim, 2021; Klievink & Janssen, 2014; Kluvánková et al., 2019; Komatsu et al., 2016; 2020; Kranzeeva et al., 2021; Kumari et al., 2020; Lee et al., 2021; Lind et al., 2018; Lukesch et al., 2020; Lythberg et al., 2021; Malek & Costa, 2015; Marchesi & Tweed, 2021; Martens et al., 2020; Martini et al., 2017; Mazzarella et al., 2021; McKelvey & Zaring, 2018; Mdleleni, 2021; Mejia et al., 2019; Mirvis & Googins, 2018; Morawska-Jancelewicz, 2021; Mulyaningsih et al., 2016; Okano, 2017; Onsongo, 2019; Otten et al., 2021; Parthasarathy et al., 2021; Pel et al., 2020; Pellicer-Sifres et al., 2017; Petersen & Kruss, 2021; Piccarozzi, 2018; Presenza et al., 2019; Prost et al., 2019; Purcell et al., 2019; Rao-Nicholson et al., 2017; Rehfeld & Terstriep, 2016; Richter & Christmann, 2021; Romanelli & Zbuchea, 2021; Rover et al., 2016; Ruszkai et al., 2021; Sabato & Verschraegen, 2019; Sacchi, 2019; Sanzo-Pérez & Álvarez-González, 2021; Satrustegui et al., 2017; Segarra-Oña et al., 2016; Sept, 2021; Seyfang & Haxeltine, 2012; Slimane & Lamine, 2018; Spinelli et al., 2018; Super et al., 2021; Tabaklar et al., 2021; Terstriep et al., 2020; Tortia et al., 2021; Ulug & Horlings, 2018; Unceta et al., 2020; 2021; Van Rensburg et al., 2019; von Jacobi et al., 2017; Windrum et al., 2016; Yang & Sung, 2015; Ziegler, 2017; Živojinović et al., 2019.

Source: own elaboration

Literature also stresses the role of civil society in promoting SI, showing the importance of individuals' and communities' direct participation and active role (Seyfang & Haxeltine, 2012; Chiodo, 2021). More in general, civil society strengthens coalitions and networks with other organizations or institutions to receive benefits, such as connecting ideas, people, and resources.

Literature also points out a growing interest in SI by profit-oriented actors since social and environmental considerations are having a greater impact on their bottom line. Through the adoption of business models sustaining SI, organizations promote sustainable growth while also

addressing social, cultural, and environmental issues (Gasparin et al., 2021; Lind et al., 2018). The private actor collaborates with other stakeholders in the search for novel ways of connecting with the public sector (mainly through public private partnerships (PPP) - Klievink & Janssen, 2014) and civil society, as well as with other organizations that share similar goals.

Despite startups' potential to address numerous societal challenges and boost SI (European Commission, 2021), they have been so-far disregarded by SI literature (Batle et al., 2018; Cacciolatti et al., 2020).

The role of technology as a key resource

The literature review also reveals the increasing role of technological innovation as a valuable resource for SIEs. In this respect, digital technologies are increasingly attracting the interest of scholar, because of their role in shaping SI processes (Table 4). Specifically, we group these articles according to the specific functions of the technology. In the first group, technology is seen as a supporter of the SI process. Supporting technologies allows the creation of a collaborative environment which can create experimental learning, which enables users to take active part in the research, development, and innovation process (Cossetta & Palumbo, 2014; Spinelli et al., 2018). Platforms are regarded as the point of interaction between actors. Crowdfunding platforms may represent an example. Recently, scholars in the field start to examine them as a way for empowering the financing of projects by soliciting investment, creating at the same time greater legitimacy for social enterprises by promoting early societal interaction and participation (Presenza et al., 2019; Cacciolatti et al., 2019; Marakkath & Attuel-Mendes, 2015). The second group of contributions examines the technology's role as a catalyst for SI. A clear example is the use of various combinations of online platforms and the configuration of online communities and their relationships with offline communities (Temmerman et al., 2021; Živojinović et al., 2019). By allowing new forms of bottom-up and decentralized collaboration, they have the potential to open up vast new fields of SI that we have only begun to glimpse, but do not fully understand (Sept, 2020).

Table 4: Role of technology– Key findings

Main topic	Key aspects	Main references
Role of technology	To evaluate the "function" played by technology in SI processes as: •Supporting technology, as a solution to create a collaborative environment and to favor interactions among the players •Enabling technology, as a catalyst for the configuration of SI interventions, to create customized solutions	Carl, 2020; Charalabidis et al., 2014; Cossetta & Palumbo, 2014; Dahlke et al., 2021; De Filippi et al., 2017; De Rosa, 2017; Füller et al., 2012; Hsuan et al., 2019; Kohler & Chesbrough, 2021; Morrar et al., 2021; Onsongo, 2019; Oomens & Scholten, 2020; Ornetzeder, 2001; Presenza et al., 2019; Sanzo-Pérez et al., 2015; Sept, 2020; Spinelli et al., 2018; Temmerman et al., 2021; Van Rensburg et al., 2019; Vasin et al., 2016; Vézina et al., 2019; Warnecke, 2016.

Source: own elaboration

Conclusion and future research directions

Academic literature on Social Innovation Ecosystems is still embryonic and highly interdisciplinary. The SLR we conducted reveals first of all, an increasing number of contributions published on the topic in recent years, thus signaling the increasing interest of scholar in this field of research. The SLR allows to identify four main themes useful for identifying a tentative framework for SIEs: i) areas of interventions; ii) context features; iii) key involved actors and their relations; iv) the increasing role of technology as a key resource.

A paragraph was devoted to each theme to grasp the variety of ecosystem components. More specifically, the potential areas of interventions in SIEs are inherent to societal needs and can be identified within the UN's Sustainable Development Goals. These can either be the core of local development initiatives or larger scale interventions. As regards the context features, the institutional framework, including either formal or informal institutions, is the one mainly adopted by scholars and emphasizes the multidimensional and complex nature of the ecosystem. The third theme corresponds to the description of the actors involved in the social innovation ecosystem. The emergence of a wide constellations of players and the fact that each of them is never responsible of developing these initiatives alone, shape the collective nature of the initiatives and bring to identify groups, partnerships, or networks, in which most of the actors are involved. Last but not least, the increasing role of technological innovation to boost SI.

Although in the format of short paper, this contribution has provided a preliminary overview of the main themes arising from the literature that could be useful to understand "how" SIEs work. However, there are still further steps to be implemented. First of all, the SLR also reveals a recently emerging interest of scholars and practitioners in understanding the role that startups aiming at pursuing social goals play in SI processes and in the ecosystem. Moreover, being startups often technology-oriented, future research could shed new light about emergent opportunities offered by the use of technology as supporter or enabler in pursuing social needs. This further step will be instrumental in achieving a deeper comprehension of SIEs along with a deeper assessment of the interplay among the existing socially innovative actors, and the importance of engaging in synergic collaborations in such a dynamic arena. Despite the difficulties in mapping the multifaceted dimensions of SIEs, and the further research needed to shed new light on the topic under investigation by adopting a holist perspective, our findings could represent a starting point for further research aiming to support the decision-making process of both practitioners and policy makers involved in the development of local initiatives or larger scale interventions.

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Annex 1

Table I: Full list of the articles selected for the SLR

No	Author(s)	Year
1	Adham, Muhamad, Said, Abdul Sarhadat, Ismail and Mohd Nasir	2018
2	Agostini, Bitencourt and Vieira	2020
3	Ahmed, Gazi, Iqbal, Islam and Talukder	2021
4	Aksoy, Alkire, Choi, Kim and Zhang	2019
5	Alfalih	2021
6	Alijani, Luna, Castro-Spila and Unceta	2016
7	Alcaide Lozano, Moliner, Murillo, Buckland	2019
8	Amanatidou, Tzekou and Gritzas	2021
9	Andion, Alperstedt and Graeff	2020
10	Andion, Alperstedt, Graeff and Ronconi	2021
11	Anggahegari, Yudoko and Rudito	2018
12	Arocena and Sutz	2021
13	Avelino, Dumitru, Cipolla, Kunze and Wittmayer	2020
14	Avelino, Wittmayer, Pel, Weaver, Dumitru, Haxeltine, Kemp, Jørgensen, Bauler, Ruijsink and O'Riordan	2019
15	Baker and Mehmood	2015
16	Ballard, Tran, Hersch, Lockwood, Hartigan and Montgomery	2017
17	Bartels	2018
18	Baselice, Lombardi, Prosperi, Stasi and Lopolito	2021
19	Basile, Tani, Sciarelli and Ferri	2021
20	Batle, Orfila-Sintes and Moon	2018
21	Belcher, Claus, Davel and Jones	2021
22	Bellandi, Donati and Cataneo	2021
23	Ber and Branzei	2010
24	Bevilacqua and Ou	2018
25	Biggeri, Testi and Bellucci	2016
26	Biggs, Westley and Carpenter	2010
27	Bittencourt and Ronconi	2016
28	Bolz and De Bruin	2019
29	Bosworth, Rizzo, Marquardt, Strijker, Haartsen and Aagaard Thuesen	2016
30	Bozic	2021
31	Bright and Godwin	2010
32	Broad and Ortiz	2021
33	Cacciolatti, Rosli, Ruiz-Alba and Chang	2019
34	Canestrino, Ćwiklicki, Di Nauta and Magliocca	2019
35	Carayannis, Grigoroudis, Stamati and Valvi	2021
36	Carl	2020
37	Castro-Spila	2018
38	Castro-Spila, Torres, Lorenzo and Santa	2021
39	Chan, Chui and Chandra	2021
40	Charalabidis, Loukis and Androutsopoulou	2014
41	Chatfield and Reddick	2016
42	Chatzichristos and Nagopoulos	2020
43	Chin, Yang, Zhang, Yu and Cao	2019
44	Chiodo	2021
45	Cipolla, Afonso, Pel, Bartholo, Silva and Proenca	2021
46	Cipriani, Kaletka and Pelka	2021
47	Cornet and Barpanda	2020
48	Correia, De Oliveira and Gomez	2015
49	Cossetta and Palumbo	2014
50	Coulson and Woods	2021
51	Cristofalo, Dariel and Durand	2019
52	Dahlke, Bogner, Becker, Schlaile, Pyka and Ebersberger	2021
53	Dayson	2017
54	De Bruin	2021
55	De Fátima Ferreiro, Sousa, Sheikh and Novikova	2021
56	De Filippi, Coscia and Cocina	2017
57	De Rosa	2017
58	Desa and Jia	2021
59	Desa and Koch	2014
60	Diniz and Leitão	2016
61	Edwards and Mercer	2010
62	Errichiello and Micera	2021
63	Farmer, Carlisle, Dickson-Swift, Teasdale, Kenny, Taylor, Croker, Marini and Gussy	2021
64	Fischer, Guerrero, Guimón and Schaeffer	2021
65	Flores and Zapata	2018
66	Füller, Hutter and Fries	2012
67	Gallouj, Rubalcaba, Toivonen and Windrum	2021
68	Gasparin, Green, Lilley, Quinn, Saren and Schinckus	2021
69	Giesecke and Schartinger	2021
70	Greene	2021
71	Guerrero and Urbano	2020
72	Gupta, Dey and Singh	2016
73	Harrisson, Chaari and Comeau-Vallée	2012
74	Hart, Ramoroka, Jacobs and Letty	2015
75	Hebinck, Galli, Arcuri, Carroll, O'Connor and Oostindie	2019
76	Henderson	1993
77	Hiteva and Sovacool	2021
78	Horgan and Dimitrijevic	2021
79	Hsu, Liu, Tsou and Chen	2019
80	Ishigaki and Sashida	2021
81	Jaeger-Erben, Rückert-John and Schäfer	2015
82	Jensen and Brandi	2018
83	Jing and Gong	2012
84	Kadyrova	2021
85	Kautonen, Pugh and Raunio	2021
86	Kim	2021
87	Klievink and Janssen	2014
88	Kluvánková, Brnkaľáková, Špaček, Slee, Nijnik, Valero, Miller, Bryce, Kozová, Polman, Szabo and Gežik	2019
89	Kohler and Chesbrough	2021
90	Komatsu Cipriani, Kaletka and Pelka	2020
91	Komatsu, Deserti, Rizzo, Celi and Alijani	2016
92	Kranzeeva, Golovatsky, Orlova, Nyatina and Burmakina	2021
93	Krlev, Einarsson, Wijkström, Heyer and Mildenberger	2020
94	Kruckenberg	2015
95	Kumari, Kwon, Lee and Choi	2020
96	Lee, Lee, Kee, Kwan and Ng	2021
97	Lind, Kang, Ljung and Forsgren	2018
98	Lindberg and Portinson Hylander	2016
99	Liu	2021
100	Lombardi, Lopolito, Andriano, Prosperi, Stasi and Iannuzzi	2020
101	Lubberink, Blok, van Ophem and Omta	2019
102	Ludvig, Sarkki, Weiss and Živojinović	2021
103	Lukesch, Ludvig, Slee, Weiss and Živojinović	2020
104	Lythberg, Newth and Woods	2021
105	Maher and Hazenberg	2021
106	Malek and Costa	2015
107	Marakkath and Attuel-Mendes	2015
108	Marcelloni	2019
109	Marchesi and Tweed	2021
110	Martens, Wolff and Hanisch	2020
111	Martini, Buffa and Notaro	2017
112	Mazzarella, May and Mitchell	2021
113	McKelvey and Zaring	2018
114	Mdleleni	2021
115	Mejia, Hincapie and Giraldo	2019
116	Mirvis and Googins	2018
117	Morawska-Jancelewicz	2021
118	Morelli, Aguilar, Concilio, De Gotzen, Mulder, Pedersen and Torntoft	2017
119	Morrar, Arman and Mousa	2021
120	Mulyaningsih, Yudoko and Rudito	2016
121	Nemec, Orviska and Lawson	2016
122	Nicolopoulou, Salama, Attia, Samy, Horgan, Khalil and Bakhaty	2021
123	Novikova	2021
124	Okano	2017
125	Onsongo	2019
126	Oomens and Scholten	2020
127	Ornetzeder	2001
128	Otten, Faughnan, Flattley and Fleurinor	2021
129	Parahoo and Al-Nakeeb	2019
130	Parthasarathy, Dey and Gupta	2021
131	Parziale and Scotti	2016
132	Pel and Kemp	2020
133	Pel, Wittmayer, Dorland and Søgaard Jørgensen	2020
134	Pellicer-Sifres, Belda-Miquel, López-Fogués and Boni Aristizábal	2017
135	Peter	2021
136	Petersen and Kruss	2021
137	Piccarozzi	2018
138	Polbitsyn	2021
139	Presenza, Abbate, Cesaroni and Appio	2019
140	Prost, Vlachokyriakos, Midgley, Heron, Meziant and Crivellaro	2019
141	Purcell, Henriksen and Spengler	2019
142	Rao-Nicholson, Vorley and Khan	2017
143	Ravazzoli, Torre, Re, Govigli, Secco, Górriz-Mifsud, Pisani, Barlagne, Baselice, Bengoumi,Dijskhoorn-Dekker, Labidi, Lopolito, Melnykovych, Perlik, Polman, Sarkki, Vassilopoulos,Koundouri, Miller, Streifeneder and Nijnik	2021
144	Rehfeld and Terstriep	2016
145	Rhodes, McQuaid and Donnelly-Cox	2021
146	Richter and Christmann	2021
147	Rizzo, Deserti and Komatsu	2021
148	Romanelli and Zbuchea	2021
149	Rover, De Gennaro and Roselli	2016
150	Ruszkai, Tari and Patkós	2021
151	Sabato and Verschraegen	2019
152	Sacchi	2019
153	Sanzo-Pérez and Álvarez-González	2021
154	Sanzo-Perez, Álvarez-González and Rey-García	2015
155	Satrustegui, Castro-Spila and Luna	2017
156	Schröer	2021
157	Schuster and Kolleck	2020
158	Segarra-Oña, Peiró-Signes, Albors-Garrigós and Miguel-Molina	2016
159	Sept	2021
160	Sept	2020
161	Seyfang and Haxeltine	2012
162	Siddike and Kohda	2015
163	Slimane and Lamine	2018
164	Spinelli, Weaver, Marks and Victor	2018
165	Super, Klerkx, Hermens and Koelen	2021
166	Svidronova, Mikušová Meričková, Nemec and Kuviková	2017
167	Tabaklar, Sorkun, Yurt and Yu	2021
168	Temmerman, Veeckman and Ballon	2021
169	Terstriep, Rehfeld and Kleverbeck	2020
170	Tortia, Degavre and Poledrini	2021
171	Tracey and Stott	2016
172	Ulug and Horlings	2018
173	Unceta, Castro-Spila and Fronti	2021
174	Unceta, Guerra and Barandiaran	2021
175	Unceta, Luna, Castro and Wintjes	2020
176	Uzsayilir and Baycan	2021
177	Van Niekerk, Mathanga, Juban, Castro-Arroyave and Balabanova	2021
178	Van Rensburg, Telukdarie and Dhamija	2019
179	Van Wijk, Zietsma, Dorado, De Bakker and Martí	2019
180	Vasin, Gamidullaeva and Rostovskaya	2016
181	Vercher, Barlagne, Hewitt, Nijnik and Esparcia	2020
182	Vézina, Ben Selma and Malo	2019
183	Von Jacobi, Nicholls and Chiappero-Martinetti	2017
184	Warnecke	2016
185	Wehn, Vallejo, Seijger, Tlhagale, Amorsi, Sossou, Genthe and Kileshye Onema	2021
186	Weinzierl, Wukovitsch and Novy	2016
187	Widyaningsih and Van den Broeck	2021
188	Windrum, Schartinger, Rubalcaba, Gallouj and Toivonen	2016
189	Yang and Sung	2015
190	Ziegler	2017
191	Živojinović, Ludvig and Hogl	2019
192	Zulazli, Raja Suzana, Zainudin, Abang Feizal and Mokhtarrudin	2017

Enabling and Constraining Contextual Conditions of Sustainable Business Models

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Extended abstract

Our conceptual understanding of sustainable business models continually advances, with increasing alignment among scholars regarding the definition and design of these business models (Bocken, 2021; Breuer et al., 2018). However, there remains insufficient knowledge regarding operationalization and implementation (Baldassarre et al., 2020; Curtis, 2021; Fobbe and Hilletofth, 2021), with few successful examples of sustainable business models (Ritala et al., 2018). Yet, success is value-laden, reflecting the foremost priorities within an embedded context (Upward and Jones, 2015). Perspective also influences success, for example, from the standpoint of the firm, its customers, its shareholders, society-at-large, or the natural world.

We submit this extended abstract to Track 1.2 *Ecosystems in Support of Sustainability*. This research aims to advance knowledge about the operationalization of sustainable business models, by exploring the conditions enabling or constraining successful sustainable business models in the Nordic context. Specifically, the research explores organizational context by examining stakeholder perspectives using the business ecosystem concept. Funded by the Swedish Environmental Protection Agency (Naturvårdsverket), the research triangulates academic literature and survey data used in a PESTELE analysis to establish an artefact detailing enabling or constraining conditions.

For transparency, we define sustainable business models, organizational context, business ecosystems, enabling and constraining conditions, among other concepts.

Again, definitions of *sustainable business models* (SBMs) are merging to offer several guiding principles: i) SBMs integrate economic, environmental, and social value to create, deliver, and capture what is called sustainable value (Fobbe and Hilletofth, 2021; Méndez-León et al., 2022); ii) SBMs proactively consider stakeholders, including the environment, in the value generation process (Fobbe and Hilletofth, 2021; Geissdoerfer et al., 2018); iii) SBMs articulate explicit sustainability aspirations, with measurable indicators, which consider a long-term perspective (Bocken, 2021; Geissdoerfer et al., 2018).

Context matters, influencing organizations and individuals (Mowday and Sutton, 1993). We define *context* as the "circumstances, conditions, situations, or environments that are external to the respective phenomenon and enable or constrain it" (Welter, 2011, p. 167). Context influences the opportunities or limitations of a business over time, based on the proximity and similarity within and between organizations and individuals (Mowday and Sutton, 1993). Therefore, to understand organization context, we suggest the need to consider the broader business ecosystem.

A *business ecosystem* is a group of companies and other interdependent stakeholders (e.g. business developers, funders, suppliers, competitors, customers) that interact, reinforcing the roles of each company/stakeholder in the ecosystem (Yi et al., 2022; Zahra and Nambisan, 2012). And, research suggests that network effects within an ecosystem improve efficiency, for example, reducing costs of product development, production, or distribution (Li and Seering, 2019). Moreover, ecosystems facilitate sharing of knowledge, experience, and resources, which supports startups and entrepreneurs (Li and Seering, 2019).

For the purpose of the research, *conditions* that enable or constrain successful sustainable business models are considered to be any contextual knowledge that affect financial viability as well as environmental or social impact of sustainable business models, taking into account a systems and life-cycle perspective. We chose to define a *successful* sustainable business model as any organisational entity operating for at least three years (or to the natural conclusion of the organisation), which is financially viable and able to demonstrate impact consistent with their mission. *Financial viability* describes the ability of the organisational entity to sustain its operations, either through adequate revenue streams, grants, donations, or volunteer support. This captures both the relativist and normative perspective on success, as outlined by Upward & Jones (2015). Therefore, our research is inclusive of commercial enterprises, social enterprises, grassroots initiatives, and non-traditional organisational forms (see Curtis and Mont, 2020).

The methods for data collection include a narrative literature review and a survey among business ecosystem stakeholders. A narrative literature review is more suitable for exploratory research (Efron and Ravid, 2019), consistent with our research aim to investigate potential enabling or constraining conditions influencing the success of sustainable business models. Literature was collected on 15 October 2021 from the Scopus database, using a combination of keywords including "sustainable business models", "business ecosystems", "PESTEL analysis" (and related permutations). The search comprised all document types, including articles, conference papers, and book chapters. The results returned 231 documents, and their titles, abstracts, and keywords were screened. This screening excluded 79 documents, resulting in a final sample of 152 documents. Excluded documents most often conflated sustainable and viable to describe the ability for the firm to sustain its operations financially. A further 15 documents were unavailable to us.

The final sample is coded qualitatively using NVivo, a computer-assisted qualitative content analysis software. Researchers engage in open coding, reviewing all articles for contextual knowledge that is described to either enable or constrain the implementation or operationalisation of SBMs. The codes are refined to arrive at an artefact – an initial prototype corresponding to overarching categories in a PESTELE analysis: political, economic, social, technological, environmental, legal, and ethical conditions (Johnson et al., 2020).

The survey is planned to be executed in March-April 2022. Survey participants will include stakeholders within business ecosystems in the Nordic context, for example, entrepreneurs,

managers, business developers, funders, and bureaucrats. The recipients will be known to us, recommended to us, or found through publicly available information. We do not intend to conduct any statistical analysis from the survey data; rather, the survey data will be used to complement, validate, and evaluate the results of the PESTELE analysis. Then, a second prototypical artefact will be developed.

In April 2022, a planned reference group of five academic and industry experts will review the artefacts to confirm, refine, and evaluate the PESTELE analysis. The enabling or constraining conditions are intended to provide insights to business ecosystem stakeholders in order to better support or advance the operationalisation of SBMs. Additionally, the conditions will be modelled using causal loop diagrams (CLDs) to identify leverage points relevant for policy intervention or other targeted support.

Keywords

sustainable business models, organizational context, business ecosystems, PESTELE analysis

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Towards a new business model: A systematic literature review on B Corporations

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Extended abstract

The socio-cultural evolution of the last twenty years has placed companies in front of new challenges that require a radical change in the development of their business model. Although the company is an open system, historically we have witnessed the development of realities oriented only towards the generation of profit that for too long have ignored the impact of their actions.

In recent years, therefore, an assumption of conscience has been demanded of companies, in line with what has been done for governments and citizens (Rufolo, 1988).

In this perspective, the company as an open system should be considered in the broader sense of a company operating according to an ecosystem approach that allows it to create value in synergy with stakeholders.

The need to develop an ecosystemic approach aimed at sustainability becomes even more important in the current pandemic period: lockdown, social distancing, and restrictions on movement have exacerbated social inequalities.

In such a scenario, the setting of the right strategy in terms of ecosystem and sustainability can represent a valid development tool.

In the absence of an "operating manual" to follow, it seems useful that companies wishing to respond positively to the social, economic, and environmental call, and at the same time see their profits increase, can be inspired by the model of Benefit Corporations (B Corps), i.e. those companies that have a dual purpose: profit and the creation of well-being for the society in which they operate.

B Corps have taken it upon themselves to structure business so that the business needs and interests of people and the environment are harmonized. They meet the highest standards of social, environmental, and economic performance and strive to consider all stakeholders, not just shareholders. They represent, therefore, a model to follow for all companies that want to take action in support of sustainability.

From an academic perspective, research on social entrepreneurship has also become more prominent over the years (Mair et al., 2016; McMullen & Warnick, 2016; Besharov & Smith, 2014; Grimes et al., 2013; Dacin et al., 2010). Many authors have focused on so-called hybrid firms that seek to mediate the pursuit of profit with their impact on the environment (Haigh et al., 2015; Hoffman et al., 2012; Miller et al., 2012).

Although there is growing academic interest in organizations that want to combine market and social logic, increasing both their mission for the environment and their business performance (Battilana & Lee, 2014), B Corps, which are part of a rapidly expanding movement, have been the subject of an in-depth study by a minority branch of research.

These firms have chosen to undergo an external certification process concerning sustainability goals by B Lab (Moroz et al, 2018) and it is relevant to understand the possibility of replicating the business model adopted by B Corps.

Although the B Lab social experiment has only recently emerged from the early adopter stage (Cao et al., 2017) some scholars believe that it is still capable of making an important contribution in the field of entrepreneurship as it is considered a true case of innovation (Wilburn & Wilburn, 2014; Kanig, 2013; Sabeti, 2011). Moreover, this topic is believed to be of particular interest as a growing number of scholars have become interested in hybrid organizations that, although they have a vocation for social work, do not always possess a certification whose importance has been studied (Lytton, 2014; Terlaak & King, 2006). Therefore, the current academic debate legitimizes B Corporations as an autonomous field of research.

Santos et al. (2015) argues that business models that align profit and social impact are a key challenge for business leaders and, therefore, it appears necessary for firms to adopt strategies that can deviate from the traditional capitalist model to meet the sustainable development needs of society (Stubbs & Cocklin, 2008).

Research on B Corps has crossed the boundaries of multiple fields of study and has been carried out using knowledge from different areas highlighting the interdisciplinary relevance of the topic.

The interdisciplinary nature of the subject and the growth of scientific attention on B Corporations make it difficult to systematize the current scientific knowledge on the topic and entail the risk that the discussion enters a phase of stagnation in which no progress is made. From the above, researchers' intent on employing the current knowledge on B Corp fail to have a holistic view of it and risk delving into issues not relevant to knowledge development. Professionals also fail to have a clear view of the studies conducted to date and to exploit the insights to make business decisions. To the authors' knowledge, no study has synthesized the previous literature.

In the light of the above, it is important to investigate the structure of B Corps' business models and at the same time systematize the knowledge accumulated to date on the subject. Therefore, the present study, by conducting a systematic review of the literature and adopting the methodology

proposed by Tranfield et al. (2003), aims to identify which elements of B Corp have been studied, highlighting the relevant findings, to bring clarity to this fragmented field of research and outlining future research directions. It is believed that this study can therefore further advance the scientific understanding of the topic.

To achieve these goals, we answered the following research questions (RQs):

RQ1: How has the literature on B Corporations evolved since its inception?

RQ2: What themes dominate research in this topic?

RQ3: What future research is needed in this area?

To conduct the literature review, articles were identified through a search of the Scopus database (de Moya-et al., 2007). To analyze the articles extracted from the database, the authors, to maximize the scientific rigorousness of the study, used the research framework developed by Paoloni and Demartini (2016) which, consistent with what has been done by previous studies, has been partially modified (Paoloni et al., 2019, Paoloni et al., 2020).

The analysis of the studies revealed that the literature that has dealt with the B Corp movement to date has focused on understanding the structural aspects of the business model (Stubbs, 2017a; Stubbs, 2017b), understanding the motivations that led firms to seek B certification (Del Baldo, 2019; Moroza et al, 2018; Grimes et al., 2018; Gehman & Grimes, 2017), the factors that enable firms to pass the B test (Hickman & Hickman, 2014), and the possible impact that B certification could have in the outreach process to other business organizations (Poponi et al., 2019).

The analysis also revealed that only a few studies have addressed the issue related to B Corps' performance in terms of both profit and sustainability. Therefore, it is believed that future studies should investigate this aspect to understand whether this model can/will be adopted by an increasing number of companies.

It is believed that the present study can have a significant theoretical impact as it makes multiple contributions. Using the framework proposed by Paoloni and Demartini (2016), it allows, starting from existing knowledge, to highlight the methodological approaches adopted, to identify the most relevant research topics and to provide guidelines for scholars to follow in future related research activities.

From a practical management perspective, the study provides a clear view of B Corp studies by highlighting the characteristics of B Corp firms and their business models. Although it has not yet become clear whether B certification will be required by a critical mass of firms (Hiller, 2013) it is believed that the separation between nonprofit firms, which focus their attention on the pursuit of social benefit, and for-profit firms, which have profit maximization as their goal, is evolving to become more blurred day by day.

Keywords

B Corp, Hybrid business model, Sustainable business model, Corporate sustainability, Sustainable entrepreneurship

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Engaging University Stakeholders in Building Ecosystems For Social Entrepreneurs: Insights From a Capacity Building Project In the Global South

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Extended abstract

In the past decade, a growing amount of scientific literature has been focusing on the ecosystem phenomenon, attempting to explain the underpinning conditions, mechanisms, processes, outcomes and outputs that lead to entrepreneurial growth within a region (Cao & Shi, 2021; Theodoraki, Dana, & Caputo, 2021). Within ecosystems, universities are portrayed as a central actor, due to their organic connections and interactions with the industry, government and wider society thanks to their core missions, technology transfer processes and community engagement (Guerrero, Urbano, & Gajón, 2020; Roncancio-Marin, Dentchev, Guerrero, Diaz Gonzalez, & Crispeels, 2022).

Many universities in developing economies are at the forefront of combating complex local social problems (Roncancio-Marin et al., 2022). The sustainability issues in the global south are more complex due to the scarcity of resources, poor infrastructure, lack of legitimacy, government failure and corruption, among other factors (Arocena & Sutz, 2021). Social Entrepreneurs play an important role in these countries, by providing innovative solutions to their social and environmental complex challenges (Diaz Gonzalez & Dentchev, 2021). To succeed, SEs need to be embedded in ecosystems, where they can benefit from the interaction with a variety of actors with complementary knowledge and assets, including universities (Autio et al., 2014; Roundy, 2017).

Despite the obvious role of universities in the supportive ecosystem for SEs, this topic remains fairly under-researched (Thomsen, Muurlink, & Best, 2018). Such gap in the knowledge has been highlighted by Guerrero et al (2016, p. 560) who stress the need to further explore "the environmental factors (i.e., formal: policies, incentives & informal: attitudes, culture) and internal

factors (i.e., resources and capabilities), that affect the development of Entrepreneurial Universities in the new social and economic landscape".

The objective of this paper is to investigate how universities engage and mobilize different stakeholders (internal and external) to build a supportive ecosystem for social entrepreneurs in the global south. We gather insights from a capacity-building project between Belgium, Ecuador, Bolivia and Uganda, with the main objective to develop university offices and policies to strengthen and promote social entrepreneurship at universities and thus dynamize the local ecosystems in support of social entrepreneurs. To do so, we will adopt a qualitative approach (Eisenberg & Miller, 1987), with interviews with elite informants (Solarino & Aguinis, 2020) from officials, professors, students and entrepreneurs from four universities involved in SEfficiency3, a two year capacity building project, combined with different observations and reports from the project activities.

To make build our arguments in this paper, we will borrow insights from institutional theory (Scott, 2005) and ecosystem thinking (Jacobides, Cennamo, & Gawer, 2018; Spigel & Harrison, 2018; Theodoraki et al., 2021). The institutional theory has been widely used to examine the influence of the institutional environment (norms, rules, culture, routines) and the actions of individuals and organizations, in the process of gaining legitimacy and support. In the context of universities and entrepreneurship, this theory has provided different insights on how universities interact with multiple stakeholders, due to multiple environmental factors that shape the university entrepreneurial activity (Guerrero & Urbano, 2016). Such external factors influence not only the teaching and research activities, but also the entrepreneurial dimension of the university, including technology transfer process, entrepreneurial education portfolio, governance structure, and the entrepreneurial attitudes of the university community (Schmitz, Urbano, Dandolini, de Souza, & Guerrero, 2016; Urbano, Guerrero, Ferreira, & Fernandes, 2018).

The relevant literature describes various types of support that an ecosystem can offer to SEs, including access to different types of capital (human, financial and commercial), and other specific resources, knowledge, information and networking expansion possibilities (Biggeri, Testi & Bellucci, 2017; Goyal, Sergi & Jaiswal, 2016; Letaifa, 2016). In addition, we see evidence in the relevant literature on how universities engage in the resolution of complex social and environmental issues by using the support and involvement of their students, faculty, and staff. This occurs mainly through curricular and extracurricular activities, where students, university faculty, and staff work with local community groups to resolve real social challenges (Jones, Warner & Kiser, 2010).

In the global south, many universities lack modern infrastructure and technologies, the knowledge or programs specifically designed to support social entrepreneurs (Diaz Gonzalez, Dentchev, & Roman Roig, 2020). Nevertheless, universities contribute to local ecosystem dynamics by means of community service learning (Furco, 2016), where students are confronted with the needs of communities, which allows them to reflect upon and resolve the rather challenging social issues that they face. Other examples of activities undertaken by universities to support the entrepreneurial environment are related to education in entrepreneurship, social entrepreneurship and sustainability, business simulation competitions, internships, volunteer programs, collaboration with incubators and accelerators and attracting or promoting grants and seed funding for students entrepreneurs (Marzocchi, Kitagawa, & Sánchez-Barrioluengo, 2017).

[3] https://www.vliruos.be/en/projects/project/22?pid=4432

Therefore, we can argue that the different university involvement with the community constitutes a favourable environment to support SE, not only because of the different amount of interactions and specialized knowledge, but also because of the multiple collaborations with corporates, multinationals, public intuitions, governments and international organizations, that aim at developing new knowledge and advancing technologies that will be serving societal needs (Wakkee, van der Sijde, Vaupell, & Ghuman, 2019). However, the specific aspect of engaging different stakeholders (internal and external) to build a supportive and conducive environment for social entrepreneurship remains underexplored (Klofsten et al., 2019).

Our main contribution will be related to characterising the different processes of engagement of university stakeholders in the process of developing ecosystems for SEs. Many contributions have mainly explored the ecosystem as a network, with much attention given to map its different actors, their affiliation, specific roles and interactions (Mars & Bronstein, 2017; Roundy, 2017). This is partial because one important of the most relevant aspect of an ecosystem is the actor's interdependence (Stam, 2015). This means that they create dynamic communities, uniting social, cultural and economic forces (Spigel, 2017) to improve the competitiveness of all entrepreneurs embedded in the ecosystem. But as in any other system, the engagement processes are key to maintaining a healthy level of interactions among its members (Colombo, Dagnino, Lehmann, & Salmador, 2017).

Keywords

Universities; Ecosystems; Social Entrepreneurship; Capacity Building; Global South

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Exploring (mis)alignment of value-risk synergies and tensions between stakeholders in circular business models

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Extended abstract

Circular business models (CBMs) offer many opportunities to create economic, environmental and social value. Various circular strategies or combinations of circular strategies such as reuse, repair, remanufacture, recycling or regeneration can optimize resource efficiency and productivity while simultaneously reducing or eliminating primary resource extraction and harmful wastes (e.g. EMF, 2020; Geissdoerfer et al., 2017). The transition towards a circular economy (CE) requires changes at a complex systemic level, involving the redesign and reorganization of entire value chain structures and a need for significant changes to the ways in which multiple key stakeholders collaborate, coordinate and align with each other. Adopting this perspective means acknowledging that interaction between different stakeholders is a key factor in determining the success or failure of CE solutions. In particular, the synergistic alignment of circular value creation and capture between businesses, investors and societal stakeholders is an important underlying mechanism for the successful scaling of CBMs and an acceleration of the transition towards a CE.

Scholars have also highlighted some of the potential risks and uncertainties relating to the CE. Depending on the way that they are configured and implemented, CBMs do not automatically lead to an improvement in environmental or social sustainability or a reduction in primary resource consumption (e.g. Hart & Pomponi, 2021; Korhonen et al., 2018; Manninen et al., 2018; Murray et al., 2017; Tukker & Tischner, 2006). For example, Zink and Geyer (2017) conceptualized the possibility of "circular rebound" whereby CE activities can potentially increase overall economic production. Other researchers have drawn attention to the inherent uncertainties surrounding financial and investment decisions pertaining to CBMs, which create barriers to their implementation (e.g. Dewick, 2020; Linder & Williander, 2017). For example, in product-service-system (PSS) business models, value is created for the business stakeholder through the retention of product ownership, which secures the rights and control over product return flows. This creates synergy with customers who value the convenience of repair and maintenance provisions that non-ownership affords them and paying only for what they use (Cherry & Pidgeon, 2018). Further

synergies can be created when PSS models reduce product life cycle environmental impact by enabling changes in consumer behavior (Bocken et al., 2018). However, financial services institutions may be reluctant to finance such CBMs due to higher capital investment and longer payback periods resulting from retained ownership of products and delayed revenue streams, resulting in a higher credit risk for financial stakeholders (Finan*CE* Working Group, 2016; ING, 2020). Attempts to ensure value capture for business and financial stakeholders, such as more restrictive contractual clauses regarding payment terms or product use, can result in higher risk for consumers and society, especially in the case of goods or services that serve fundamental personal or societal needs (Cherry & Pidgeon, 2018; ING, 2020).

The above examples illustrate the existence of interrelated synergies and tensions between circular value and circular risk. On the one hand, circular value creation and/or capture by one stakeholder can simultaneously create value for others. On the other hand, circular value creation and/or capture by one stakeholder or set of stakeholders could potentially generate costs or risks for another stakeholder or set of stakeholders. In addition, an individual organization may encounter value-risk synergies and tensions between different elements of its CBM configuration. In short, value-risk synergies and tensions could occur in the CE on different levels: among a set of societal stakeholders, within a circular value chain or within a single organization. The relative salience and importance of value-risk constructions within and between different stakeholders has significant implications for the successful and sustainable implementation of circular initiatives (e.g. Machacek et al., 2017). That is: synergistic effects will align interests and function as an enabler, whilst conflicts and misalignment will inhibit progress. Therefore, it is important to investigate and understand the degree to which stakeholders are aligned or differ with regards to capturing circular value and their exposure to circular risk.

Several systematic literature reviews have categorized and conceptualized many examples of value creation, benefits, opportunities and drivers as well as risks, challenges, and barriers that emerge in the implementation and operation of CBMs and CE initiatives (e.g. Ghisellini et al., 2016; Govindan & Hasanagic, 2018; Hina et al., 2022). However, there is currently very little understanding of how value and risk factors are co-dependent and interrelated with each other on different levels and how they are aligned or misaligned between key stakeholder groups. A conceptual understanding of the most pertinent value-risk synergies and tensions from different stakeholder perspectives could lead to important insights surrounding the underlying mechanisms of enablers and barriers to CE implementation. Insight into this could help to develop more effective solutions for constructive collaboration among the stakeholder groups in order to support the growth of CBMs, and to understand how stakeholder interests could be better aligned while doing so. Therefore, the research paper aims to answer the following research questions:

What circular value and circular risk emerges from the perspective of three different stakeholder groups – business, finance and society?

How is circular value and circular risk aligned or misaligned between the three stakeholders?

How can value-risk synergies and tensions between stakeholders be identified and conceptualized in a systematic manner?

The proposed development of a systematic conceptualization of circular value-risk synergies and tensions requires an investigation and assessment of the current state of knowledge that is

grounded in the academic literature, thus allowing for the synthesis and extension of this research domain and the identification of gaps for further investigation. Therefore, a systematic literature review is currently being conducted in order to identify and conceptualize the most significant sets or configurations of circular value-risk synergies and tensions between three specific stakeholders, namely business, finance and society.

A systematic search for literature has been conducted in the Web of Science database and relevant articles have been filtered according to title, keywords, and abstract. The final data set for full-text analysis consists of approximately 100 peer-reviewed academic articles that partially or fully address perceptions or conceptualizations of circular risk or circular value creation and capture from the perspective of business organizations, financial institutions and investors, or societal stakeholders such as consumers or local communities. In line with qualitative content analysis, articles are being coded in Maxqda to identify patterns of co-occurring and interdependent value-risk synergies or tensions between the three stakeholders. In addition, we aim to identify how value-risk patterns or configurations relate to different CE contexts, such as the position in the value chain, stage of the product life cycle, industry and type of CE strategy or combination of CE strategies being utilized.

Through a synthesis of the literature, the intended outcome of the review is to create a typology or conceptual framework of circular value-risk synergies and tensions that highlights alignment and/or misalignment between the three stakeholder groups, and in which “circular contexts” they occur, thereby extending the literature and identifying areas for further research.

In conclusion, different perspectives of circular value and circular risk could hinder constructive collaboration between three important stakeholder groups that are considered vital to the transition to a CE: business, finance and society. Through the development of a conceptual framework of value-risk synergies and tensions between these three stakeholders, we offer a more holistic stakeholder ecosystem approach and deeper insights into CE enablers and barriers. We intend to provide academics and practitioners with a way of actively and systematically navigating value-risk synergies and tensions in different CE contexts, so that synergies can be strengthened and leveraged, while potential difficulties can be preemptively recognized, managed and reconciled.

Keywords

circular economy, value, risk, synergies, tensions

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Multi-actor business models in the manufacturing industry. Exploring how first-tier suppliers transition towards circularity.

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Extended abstract

Abstract

Adopting circular business models (CBM) represents a key lever for industry to address urgent global challenges. Prior research recognizes the need for systems thinking and collaboration, but existing CBM tools and methods often implicitly assume that the focal firm has direct access to end customers, usage data and end-of-life phases. However, upstream suppliers who lack this access often produce key components of the final product – particularly in manufacturing – and could thus be an impactful actor in driving circular solutions. We therefore aim to explore and explain how non-end-user-facing manufacturers, i.e. first-tier suppliers, drive CBM adoption through their value chain and stakeholder partners, and how existing CBM archetypes need to be extended for these novel constellations. For this purpose, we conduct an action research case study with a Swedish first-tier manufacturer who is starting to develop CBMs for its marine engine product lines which are currently sold in a linear fashion through boat manufacturers and dealers to end users. Expected results include an extended CBM canvas that accounts for CBM archetypes based on more complex value chain and stakeholder collaborations. By exploring how companies further upstream in the value chain initiate and build CBMs, we aim to advance and bridge knowledge on multi-actor CBMs and circular supply chains. We thereby hope to invite more research into how non-traditional actors can drive circular industry transitions.

Introduction

Adopting circular business models (CBMs), i.e. sustainable business models that focus on "closing, narrowing, slowing, intensifying, and dematerializing [resource] loop" (Geissdoerfer *et al.*, 2018:p.713), is a central lever for industry to help address societal challenges, such as resource scarcity and climate change. This transition away from current linear production and consumption

systems to circular business models can take different shapes (Geissdoerfer *et al.*, 2020), however, entails inherent challenges (Linder & Williander, 2017) and often requires collaboration with multiple actors (Bertassini *et al.*, 2021). In this transformation process, the roles of value chain partners and stakeholders change (Kanda, Geissdoerfer & Hjelm, 2021; Frishammar & Parida, 2019), with researchers calling for a wider perspective on the surrounding ecosystem (Parida *et al.*, 2019; Fehrer & Wieland, 2020; Lieder & Rashid, 2016). While such research is growing (Bertassini *et al.*, 2021; Reim, Sjödin & Parida, 2021), it remains underexplored what happens if other actors in the ecosystem – not the end-user-facing company – initiate and drive CBM design and implementation.

Many existing CBM archetypes, tools and design principles implicitly assume that the focal firm is end-user-facing (i.e. private users in B2C and industrial users in B2B) (Pieroni, McAloone & Pigosso, 2021; Bocken *et al.*, 2014), even in studies focusing on the ecosystem level (Konietzko, Bocken & Hultink, 2020). For instance, CBM canvas tools subsume possible multi-actor constellations under the 'key partners' (Nußholz, 2018; Antikainen & Valkokari, 2016) or 'key partnerships' (Lewandowski, 2016) element, thus oversimplifying the relations and their implications. While this focus is justifiable and relevant for most CBM adopters, circularity's inherent need for multi-actor solutions creates a rich potential for and growing interest from non-traditional, non-end-user-facing organizations, such as for instance first-tier suppliers in the manufacturing industry. It remains unclear how such companies initiate and develop CBMs while facing a lack of access to end customers, usage data or end-of-life stage. Since they often produce key components (i.e. key both, concerning the final product's functionality and economic value as well as concerning environmental impacts in production and use phase), such first-tier suppliers assume a critical role for circularity, yet need to leverage their value chain partners and possibly additional collaborations to implement CBMs and boost innovation.

The research aim is to explore and understand how non-end-user-facing manufacturers, i.e. first-tier suppliers, can drive CBM implementation through their value chain, and thereby contribute to a circular industry transformation. For this purpose, we first explore the particularities faced by first-tier suppliers when initiating CBMs in terms of value chain relations, access to customers and data etc.; second, we compare and contrast this with the CBM literature which implicitly focuses on CBM implementation by customer-facing organizations; and third, we synthesize suitable CBM configurations and necessary organizational changes that first-tier suppliers face for transitioning to CBMs. In doing so, we seek to address the following two research questions: (1) How do CBM archetypes need to be adapted and extended to fit for First-Tier Suppliers in the manufacturing sector (marine industry)? (2) How do organizational structures, value chain relations and collaboration change when first-tier suppliers transition to such multi-actor CBMs?

Method

The research follows a case study approach (Siggelkow, 2007; Verschuren, 2003) which is particularly relevant for gaining deep and contextual insights into an emerging phenomenon (Flyvbjerg, 2006). The case company is a Sweden-based multinational manufacturer of engines and drivelines for marine and industrial applications that is exploring opportunities connected to CBMs. This particular case focuses on the development of CBMs for their marine leisure segment where engines and drivelines produced by the case company are currently sold in a linear way via boat

manufacturers and dealers to end user. The adoption of CBMs by first-tier suppliers – who have no direct access to customers, usage data and product at end-of-life and, thus, rely on new and different value chain partners and multi-actor business models to circumvent these limitations – is a recently emerging phenomenon. Case selection in exploratory studies serves to identify cases that are novel, extreme or otherwise particular (Verschuren, 2003) and therefore promise rich insights (Flyvbjerg, 2006) into emerging phenomena (Siggelkow, 2007). The case at hand was chosen for its unique, real-world setting that provides valuable insights into the new development.

For data collection, the study builds on semi-structured expert interviews with practitioners in the case company as well as complementary interviews with value chain partners and peers in the industry. Interviews are triangulated with (a) document review to cross-check background information, dates and facts as well as (b) observations during field visits to the company plant and headquarters. We seek to understand the current factual business model and value chain relations, but also the background to how these structures have grown, what inherent challenges are and where possible entry points for new value chain relations emerge.

Data analysis is performed as qualitative content analysis in NVivo and takes an iterative approach, starting with literature-driven coding based on categories for barriers, drivers, CBM archetypes and value chain relations that emerged from the (not-first-tier-focused) literature. Staying close to the case data, we will then gradually refine these codes to the case setting and first-tier context as new aspects emerge inductively from the data.

Expected results

Data collection for this study is ongoing, thus we present expected results here. Over the coming months, the collected data will be analyzed, transferred into an initial framework and then tested and validated against the reality of the case company, and adjusted where needed. The expected results include (1) identification of particularities faced by first-tier suppliers, e.g. connected to a lack of access to end users or usage data, that hinder or enable adoption of CBMs; (2) insights into the role of supply chain relations and reconfigurations in overcoming or harnessing particularities of first-tier suppliers; (3) synthesis of corresponding CBM configurations suitable to these particularities.

By exploring and demonstrating options for how companies further upstream in the value chain can initiate and build CBMs, we aim to advance and bridge knowledge on multi-actor CBMs and circular supply chains. By investigating how actors other than ‘the usual suspects’ can enter the circularity space, we open up for more future research into these non-traditional agents behind circular business models.

Keywords

Business model; Circularity; First-tier supplier; Value chain relations; Collaboration

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Creating Social Impact with Startup Incubator Programs for Refugees

Using social entrepreneurship to accelerate integration

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Extended abstract

Introduction

This research focuses on social business model innovation at the example of startup incubator programs for refugees which promote entrepreneurial activities and support socio-economic integration (Harima & Freudenberg, 2020; Harima et al., 2019; Meister & Mauer, 2018).

At the example of SINGA Switzerland, this work examines how to innovate its program offering to accelerate integration. Presented findings are based on a collaboration between FHNW and SINGA Switzerland, member of the international SINGA network promoting entrepreneurship among refugees. Seed-funding for an initialization project has been granted by Innosuisse, the national innovation agency.

The guiding question for this work is how social entrepreneurship in the form of startup incubator programs for refugees can create social impact by addressing key challenges of integration. In this work, integration is defined as the process or result of refugees becoming part of the host society (Ruedin et al., 2020; Ruedin, 2011). Exemplary measures taken by incubators like SINGA to address these challenges include access to professional support (e.g., relevant training), resources (e.g., co-working spaces) and the local network (e.g., contacts from mentors and coaches). These measures create social impact in that refugees feel empowered, become more confident, interact more proactively, take more responsibility and invest more effort in shaping a better future for themselves and the people around them.

Methodology

Semi-structured interviews were conducted with 22 individuals among two groups across Switzerland:

15 integration experts at not-for-profit organizations and cantonal and governmental integration departments who assist integration of refugees in Switzerland
7 refugees in Switzerland who have participated in the SINGA startup incubator program

Discussion

Whether social, cultural or economic parameters are considered, experts agree that rapid integration of refugees is essential (Spadarotto et al., 2014; Marbach, Hainmueller & Hangartner, 2018). However, challenges exist, often related to professional qualifications (and the recognition thereof), language skills, psychological stress and discrimination (Dustmann et al., 2017; Brücker et al., 2018; Spadarotto et al., 2014). Based on the literature and findings from interviews with refugees and integration experts, some challenges are discussed here. Language skills: These are important for various reasons (Bucken-Knapp et al., 2019; Gnesa, 2018) and refugees benefit from training at the earliest stage possible (Morlok et al., 2018). Interviewed refugees and integration experts explain why. First, refugees with good language skills face fewer obstacles when engaging in conversation. Second, refugees are empowered emotionally as the overcome obstacles, which builds confidence. Third, they are better able to get a foothold in the professional world because potential employers or co-founders recognize their language skills (Degler et al., 2017). Moreover, being confident supports refugees to be more outgoing and proactive which increases their chances to start a business or find employment.

Professional qualifications: Refugees often cannot use qualifications from their home-countries because they are regarded inferior to the Swiss equivalent or are not recognized. This makes refugees less attractive for employers and undermines labor market integration (Bucken-Knapp et al., 2019; Spadarotto et al., 2014; Degler, Liebig & Senner, 2017; Gnesa, 2018). Interviewees corroborate this problem and suggest that policy makers should review approval processes of foreign qualifications. Moreover, obtaining new qualifications in Switzerland is a time-consuming endeavor.

Psychological stress: Refugees may have had traumatic experiences causing psychological issues which may lead to reservations among employers or business partners (Degler, Liebig & Senner, 2017; Dustmann et al., 2017; Efionayi-Mäder & Ruedin, 2014; Karlsdóttir et al., 2017). While this is a severe problem for the affected and their surroundings, psychological issues can undermine entrepreneurial efforts and job-search activities.

Discrimination: Refugees and integration experts alike share instances of outright prejudice and discrimination because of different socio-cultural backgrounds. Additionally, interviewees note that the local network tends to be rather small and homogeneous as it mainly contains compatriots which magnifies the effect of discrimination. They are often poorly integrated themselves, which is no help to access the local ecosystem (Ruedin et al., 2020; Söhn & Marquardsen, 2017). Even when refugees become self-employed or find employment with the help of their networks, their pay tends to be lower and working conditions worse (Ruedin et al., 2020; Söhn & Marquardsen, 2017).

These challenges need to be addressed to increase success of integration programs (Bucken-Knapp et al., 2019). Furthermore, interviewees observe that individual needs (depending on socio-cultural factors, level of education and traumas) are not accounted for in standardized integration programs. This undermines the effectiveness of standardized approaches (Ruedin et al., 2020; Degler et al., 2017) and suggests that integration processes should be complemented by voluntary

engagements at the local level (Schillinger, 2017). Such personal and trusted encounters between refugees and locals go far beyond typical parameters of integration (Schillinger, 2017).

As interviewees suggest, startup incubator programs can help solve these challenges and create social impact. Accordingly, SINGA innovates its social business model with special emphasis on its program offering to build a participative environment where refugees can strive (Hynie, 2018). Exemplary approaches and respective views of program graduates are briefly outlined:

Participants receive regular and personalized support from the program team, coaches, mentors and course instructors. This support structure empowers them to shape their future, gain confidence and self-esteem and make use of their potential. Beyond relationships with coaches and mentors, participants are encouraged to interact regularly with program peers. This is possible at various training courses and networking events. These interactions can go even further when participants engage in constructive discussions, share their entrepreneurial experiences, describe their challenges, ask peers for feedback or offer involvement in their projects. Program graduates agree that these interactions have encouraged them to step out of the comfort zone, confidently pitch their ideas, ask for help if necessary and develop their project further.

In terms of expanding personal contacts, special attention is on helping participants build a strong local network. Whenever possible, mentors and coaches share their network so that participants can branch out into the local ecosystem on their own. They can build a more heterogenous network which assists them in starting a business or finding employment. On average, participants have connected with close to 50 professionally relevant individuals by the time they complete the program. Nevertheless, some graduates state that it remains challenging to take the next step in self-employment. By organizing networking events and growing the community of program graduates, SINGA intends to support continuous networking and integration in the local ecosystem.

Instead of a standardized one-size-fits-all approach dealing with all participants alike, no matter what their individual needs, great emphasis is placed on development of trusted personal relationship among all involved parties. This creates an environment where specific requirements are considered and personal skills are expanded further. Most gradates confirm that they have improved professional skills considerably. Nevertheless, the process of becoming self-employed remains challenging. This suggests that an extended SINGA program over longer periods can add value.

Language courses are an integral part of the program. Beyond that, all communication and training courses are done in the local language. This provides a safe environment to build language skills and gain confidence using it. Nevertheless, some graduates state that language barriers persist when interacting with locals which undermines the integration process. This suggests that language training should remain a priority upon graduation from the SINGA program.

As a startup incubator program focusing on entrepreneurial skills, participants are prepared for self-employment. This represents an attractive alternative to the job market where they face disadvantages in terms of qualifications and language skills. Program graduates suggest that this support structure with coaching and mentoring should be available beyond graduation from the program. SINGA is evaluating this option, however, feasibility depends on the availability of voluntary mentors and coaches.

Conclusion

This research illustrates that startup incubator programs for refugees like SINGA have significant potential to accelerate social integration in the host-country, which enables refugees to lead better lives. Social impact is created in a way that they feel more "at home", have more interactions with others, become more confident and empowered, have higher self-esteem, make better use of their professional skills and become self-sufficient.

When going through the mechanisms of social business model innovation at the example of startup incubators, several positively re-enforcing feedback loops become apparent. Gaining deeper insights into these mechanisms represents promising avenues for further research to create higher social impact for refugees and their communities.

Keywords

Startup incubators for refugees, integration, social business model innovation.

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Blockchain for a circular plastics economy

Building supportive ecosystems for blockchain-based circular business models

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Extended abstract

Plastics are versatile materials involved in almost every aspect of daily life for i.a. clothing and footwear, packaging, transportation and telecommunications (Thompson et al., 2009). The production of plastics has almost 200-folded since 1950 and is estimated to double within the next 20 years (Andrady & Neal, 2009; Schwarz et al., 2021). Under a business-as-usual scenario, however, the manufacturing and disposal of plastics could be responsible for over 56 gigatons of cumulative greenhouse gas (GHG) emissions globally by 2050, which accounts for more than 10% of the entire remaining carbon budget to stay below the 1.5°C change in global mean temperature (Center for International Environmental Law, 2019). Therefore, there is a growing consensus on the need to move away from a linear, 'take-make-dispose' approach to plastics and embrace circular business models able to narrow (e.g. reducing material use and reduce waste), slow down (e.g. reusing and repairing products) and close (e.g. recycling) resource flows (Bocken et al., 2016; Kirchherr et al., 2018; Kleine Jäger and Piscicelli, 2021; Schwarz et al., 2021; World Economic Forum et al., 2016).

New digital technologies such as artificial intelligence, machine learning, Internet of Things and blockchain can enable and accelerate the transition to a circular economy (Dahl Andersen et al., 2021). For example, blockchain – a distributed virtual database that maintains a permanent and tamper-proof record of transactional data – can support the reuse and recycling of plastics by serving as a trust-based platform for waste segregators, recyclers and manufacturers to exchange reliable information about the availability, quantity and quality of recycled plastic feedstock (Chidepatil et al., 2021; Sankaran, 2019). Besides enabling the monitoring and tracking of plastics waste, blockchain technology can improve resource and waste management practices by facilitating rewards-based reuse and recycling initiatives, as well as the implementation of cryptocurrency payments and smart contracts (Steenmans et al., 2021).

In the last decade, a variety of blockchain-based circular plastics initiatives have been developed worldwide like those launched by the Plastic Bank to encourage plastic recycling in developing countries by means of financial rewards paid in cryptocurrency or RecycleGO, which developed a blockchain-backed chain of custody system for tracking the lifecycle of recyclable materials (Steenmans et al., 2021). Most of these projects are led by sustainable start-ups, although small and medium-sized enterprises (SMEs) and multinational companies (MNCs) are also increasingly experimenting with blockchain-based circular business models. However, the number of existing initiatives remains rather low and only few of them have reached the piloting or operational stages, while some others are discontinued after a few years (Steenmans et al., 2021). This can largely be explained by the fact that the adoption and diffusion of innovative technologies to solve or mitigate sustainability challenges often require significant socio-cultural, economic, and legislative changes (Planko et al., 2016).

Technology-innovating firms thus need to engage with a broad range of public and private actors (e.g. suppliers, customers, governments, competitors, media) to build a supportive business ecosystem around their new technology (Iansiti and Levien, 2004). Planko et al. (2016) identified four overarching goals (i.e. 'technology development and optimization', 'market creation', 'socio-cultural changes' and 'coordination') and a set of related system building activities that entrepreneurs and entrepreneurial managers can pursue in order to create such a favorable ecosystem. However, the strategy framework for collective system building developed by Planko et al. (2016) draws on insights from the Dutch smart grid sector and its applicability to other industries and emerging technologies like blockchain requires further examination. Moreover, the framework does not discriminate between startup entrepreneurs *vs* entrepreneurial managers in SMEs and MNCs. Yet, the two types of entrepreneurs have access to different (financial, physical, human, technological, reputational, organizational) resources and have different characteristics (e.g. firm age, size and level of diversification in business practices), which may have an influence on what goals and collective system building activities they (can) pursue and the success of their actions.

This empirical study aims to fill these knowledge gaps by investigating how entrepreneurs (in startup, SMEs and MNCs) build supportive ecosystems for blockchain-based business models that enable a circular economy for plastics. This research adopts a qualitative, multiple case study design (Yin, 2003). Data was collected through desk research and semi-structured interviews. Desk research was performed to compile a list of active (global) blockchain-based initiatives for circular plastics and to collect data on their activities, type of blockchain used, stage (i.e. pilot, development, operational, discontinued), and (inter)national focus of operations. All 20 initiatives identified were invited to participate in the following round of qualitative interviews. 12 in-depth, semi-structured interviews (with 6 startups, 3 SMEs, and 3 MNEs) were conducted in March 2022. The interviews lasted on average one hour, and were recorded, transcribed verbatim and coded by means of thematic analysis.

The results of the study uncover common patterns in the type of goals and collective system building activities pursued by different types of entrepreneurs, and how these are influenced by the resources available to them. Our findings provide practical insights for entrepreneurs striving to develop and commercialize blockchain-based circular business models and extend existing knowledge on the processes of creating and orchestrating business ecosystems for the successful wide uptake of a blockchain-driven circular plastics economy.

Keywords

Circular plastics economy, blockchain, business ecosystem, collective system building

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Entrepreneurship and its Ecosystem in Circular Fashion Transition: A Systematic Literature Review

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Extended abstract

This paper provides a systematic literature review on circular economy in the fashion industry, with the aim to elucidate the role of entrepreneurship and its supportive ecosystem in driving a system-level transition towards circular fashion. By combining insights from the multi-level perspective (MLP) of sustainability transition literature and circular economy ecosystems literature, this review highlights how entrepreneurial niches are discussed in existing circular fashion research, how these niches interact with the dominant linear, fast fashion regime, and how ecosystem actors facilitate flows of material, knowledge and values at the niche-regime interface, thereby scaling niches and destablizing the regime.

The fashion industry is characterized as a cultural and creative industry (CCI) that is driven by constant innovation and entrepreneurship. While the aesthetic and symbolic elements are defining features of the industry's value creation activities, its material implications make it one of the most polluting industrial sectors. The pressing challenges in the industry arise from the industrial adoption of the *fast fashion* paradigm, in which the production and consumption regimes are characterized by a linear, take-make-waste mode of industrial practices and institutions that has solidified long-distance supply chain management systems, exploitative labor practices, and short lifetime of clothes (Bhardwaj and Fairhurst, 2010; Moretto *et al.*, 2018; Niinimäki *et al.*, 2020).

Calling for a new textile and fashion economy, the Ellen MacArthur Foundation (2017, 22) defines *circular fashion* as an industrial economy where "clothes, textiles, and fibers are kept at their highest value during use and re-enter the economy afterwards, never ending up as waste." This discourse follows the more general *circular economy* (CE) paradigm, for which scholars and practitioners characterize as an industrial economy that is restorative and regenerative by intention and design, where biological components return to the biosphere and technical components are

collected for reuse, repair, remanufacture, and recycle (Ghisellini, Cialani and Ulgiati, 2016; Geissdoerfer *et al.*, 2017; Kirchherr, Reike and Hekkert, 2017).

Businesses, entrepreneurs, and their new business models are assessed to be the main drivers in CE transitions (Bocken *et al.*, 2016; Geissdoerfer *et al.*, 2020; Henry *et al.*, 2020). In the case of fashion industry as well, business and supply chain management literature has identified various design and business strategies to practice circular fashion, which could be categorized as (1) *narrowing* the resource loop by increasing resource and energy efficiency in the production process of fashion products, (2) *slowing* the resource loop that extends the lifespan of clothes through reuse and repair, or (3) *closing* the resource loop by recycling textile waste as production input (Goldsworthy, Earley and Politowicz, 2018; Pal and Gander, 2018).

While there is emerging literature that examines the specific practices of circular fashion businesses, actors involved, and the challenges they face in narrowing, slowing, and closing the industry's resource loops (Franco, 2017; Todeschini *et al.*, 2017; Brydges, 2021), how circular fashion entrepreneurs could make system-level transitions and the kind of ecosystem actors that support these transitions dynamics are yet to be investigated in depth. Hence, by conducting a systematic literature review, the key research question that this paper aims to address is what kind of supportive ecosystem facilitates entrepreneurs to drive system-level transitions toward circular fashion? I bring in the multi-level perspective (MLP) of sustainability transition literature, thereby understanding system-level transition of the fashion industry as processes of entrepreneurial niches in circular fashion disrupting the dominant linear, fast fashion regime (Buchel *et al.*, 2022). Such system-level transition processes require an understanding of the interaction of multiple actors that form an ecosystem around the common system-level goal to narrow, slow, and/or close resource loops of production and consumption in the fashion industry, through which flows of material, knowledge, and economic values are enabled (Aarikka-Stenroos et al., 2021).

As the intersection of entrepreneurship and circular fashion is still an emerging topic, this paper reviews circular fashion literature in general and analyzes its explicit and/or implicit arguments on entrepreneurship and its supportive ecosystem actors. The key databases used for the systematic literature review are Scopus and Web of Science. The key terms in the search criteria were selected to allow for the broadest selection of articles written on the topic, with reference to key terms used in previous literature reviews on circular and sustainable fashion such as Jia et al. (2020), which takes a supply chain management perspective, and Ki et al. (2020) from corporate stakeholder engagement perspective. The key terms and operators used in this paper are "circular" AND "fashion" OR "textile*" OR "cloth*" OR "apparel" OR "garment," found in the title, abstract, or keywords in published journal articles from 2010 to 2022. This specification yields 2,019 articles in total, and 509 articles excluding duplicates. A careful reading of the titles, abstracts, and findings were guided by the following criteria:

Does the paper contribute to research on emerging entrepreneurship that applies circular economy strategies (narrowing, slowing, and/or closing) in the fashion industry? In other words, does the paper address an emerging niche in circular fashion?
Does the paper contribute to understanding of how niches conflict or conform with the dominant fashion regime?
Does the paper discuss or imply the role of supportive actors that facilitate circular fashion niche scaling or regime disruption?

Based on these criteria, a total of 30 articles are selected for the analysis. Guided by the multi-level perspective (MLP) of the socio-technical sustainability transition literature, as well as Aarikka-Stenroos et al.'s (2021) conception of the CE ecosystem, the thematic analysis of the selected articles assesses (1) what kind of entrepreneurial niches are researched, (2) how niches interact with the dominant, fast fashion regime, and (3) how ecosystem actors facilitate flows of material, knowledge, and values at the niche-regime interface of circular fashion.

The preliminary findings of this systematic literature review are that (1) the main aspect of the fashion regime that entrepreneurs have difficulty disrupting is the consumption culture of the linear, fast fashion paradigm, (2) the forms of niches in circular fashion entrepreneurship are diverse, and (3) supportive ecosystem actors of circular fashion entrepreneurship need to facilitate the flows of material, knowledge, and values at the niche-regime interaction to drive system-level transitions, hence playing a bridging role between niche entrepreneurs and regime actors. These findings contribute to providing a sustainability transition lens to the emerging circular fashion dynamics and understanding how niche entrepreneurs and their supportive ecosystem actors could make a system-level transformation towards CE. The findings also guide tailored policymaking and business decisions to enable entrepreneurs and their ecosystem to drive system transition towards the CE. The paper strongly aligns with the theme of Track 1.2 of the 2022 New Business Model conference, as the track focuses on ecosystem thinking and discussions on ways that a supportive ecosystem could strengthen the various stakeholders' endeavors in developing and innovating sustainable businesses.

Keywords

circular economy, fashion industry, circular fashion, circular economy ecosystem, sustainability transition

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Exploring the business ecosystem for green business models – a literature review

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Extended abstract

Abstract

Green business models contribute to environmental benefits and are financially viable. But no green business model can exist alone and must be understood and measured together with other business models, both traditional and green business models. There is a gap in the literature exploring green business models from a business ecosystem perspective. A systematic literature review provides a such insight from the existing green business model literature. The review indicates that there are various publications that address green business models in a business ecosystem perspective, however, there is a lack of categorising the various approaches in a holistic view.

Introduction

Green Business Model (GBM) could be defined as "*business models which support the development of product and services (systems) with environmental benefits, reduce resource use/waste and which are economic viable. These business models have a lower environmental impact than traditional business models*" (FORA 2010). Green business models contribute to environmental benefits and at the same time should be economic viable. There are many articles that review sustainable business models (Bocken et al., 2014; Comin et al., 2019; Goni et al., 2021; Lüdeke-Freund et al., 2018), which could defined as business models that create, capture, and deliver economic, social, and environmental value (Bocken et al., 2014). To narrow it down, this study focuses on Green Business Models as the environmental, green lenses of sustainability in the business model ecosystem perspective.

The importance of the business ecosystem perspective for green business models has been suggested by serval authors. Any business model, either physical, digital and/or virtual is a network-based business model because a business model can´t exist alone (Lindgren and Rasmussen, 2013), and the same goes for green business models. All green business models in such a network must be understood and measured to classify the degree of green in the business ecosystem in order to get a more accurate picture (Lindgren 2021). Sommer (2012) gives a GBM definitions where the entire value chain is included: "*a business model that represents a significant improvement (discontinuous leap) in overall environmental performance relating to its entire value chain system vis-à-vis that of conventional business models (i.e., the reference case)*. A value network could be described as the focal business together with its users, customers and network that are linked together through tangible and intangible relations that carry the business model´s value transactions (Allee 2020).

There is a gap in the existing literature addressing green business models beyond single business model perspective (Henriksen et. al, 2012 and Lindgren, 2021). The success of green business model relates to green performance in an ecosystem perspective, and therefore forms the purpose of this research article; to conduct a systematic literature review to explore the business ecosystem perspective for green business models. The research question is established:

What Green Business Models in a business ecosystem perspective exists in the GBM literature?
New contributions from this research are related to the field of defining and implementing green business models in the contribution to sustainable development.

Methodology

The main objective of this study is to explore GBMs in a business ecosystem perspective. A systematic literature review approach will be conducted to this work to ensure evidence-based results (Thomas and Harden 2008). The systematic review will have a structured approach to secure transparent and replicable results, consisting of a data collection part for planning the review; and a data analysis part for reporting and synthesising the findings of the conducted review. (Tranfield et. al 2003) Implications of the thematic analysis will be given in the discussion session.

The literature review process started January 2021 to identify publications related to green business model. Most of the publications were identified by search in the academic databases Elsevier Science Direct, Elsevier Scopus, Sage, Web of Science with the search term "green business model" as the first initial screening criteria. This yielded 246 publications. Several publications had "green business model" just as a reference, or even confusingly only in the abstract or as keyword without addressing the topic in the text. Such papers along with duplicates were excluded giving 103 relevant publications. The last step was about identifying publications related to green business models in a business ecosystem perspective to be able to answer the research questions. This selection criteria gave XX publications for assessment.

Preliminary results

An overview of different approaches of green business models in the business ecosystem are shown in table 1.

GBMs IN THE BUSINESS ECOSYSTEM	AUTHOR(S) (YEAR)	TITLE

A shift in Market trends, Network	Lindgren and Taran (2011)	A Futuristic Outlook on Business Models and Business Mode Innovation in a Future Green Society
Stakeholders in the external environment	Sommer (2012)	Managing Green Business Model Transformations
Partnership, Knowledge partnership, Green Supply Chain Management, Take-Back-Mechanism, Cradle to Cradle, Industrial Symbiosis	Henriksen et. al (2012)	Green Business Model Innovation - Empirical and literature studies
System thinking, Design thinking, Entire ecosystems, Holistic thinking	Bisgaard et. al (2012)	Green Business Model Innovation, Conceptualisation, Next Practice and Policy
Stakeholder engagement	Abuzeinab and Arif (2014)	Stakeholder engagement: A green business model indicator
Interconnections between business models, industry, and the external environment	Nair and Paulose (2014)	Emergence of green business models: The case of algae biofuel for aviation
Circular Value Chain external to the business	Roos (2014)	Business Model Innovation to Crate and Capture Resource Value in Future Circular Material Chains
Business Ecosystem, Stakeholders in the ecosystem Collaboration	Rajala and Westerlund (2016)	Environmental sustainability in industrial manufacturing: reexamining the greening of Interface's business model
Overcome constraints outside business	Abuzeinab and Arif (2017)	Barriers to MNEs green business models in the UK construction sector: An ISM analysis
Life-cycle-approach, LCA (Life-cycle-assessment)	Løkke et. al (2020)	How green are supported 'green' business models? Time for the life cycle approach to enter public support programmes
Green business model ecosystem, Business model ecosystem, Ecosystem service, Value network, Business model ecosystem value network, Open business model value network, Stakeholder approach: Triple, quadruple and quinto Helix Etc.	Lindgren (2021)	A Scoping Review and Framework of Green Business Models Related to Future Wireless Technology: Bridging Green Business Models to Future Wireless Technology

Table 1: Green business models in business ecosystem

Discussion

The literature review indicates that there are various publications that address green business models in a business ecosystem perspective, however, there are a lack of categorising the various approaches in a holistic view. Based on table 1, a categorisation could be carried out to get more insight into the topic.

Keywords

Green business model, business ecosystem

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Social Franchising as an innovative sustainable business model

Learning from a local ecosystem of housing initiatives for very low income people

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Extended abstract

Summary

This paper contributes to the challenges of adequate housing and scalability of social enterprises by suggesting an innovative sustainable business model. The concept of social franchising will be illustrated by the analysis of two Belgian cases, Het Pandschap and Renoseec. The research is based on in depth interviews with relevant stakeholders of these organisations: the founders and operational managers of the organisation, the owners of the houses, the government, the tenants and the local community. These two organisations were able to experiment, test and improve diverse approaches that support owners in improving housing conditions, thanks to an extensive collaboration with and support from the local government. The projects started in one city, but expanded to other cities and regions thanks to its bottom-up approach: connection with the local context, network of local contractors, and collaboration with other local organisations in the civil society. Vital for this social franchising concept is the open-source distribution of knowledge and the sharing of sustainable values. These key features of the region-wide network are implemented by (1) setting up regional campaigns through partnering civil society organizations and local governments; (2) initiating local spin-offs with shared values after having identified local opportunities and interest from local government; (3) supporting the spin-offs in order to guarantee a successful scaling based on the original values and approaches.

Main

Being part of the so-called third sector, one of the main challenges for social enterprises is to enlarge their institutional visibility (Chaves and Monzón 2013). According to Chaves and Monzón

(2013, p. 17) this third sector remains invisible for mainly two reasons. First, the absence of a separate category in the national accounts system. Second, the lack of a clear and rigorous definition. In this paper, we focus on this challenge by elaborating on one of the elements that are seen as being vital for social enterprises, i.e., scalability (André and Pache, 2016; Portales 2019; ; Islam, 2020; Shepherd and Patzelt, 2022). If social enterprises succeed in scalability, this might add to their visibility.

Measuring success in social enterprises is different from profit oriented organisations. This does not come as a surprise since the aim is not maximising profit, but addressing societal problems. Being able to scale societal impact is therefore an important component in the assessment of their success (Portales, 2019; Islam, 2020). According to Portales (2019, p. 4), "scalability of social enterprises refers to the ability to replicate the business model successfully in other places, to continue generating more benefits." Islam (2020, p. 1), referring to André and Pache (2016) defines scaling impact as "the creation of higher social value by serving large numbers of beneficiaries, as well as serving them well in relation to specific social problems". "Spreading excellence within an organization as is grows" is how Shepherd and Patzelt (2022, p. 255) define it. These definitions show that upscaling contains a quantitative element as well as a qualitative one. The focus, however, is most of the time on increasing the numbers and that might be an explanation for the unintended negative consequences (Islam, 2020 and 2022). Islam's (2022) suggestion for future research, i.e. how to avoid the potential unintended consequences resulting from scaling strategies, is the focus of this research. Scalability is not an easy process because social enterprises often lack resources. Moreover, scalability is a controversial concept because it is often related to scaling up to reduce costs and increase efficiency. However, the scalability of social enterprises serves another goal. Benefits relate to the social impact they can create for economic, social, and environmental aspects. The aim is to increase impact or replicate a business model that has been proven successful in solving a societal problem. 'Het Pandschap' and 'Renoseec' respond to the urgent issue of sustainable housing. In the paper, the purpose is to focus on the conditions that are helpful in guaranteeing a successful scaling of social impact by analysing the specific approach of 'social franchising' by these two Belgian cases.

Adequate housing is a universal human right and viewed as one of the most basic human needs (United Nations, n.d.; Schumacher 1977). Yet, this article 25 of the Universal Declaration of Human Rights is not met, neither in the south nor in the north of the world. In December 2022 more than forty Flemish social organizations filed a complaint against the Flemish housing policy with the European Committee for Social Rights, under the Dutch name "Woonzaak". They aimed for a policy that guarantees better access to safe and affordable housing for everyone. The universal right to housing requires attention. In general, human rights are inextricably linked to the 17 Sustainable Development Goals (SDGs) that the 193 member states of the United Nations have put on the agenda by 2030. The core ambitions are: ending extreme poverty, inequality, injustice and global warming. The SDG ambition in the field of housing is to provide access for everyone to adequate, safe and affordable housing with associated basic services by 2030.

Only improving the entire value chain of the housing sector can offer a way out, provided by societal triangulation (Van Tulder and Keen., 2018), i.e. a joint approach by all relevant actors, including government, profit-driven companies and social enterprises operating in the market and civil society, all pursuing an unambiguous social objective. Some governments take initiatives to meet the most urgent needs. For example, several European cities, including Ghent, are committed to

tackling structural homelessness. Flemish initiatives such as interest-free energy loans, Flemish rent subsidies, etc. are good examples that partly meet the current housing shortage. However, these numerous top-down initiatives often involve merely incremental social corrections without addressing in a systemic way the structural problem, i.e., the lack of affordable housing to all social groups, including the people with a very low income (Braudel 1979). Some companies join forces with civil society to address this challenge (Bruni and Grévin 2016; Bruni and Uelmen 2006; Schmidt and Budinich 2008). They do this for example in collaboration with Social Rental Offices that are responsible for the social rental of private homes. A company such as 'Het Pandschap' in the regions of Ghent, Antwerp and Bruges sets the bar very high for private entrepreneurship because of their structurally ingrained social purpose. It also does this by setting up collective neighbourhood renovations with the 'RenoseeC project'. 'Het Pandschap' and 'Renoseec' are two innovative social housing projects in Ghent and will be used as cases to elaborate on a specific concept of social franchising. The analysis is based on in depth interviews with relevant stakeholders of these organisations: the founders and managers of the organisation, the owners of the houses, the government, the tenants and the local community.

These two cases have been chosen because of their innovative approach of providing affordable houses for very low income people. In this approach, two principles are paramount. Firstly, the collective interest of entrepreneurship must prevail. The planet, its resources, the air, the soil on which we live, are all common goods and must also be managed collectively. Secondly, the social purpose must be a structural and statutory part of the DNA of the organization and – in addition to the financial robustness of the company – come first (Bruni and Grévin 2016; Bruni and Uelmen 2006; Linard 2003). Social entrepreneurship does not exclude financial gains. But, profits that are made on a basic right such as the right to housing and that partly include government funds, have to be paid out to a larger group of stakeholders including residents and the local community.

Entrepreneurship is understood as a vital aspect of the city as a space where several functions (working, living, relaxation) intersect (Tjallingii 1995; Versele 2020). Companies operate at the human scale of local communities (Schumacher 1973). Sustainable housing is a dimension of urban development that also depends on the collaboration between companies and other local actors (CEB 2010). As part of an ecosystem of organisations, 'RenoseeC' and 'Het Pandschap' were able to thoroughly experiment, test and improve diverse approaches that support owners in improving their housing conditions, thanks to an extensive collaboration with and support from the Belgian City of Ghent and the province of East Flanders. This results in a current set of activities that are solution driven, accessible and tailored to individual needs, rather than top-down and 'one size fits all' approach. An increasing number of requests for the offered services from all over Flanders, combined with expected adaptations (and accompanying investments) of policies in the near future, makes scaling of activities across the Flemish region necessary. This not only ensures the effective use of public resources in helping vulnerable families with their housing situation, it also helps the ecosystem ensure that future policies are based on activities that have already proven their success in practice.

The main objective to scale these local activities to the rest of the Flemish region is to maximize the organization's impact on affordable and qualitative housing. The ambition is to ensure everyone in need of support improving their housing conditions. Research mostly focuses on either organizational growth strategies or ecosystem growth strategies as social impact scaling strategies (Islam, 2022). Renoseec and Het Pandschap combine both. There is not only a focus on geographic

expansion (Giudici et al., 2020), but with the specific model of social franchising, contributions are also made towards expanding the ecosystem by training and supporting the individual social enterprises. Moreover, the different way of tackling the need for social housing is new in the field which has the potential of establishing a new sector.

The social franchising concept that is suggested, is different from mainstream approaches of franchising. The concept is not sold, but shared. Central is the commitment to help the other and to be part of it. The success of this scaling is based on connection with the local context; specific needs and focus of the local government, network of local contractors, collaboration with other local organizations in civil society, … Hence, the aspiration is to socially franchise the activities in an open-source way and based on shared values. Socially engaged technical profiles like in Ghent will be supported in setting up their own local spin off. Finally, this should result in a regional wide network, increasing the influence on housing policy.

The analysis of the cases has identified key features of the regional wide network or social franchising: (1) setting up regional campaigns through partnering civil society organizations and local governments in the 5 Flemish provinces; (2) Initiating local spin offs after having identified local opportunities and combined interest from local government; (3) supporting the spin offs in order to guarantee a successful scaling based on the original values and approaches.

Keywords

Social franchising, scalability, social impact, local ecosystem, affordable housing

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Universities and Social Enterpreuners. Where do they meet?

Bibliometric Analysis

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Abstract

The aim of this study is to examine the trends observed in scientific literature regarding the roles of universities as actors in ecosystems to support social entrepreneurs. We performed a bibliometric analysis of the scientific literature covering 302 Scopus indexed publications which deal simultaneously with universities and social entrepreneurship/social entrepreneurs. The results indicate where connections are found between the two concepts and allow for the mapping of the existing research of the role of the university demonstrated in the scientific literature so far.

Keywords

Social entrepreneurs; social entrepreneurship; university; ecosystem for social entrepreneurship; bibliometric analysis

Track 1.3 - Natural Ecosystem Services as Drivers for Sustainable Business Model Development

Track chairs: *Anna Hansson and Niklas Karlsson (Halmstad University)*

Ecosystem services are critical to the function of life-support systems on earth. Due to human activities, the goods and services that ecosystems provide have been significantly degraded along with their global financial value. As a result, there is a need to explicitly consider how ecosystem services can be part of sustainable value creating business activities. By including ecosystem services in business models, businesses and their stakeholders can benefit from new innovative business opportunities.

Thus, this track explores how sustainable business models, business resilience, and sustainable growth can be facilitated through preservation, regeneration, and processing of services provided from natural ecosystems.

Business Models Embedding Ecosystem Services to tackle Climate Change

The case of Digital Climate Solutions

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Extended Abstract

Purpose

This research explores Business Models for Sustainability (BMfS) developed by emerging enterprises that use digital technologies (DT) and ecosystem services[4] (ES) as part of their value proposition and that were born with the purpose of addressing climate change issues (climate native companies).

One of the first academic articles referring to BMfS was in 2008 by Stubbs (Stubbs, 2008), where a sustainable business model was defined as "a model where sustainability concepts shape the driving force of the firm and its decision making". Under BMfS, sustainability is considered part of the business strategy itself, not as add-on (Stubbs, 2008). According to Dyllic (2016), a truly sustainable business reflects on questions that go beyond traditional considerations. In fact, it reflects on questions, such as: "How can business contribute with its products and services to resolve pressing sustainability issues in their societies?" (p.165).

In line with this, the rapid development of DT in the last decade has empowered new business solutions with the potential to significantly contribute to the challenge of climate change (CC). According to Gregori and Holzman (2020), DT contribute to the development of new value

[4] According to the Millennium Ecosystem Assessment (2005), ecosystem services can be defined as the benefits people obtain from ecosystems. These include provisioning services; regulating services; supporting services; and cultural services.

propositions that combine environmental, social and economic value. Digitalization is also seen as a 'problem solver' for CC (Lenz, 2021) and can contribute to the development of smart solutions to many environmental problems related to CC in sectors, such as: health, farming, food security, manufacturing, among others (Eteris, 2020).

According to George et al. (2019), entrepreneurs are already employing DT to address key sustainability challenges, not only through technology innovations, but also through the development of business models (BM) that provide a new purpose to the innovations. They state that management scholars are yet to embrace the urgency of CC and sustainable development in their work, identifying as one of the main avenues for future research the need to investigate innovative BMfS. In particular, there is a need to understand how ecosystem services can be part of the value creation of these BMfS, as stated in the call for this Conference.

The research questions addressed in this research are: *How are new business models for sustainability based on Digital Climate Solutions (DCS) supporting and advancing climate change actions? and How are natural ecosystem services part of these new business models' value proposition?*

Design/Methodology/Approach

This empirical research is based on multiple case studies. This method offers the opportunity of a holistic view of a process (Gummesson 1991, in Patton and Appelbaum, 2003), and also allows an investigation to retain the holistic and meaningful characteristics of real-life events (Ying 1984, in Patton and Appelbaum, 2003). The justification for cases studies also rests on the phenomenon´s importance and the lack of visible theory and empirical evidence (phenomenon-driven research questions).

With this aim, semi-structured interviews are primary sources of data. A questionnaire addressing aspects of company strategy, KPIs and BM design was developed aimed at CEOs and founders of the companies (near 20 questions in total) in an interview lasting 45 minutes conducted via Zoom. The type of questions included: market need being addressed, main innovation being proposed, value proposition and value capture mechanisms, CC objectives and KPIs, description of the DT and NCS components, among others.

These companies are mainly start-ups, with an average of 10 employees, from the UK and Europe, and were selected based on recommendations and referral by related official programs (e.g. Net Zero program, EIT Climate-KIC) and other sources (e.g. Tech Nation program, web searches, experts on the field). Secondary data was also collected from publicly available reports, websites, newspaper, journal articles, and internal company documents. In addition, a desk-based research of companies in the UK Tech Nation Program was conducted together with the review of other outstanding DT companies of interest, to understand and compare their value proposition in relation to digital technologies and ecosystem services.

The framework for analysis is based on the systems dynamic's perspective, particularly looking at causal-loop diagram, as presented in Casadesus-Masanell and Ricart (2010).

Findings

As this is an on-going investigation, the following are preliminary findings mainly based on a sub-set (desk analysis). Thus, two types of value propositions were found: mitigation and adaptation value propositions. From the group of 60 climate tech companies that are part of the UK Tech Nation Program, around 90% of the companies focused on mitigation value propositions.

Mitigation value propositions include offerings related to energy efficiency, new materials, waste management, electric transport, carbon sequestration, among others. In particular, examples related to ecosystem services include the restoration of habitats, insect's bioconversion capabilities, and the provision of information to invest in sound carbon offset projects, with the visualisation of the impact of the investments, and monitoring over time. Adaptation value propositions include services to identify, prevent, anticipate, and mitigate the impacts of CC on companies' assets.

75% of these companies are CC natives (i.e. companies that were created with the aim of tackling CC), 70% of them have DT as part of their value proposition, while 5% of these companies have ES as part of their value proposition. In terms of targeted sectors, the most commonly mentioned are: transport, energy, construction and food, although very often these companies declare to be agnostic to sectors (implying that their value proposition is wide reaching).

DT embedded into the BM that were studied include: Artificial Intelligence (AI), Machine Learning (ML), Internet of Things (IoT), blockchain, satellite images, among others, and their business models (BM) usually consider a combination of these technologies. Some of these companies improve the CC decision-making process for their clients (e.g. deciding on a portfolio for carbon offsetting), others deal with CC risks (insurance, smart contracts, climate intelligence) while others attempt to directly contribute to carbon sequestration through the restoration of ecosystems or the promotion of tree planting. Figure 1 is a preliminary and simplified model of the value creation of a DT climate native company. It is a search engine which main aim is to contribute to address CC by using the natural capacity of trees to capture CO_2 from the atmosphere.

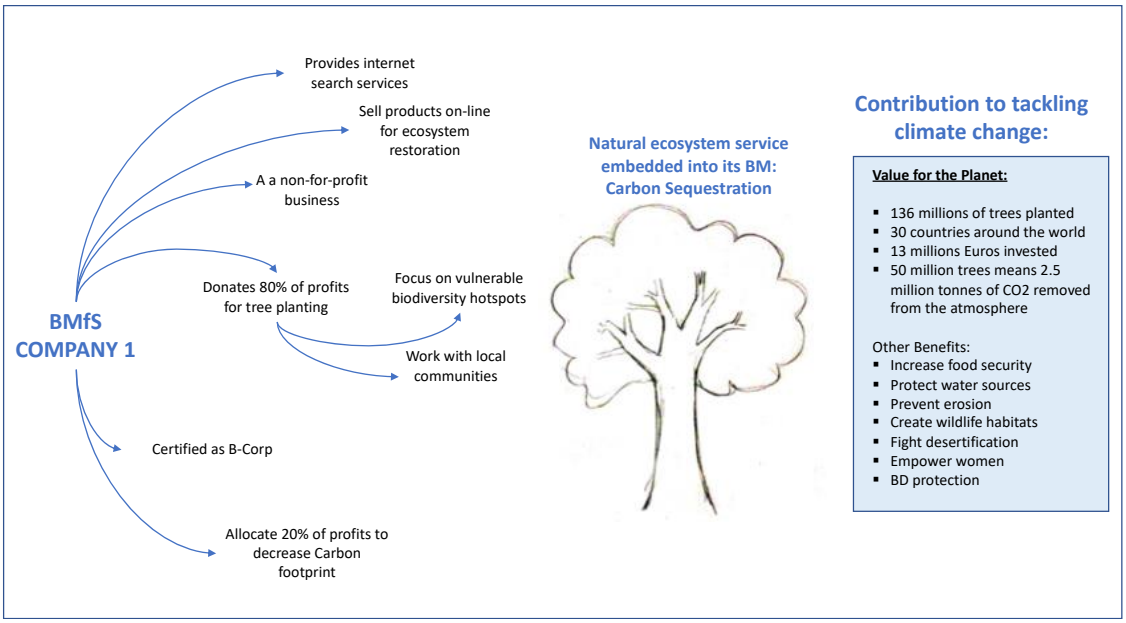

Figure 1: Simplified business model of a climate native company that considers natural ecosystem services in their value proposition.

The barriers to further DCS include: the need to build credibility and climate literacy, the ability to collect the best possible data, the uncertainty inherent to this complex challenge, plus aspects of data protection, and confidentiality.

Relevance/Contribution

This research contributes to the debate at the intersection between Climate Change and Digital Technologies (the Sustainability and Digital Imperatives) from a system dynamic perspective. It provides an insight on how DT are enabling new value propositions that incorporate ecosystem services as part of innovative business models for sustainability. Figure 2 shows a general preliminary framework to understand this dynamic.

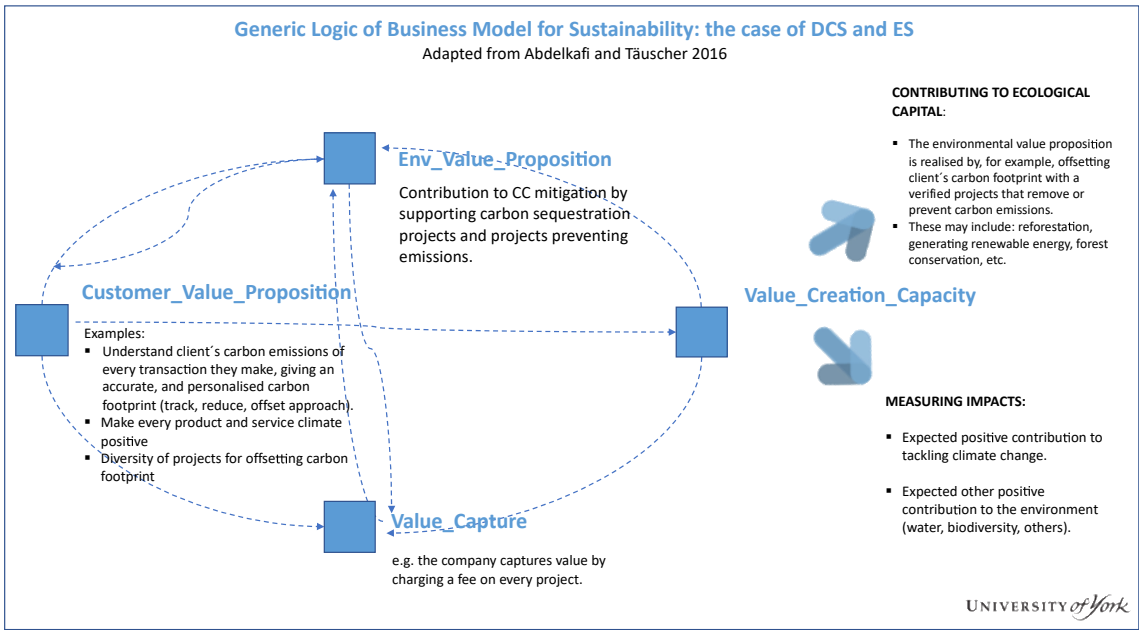

Figure 2: Generic Logic of BMFS: the case of DCS and ES.

The theoretical framework emerging from case-based research can advance and stimulate new approaches to inspire entrepreneurs, businesses, and institutions to make further progress in DCS and ecosystem services. It can also support decision makers, managers and entrepreneurs, in understanding how the business model and its value proposition can benefit the natural environment.

In particular, this is a contribution to Theme 1 of this conference ("Exploring the system level"), specifically to the question: *How can we design new business models to support value capture from ecosystem services?*

Preliminary Conclusions

Under the systems dynamic's perspective, this research is showing the interaction between innovative BMfS, their value creation and value proposition, the role of ES within this BM, and the expected benefits for the environment (particularly regarding CC), thus contributing to the research gap initially stated.

In addition, it seems clear that emerging enterprises face numerous challenges and opportunities in relation to this ambition to contribute to tackle CC though DCS and innovative BM.

Limitations of these findings include the fact that this research is still ongoing, so it is expected that new information and data will become available. In addition, the amount of companies to be interviewed (between 10 and 20) may be considered to some extend limited.

Finally, it is considered that there is a great potential to conduct further research on the interaction between these concepts in order to improve the understanding of the system and contribute to both management theory and practical recommendations for policy makers, managers and entrepreneurs.

Keywords:

Business Models for Sustainability, Climate Change, Digital Technology Solutions, Ecosystem Services, Case studies, System Dynamics.

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Drivers and Barriers for Initiating the Business Model Innovation Process for Sustainability Based on Ecosystem Services

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Extended abstract

The agricultural sector has a critical role in creating social and environmental value from natural resources in addition to its traditional role of creating economic value through food production. In fulfilling this dual role, the agricultural sector faces what is often viewed as competing pressures: to operate financially profitable businesses and to create, maintain and benefit from ecosystem services (ES) in their operations. ES, such as food production, climate regulation, and water management, are benefits ecological systems provide humans and that are critical to the function of life-support systems on earth (Costanza et al., 1997).

Previous research shows that agricultural businesses associate maintenance of sustainability-oriented ES (other than those connected to food production such as climate regulation and water purification) with increased costs connected to their preservation, and uncertain incomes due to their intangibility and long-termism (Bocken and Geradts, 2019; Hansson et al., 2012; Smith and Sullivan, 2014). As a result, drivers, barriers, and changes in the external environment greatly shape business strategies and decisions on activities for creating, delivering, and capturing sustainable value (Kaplan, 2011; Teece, 2010; Yang et al., 2019). Moreover, the understanding of such moderating factors is especially important for realising sustainable business activities that require radical changes in current business models (BMs) (Lütz and Bastian, 2002; Bocken and Geradts, 2019). A BM describes the business logic of a company i.e., how economic value is created, captured, and delivered (e.g., Teece, 2010; Zott and Amit, 2007). It can be used to describe and implement a company's current and future plans for financial success through producing, marketing, and selling sustainable goods and services (Karlsson et al., 2018).

Sustainability-oriented BM changes can be realized via a business model innovation process for sustainability (BMIpfS) that builds on a systematic and holistic mindset of the involved actors

(Stubbs and Cocklin, 2008; Zott and Amit, 2010). The BMIpfS requires businesses to make strategic decisions related to market, customers, and value propositions for optimizing social and environmental value creation (Bocken et al., 2014; Schaltegger et al., 2016). The BMIpfS can thus be crucial for driving the development of sustainable BMs (Karlsson et al., 2018) for agricultural businesses in which the creation and processing of ES are important elements. Through BM changes supported by the BMIpfS, inclusion of ES previously not captured by BMs could become a sustainable value-creating activity for agricultural businesses and their stakeholders (e.g., customers, suppliers, and retailers) by creating financial value from ES while simultaneously preserving the ecosystems.

Thus, the aim of this study is to further the understanding of drivers and barriers, as perceived by agricultural business managers, for initiating the BMIpfS based on the inclusion of sustainability-oriented ES. The study uses qualitative thematic content analysis (Graneheim and Lundman, 2004) to analyse the data of perceived drivers and barriers to the initiation of the BMIpfS as they are revealed in semi-structured interviews by ten agricultural business managers operating farms in southern Sweden.
The results show that business managers' main business concerns were based on financial considerations that acted as either drivers or barriers for the initiation of the BMIpfS depending on whether the managers viewed the inclusion of sustainability-oriented ES as business risks or as opportunities. The drivers reported by the managers were based on the core idea of realising and taking advantage of business opportunities, both on a short-term and a long-term basis, in connection to the uncaptured value inclusion of sustainability-oriented ES in BMs can offer. The managers were also driven by their belief that sustainable value creation is a business responsibility in relation to stakeholders and the global population in which challenges to food supplies play an important part. The drivers included the idea that a breaking point may arrive when profit cannot be sustained and a new balance between shareholder and stakeholder value is needed. To proactively avoid such breaking points, they viewed value creation and capture of sustainability-oriented ES as an important part of sustainable farming systems. The barriers identified revealed that the business managers' main concern was the financial risks associated with the sometimes substantial changes to current farming systems required to include sustainability-oriented ES. They were concerned with how these changes would affect their long-term profit, especially the impact on their revenue streams. This was emphasised by their low tolerance for uncertainty when making decisions about business changes, especially because they thought the proposed changes were antithetical to their traditional value-creating activities and their self-perception of what it means to be a food producer. Unclear benefits from meeting sustainability targets added to their doubts.

On a general level, this study contributes to the business model innovation literature by identifying drivers and barriers that moderates the initiation of the BMIpfS. It complements previous research regarding the connection between individual, sustainability concerns and organisational values in a BM change process (Bansal 2003; Rauter et al., 2017). Through the contributions of this study, the needs connected to sustainable BM change amongst agricultural business managers can be better understood and met as the managers acknowledge the importance of long-term, sustainable social and environmental value creation, while addressing their grave doubts about the profitability of activities associated with the initiation of the BMIpfS based on to the inclusion of sustainability-oriented ES. The managers would benefit from taking a more proactive, long-term approach to business model changes for sustainability and from acquiring more knowledge about market

demand for sustainability-oriented ES. Support is needed by one or several actors that can facilitate (clarify, motivate, and practically assist) change and improve the turning of profits based on sustainable value creation (Kundrupi et al., 2021). The results could also be important for policy makers in the development of agricultural support systems and programmes. These, in turn, can benefit the implementation of sustainability-oriented BM changes that can play a crucial role in preservation of natural ecosystems.

Keywords

Business model innovation process, sustainable value creation, ecosystem services, agriculture

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How Smart Service Portals Trigger Social Action to Reduce Energy Consumption

Applying Choice Architecture to Sustainable Business Model Innovation

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Extended abstract

Introduction

At the example of municipalities seeking to reduce citizens' energy consumption with digital tools, this research focuses on Sustainable Business Models (SBM) innovation (Dentchev et al., 2018; Evans et al., 2017; Schaltegger, Lüdeke-Freund & Hansen, 2016). A collaboration between Fit4Digital and FHNW has been the basis for this research, amongst other streams. Fit4Digital is a program of the Swiss Canton of Aargau to advance digitalization of municipal services with Smart Service Portals (SSPs) aiming to shape future engagement between public bodies and citizens. SSPs are digital interfaces of municipalities where citizens can access, manage, submit and retrieve various official documents (e.g., birth certificates, tax records) and pursue administrative tasks (e.g., registration for geriatric care or application for a building permit) anytime from anywhere (Fit4Digital, 2022).

The potential of SSPs goes far beyond the introduction of online municipal services. As digital interfaces, they are highly effective to engage citizens in what Zott & Amit (2010) refer to as social action. This work examines how SSPs can be innovated to motivate social action among citizens to reduce energy consumption at home (Lindenberg & Papies, 2019; Lehner, Mont and Heiskanen, 2016; Asensio & Delmas, 2015; Zott & Amit, 2010). To gain insights into this matter, essential aspects of SSPs can be examined in the context of business models (Osterwalder & Pigneur, 2010). More specifically, sustainable business models (SBMs) focus on how different business model elements can be adjusted and innovated to account for sustainability issues (Dentchev et al., 2018, Evans et al., 2017). When innovating business models of SSPs to motivate citizens to reduce energy consumption at home, two elements appear particularly relevant. Following Osterwalder & Pigneur (2010), these are channels to customers (i.e., citizens) and the relationships with them. As desired

by public policymakers, choice architecture can drive innovation of these two SBM elements by using powerful triggers on citizens to reduce energy consumption at home (Johnson et al., 2012; Lindenberg & Papies, 2019; Lehner, Mont and Heiskanen, 2016). Derived from that, the guiding question in this research is how choice architecture can be applied on SSPs to better motivate citizens to save energy at home.

Following a thorough review of literature and case studies, semi-structured interviews were conducted with experts in the field. Focusing on using choice architecture tools to innovate the two abovementioned SBM elements, recommendations for campaigns on SSPs are discussed.

Literature

Choice architecture suggests that decision-makers often choose depending on how choice options are presented and in which context (Johnson et al., 2012; Thaler & Sunstein, 2008; Thaler, Sunstein & Balz, 2013). Based on dual process theory, two cognitive systems, namely intuition (automatic and rapid instincts) and reasoning (reflective and deliberate thinking) are engaged (Grayot, 2020; Thaler & Sunstein, 2008; Thaler, Sunstein & Balz, 2013).

NUDGES and MINDSPACE are useful tools to apply choice architecture systematically and have been discussed in the academic literature (Dolan et al., 2012; Thaler & Sunstein, 2008). Given that they trigger human intuition as well as reasoning for well-balanced decision-making, they are useful practical tools when policymakers intend to steer decision-makers in a certain direction (Dolan et al., 2012; Thaler & Sunstein, 2008). This is particularly relevant for topics like sustainability (Lindenberg & Papies, 2019; Lehner, Mont and Heiskanen, 2016; Asensio & Delmas, 2015). As shown in Table 1, NUDGES and MINDSPACE are acronyms for influencing factors that trigger human behavior (Dolan et al., 2010; Dolan, et al., 2012; Thaler & Sunstein, 2008).

NUDGES	"I**N**centives", **U**nderstand Mappings, **D**efaults, **G**ive Feedback, **E**xpect Error, **S**tructure Complex Choices
MINDSPACE	**M**essenger, **I**ncentives, **N**orms, **D**efaults, **S**alience, **P**riming, **A**ffect, **C**ommitment, **E**go

Table 1: NUDGES/MINDSPACE Factors

These factors steer outcomes of individual and collective decision-making (Hausmann & Welch, 2010; Johnson et al., 2012; Lehner, Mont & Heiskanen, 2016) and support sustainability considerations in various settings (Lindenberg & Papies, 2019).

Methodology

Semi-structured expert interviews were conducted with seven management-level teams of five governmental organizations and one association and public think tank each, as listed in Table 2. Sample organizations were chosen because they are not privately owned and not-for-profit organizations that seek to support sustainability through social action and create benefits for society. Further, the sample was selected to cover a broad array of different perspectives on sustainability and energy consumption. Other selection criteria included availability of expert knowledge on sustainability and commitment to use digital information to trigger citizens to save energy at home.

Given the Fit4Digital program and the intention of policymakers to establish SSPs across Switzerland, 13 local organizations were contacted of which five agreed to an interview. To

complement the picture with insights from other European and Nordic countries, which are regarded as leaders of sustainability roadmaps (Henriksson & Weidman, 2020), seven organizations in Germany, Holland, Denmark and Finland were contacted, of which two based in Finland agreed to be interviewed. Regarding data analysis, interviews were recorded and transcribed using the clean verbatim method (Braun & Clarke, 2013; Mayring, 2014).

Type of Organization	Area of Expertise
Governmental Department	Sustainability / Energy Strategy
Ministerial Unit	Sustainability / Energy
Ministerial Unit	Economics / Sustainability
Regional Governmental Department	Energy Efficiency
Energy and Sustainability Think Tank	Energy Efficiency
Energy Association	Energy Management Strategy
Public Transport Provider	Energy Efficiency

Table 2: Classifications of Interviewee Teams

Discussion and Recommendations

Digital campaigns to motivate citizens to reduce energy consumption at home were identified in Switzerland and beyond with a focus on 42 successful cases: smart energy metering, CO2-footprint calculators, interactive web portals, energy challenges and gamification (Brandon et al., 2019; Chui, Lytras & Visvizi, 2018; Darby, 2010; Schleich et al., 2011). Cases were checked for most common NUDGES/MINDSPACE factors: incentives, salience, understand mappings and structure complex choices.

Focusing on choice architecture tools to innovate channels to customers (i.e., citizens) and the relationships with them, recommendations to trigger social action via SSPs to reduce energy consumption at home are discussed.

Use multiple NUDGES/MINDSPACE factors: In line with what Osman, Schwartz & Wodak (2021) and Torma, Aschemann-Witzel & Thøgersen (2018) suggest, interviewees apply different factors of choice architecture simultaneously and emphasize that combined factors trigger energy savings more effectively than single factors. They observe that triggers can cause different individual responses and design their campaigns accordingly to capture that:

Provide different choice options in a structured and distinguishable manner to facilitate decision-making like “option 1/2/3 requires A/B/C for impact X/Y/Z” (structure complex choices following Thaler & Sunstein, 2008)
State comprehensive scientific facts like “we can all reduce climatic impact by doing X/Y/Z” (understanding mappings following Thaler & Sunstein, 2008)
Provoke attention with memorable images or distinctive colors (salience following Thaler & Sunstein, 2008)

Trigger intuition and reflection simultaneously: Going beyond the simple number of triggers, this is concerned with dual process theory. As noted by Grayot (2020) and Thaler, Sunstein & Balz (2013), responses become more effective when intuitive and reflective reactions are jointly triggered. Numerous interviewees corroborate this by saying that environmental campaigns need to “hit the right buttons” among differently motivated citizens. Interviewees state that most incentives are geared towards financial reward (“what is the financial benefit?”) as a common initial reaction.

However, if that is unavailable, other approaches with "the right incentives for the right people" are needed (Thaler & Sunstein, 2008). This suggests that other potential benefits ("what else can I get out of it?") need to trigger reflective reactions causing social action. Interviewees suggest use these examples:

Appeal to our ego: publicly awarding "energy champions" through energy competitions
Calling on our consciousness: providing personal versus community-wide CO2-emission data with emissions calculators
Waking our playful side: introducing gamification of energy saving challenges to collect bonus points

Understand cause-and-effect of incentives: Incentives influence decisions-making (Dolan et al., 2010; Thaler & Sunstein, 2008) and steer energy consumption behaviors (Omar & Delmas, 2015). However, interviewees state that incentives are quite generic and overlap with other NUDGES/ MINDSPACE factors:

Commitment: "what makes me do that?"
Ego: "can I improve my (self-)image?"
Norms: "why do I follow them?"

This obscures cause-and-effect relationships, makes impact assessment of energy saving campaigns harder and undermines the recommendation of using multiple triggers. Indeed, this suggests that different triggers should be launched sequentially rather than all at once. In support of understanding cause-and-effect, Deterding (2019) proposes experimentation with choice architecture. This can take the form of measuring the impact on energy consumption of one trigger before launching the next. At the example of energy consumption applications, experiments could sequentially increase the power of their triggers and measure impact at each stage: begin with display of raw data of household consumption, then show appealing charts of CO2-emissions saved, add costs saved to the chart and finally provide comparative charts of households versus neighborhood.

Conclusion

With SBM innovation in mind, this research focuses on how choice architecture tools like NUDGES/MINDSPACE can be applied on SSPs to better motivate citizens to reduce energy consumption at home. This is particularly relevant for two SBM elements, namely channels to customers (i.e., citizens) and the relationships with them, where NUDGES/MINDSPACE factors can be used to motivate desired actions among citizens. Underlying mechanisms which trigger social action to reducing energy consumption at home are examined.

One limitation is that impact measurement of choice architecture applications is not examined. Given the digital nature of SSPs, this represents an interesting direction for further research. Another limitation is the focus on relationships with and channels to target audiences. This limitation stems from choice architecture and its emphasis on triggering desired behaviors (by using channels to citizens and relationships with them). Further research can be done into other elements of SBMs.

Keywords

Smart Service Portals, choice architecture, social action, energy consumption, sustainable business model innovation.

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Approaches for Inclusion of Nature and Cultural Heritage Assets in Business Models for Sustainability

An investigation of tourism enterprises in Protected Areas

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Abstract

Protected areas are sources of natural resources such as unique flora and fauna, and cultural resources such as historic buildings and practices. In order to foster conservation and sustainable development consecutively, novelty is required. Sustainable entrepreneurship presents a viable means by which to achieve social, economic and ecological benefits for protected areas. This study investigates implementation of sustainable entrepreneurship through the lens of business models for sustainability. Employing a multiple case study approach, we explored examples of implemented sustainable business models in a trans-national protected area. This was to determine how they are able to incorporate nature and cultural heritage assets into their enterprises. Our study contributes to sustainable business model literature by delineating processes applied by small and medium sized enterprises (SMEs), in a predominantly service oriented industry (tourism). Further, it illustrates how business model for sustainability serve as a mediator between nature and cultural heritage resources, and implementation of sustainable entrepreneurship.

Track 1.4 - Business Models for a Circular Economy

Track chairs: *Niels Faber (University of Groningen)*, *Jan Jonker (Radboud University Nijmegen)*, *Abhishek Agarwal (Edinburgh Napier University)*

The Circular Economy (CE) is one of the promising perspectives that might offer innovative and radical solutions at system level to tackle wicked and pressing problems associated with our current, linear economy and society that formed around this. Among others, these problems are climate change, resource shortages, and social exclusion. The linear take-make-waste economy has shown itself to be inadequate to address increasingly complex societal challenges, and instead resulting in excessive waste, pollution, and extreme forms of social exclusion. Radical change is needed. This calls for a reconceptualization of notions such as value preservation, restoration, and revitalization of raw materials, and natural, biological, and social systems, as the foundation for a new generation of business models.

A new generation that is based on organising closed and extended loops, driven by principles such as design for circularity, decomposability, minimum and extended use of resources and strategies to optimize the use of functionality. We explicitly add to this exclusive material-oriented view the need to incorporate social inclusiveness. Shaping a circular economy is not just an adjustment of the current economic fabric by using less and better commodities, but entails a large-scale overhaul of both economy and society. The transition to a circular economy requires rethinking of supply chains into value cycles, forming the building blocks of a system transition.

We will focus this track on large-scale, regional cases in which the principles of the circular economy become manifest in business models. All domains are welcome, e.g., energy, waste collection and handling, mobility, et cetera.

Circular Moonshot: Understanding field logic shifts and the influence of business models for sustainability on field change

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Abstract

We aim to understand the interaction between shifting organizational field logics and field actors' responses to reconcile logic plurality and maintain legitimacy through business model innovation. Drawing on a multimethod, longitudinal field study in the fashion industry, we traced how de novo and incumbent firms integrate circular logics in business models (for sustainability) and uncover how productive tensions in field logics lead to experimental spaces for business model innovation. Our findings showed a shift in the discourse on circular logic that diverted attention and resources from materials innovation (e.g. recycling) to business model innovation (e.g. circular business models). By juxtaposing the degree of field logic tension and the degree of business model innovation, we derive four types of business model hybridization responses that actors engaged in to maintain legitimacy – constrained, limited, integrated, and expanded. Our study generates new insights on business models for sustainability as vehicles for organizational field change. We make novel contributions to the literatures on organizational fields, business models for sustainability and business model innovation.

Keywords

Business models for sustainability; organizational field logics; productive tensions; hybrid organizations; circular fashion

To achieve its "moonshot ambition" of cutting environmental impact by half, while doubling its business, we "will need to forget the linear and move to a circular model."

Hannah Jones, Chief Sustainability Office, Nike, quoted in GreenBiz, September 20, 2016

Introduction

Business modeling has become ubiquitous with business strategizing, representing a designed architecture that informs an organization's value creation and capture activities (Casadesus-Masanell & Zhu, 2013; Chesbrough, 2010; Massa, Tucci & Afuah, 2017). Although the predominant underlying logic of business models is a single commercial or economic logic, increasingly business models embed social responsibility logics, so-called Business Models for Sustainability (BMfS) (Laasch, 2018a; Laasch & Pinkse, 2020; Lüdeke-Freund, 2020), leading to organizational hybridity and dual orientations. Hybrid organizations that combine a variety of logics – market-science logics, economic-social logics, commercial-community logics – have been studied by prior scholarship which has shown that they shape and influence organizational fields (Murray, 2010; Smith & Besharov, 2019). Prior studies have also explored the link between sustainable entrepreneurship and multiple logics, highlighting the duality of the entrepreneurial orientations and the reconciling of tensions (Hahn et al, 2014; DiVito & Bohnsack, 2017; Mair, Mayer & Lutz, 2015). However, few studies have investigated how field actors use BMfS, as representations of organizational hybridity, to respond to shifts in organizational field logics. Using this focus, we direct attention to the interactions between field level change and business models innovation, specifically in BMfS.

Organizational fields are socially constructed constitutions of organizations that interact relationally based on commonly understood, institutionally embedded meanings and rules, or field logics (Scott, 2001). Field actors engage in strategic action and framing tactics that define the network of field actors, their shared practices and norms, and a common identity of enterprising. Recent work highlights that organizational fields form not only around central markets or technologies (exchange fields) but also around prominent issues (issue-based fields), such as climate change or environmental protection (Hoffman, 1999; Meyer & Höllerer, 2010; Wooten & Hoffman, 2008; Zietsma, et al, 2017) often requiring collective action to address the issues (Grodal & O'Mahoney, 2017). Exchange fields and issue-based fields intersect triggering tensions, conflict and plurality in field membership and logic and influencing the trajectory of field evolution. Extant literature has shown that firms devise specific responses to tensions that arise from conflicting logics to maintain their legitimacy in the field (Ansari, Wijen & Gray, 2013; Klitsie, Ansari & Volberda, 2018). We investigate how field actors adapt their business models in response to field level logic plurality.

Drawing on a longitudinal study in the fashion industry, we traced the field discourse on linear and circular logics from 2016 to 2020. We focus on how de novo and incumbent firms reconcile and respond to changing field logics through business model innovation and augmented our dataset with 27 in-depth interviews with field actors – de novo firms, incumbents, material innovators and field experts. Using rich, contextualized data from interviews and archival documentation, we elucidate how field actors respond to shifts in field logic and contribute to field evolution. Our findings uncovered a shift in the discourse on circular logic that diverted attention and resources from materials innovation to business model innovation. We derive four types of business model hybridization responses – constrained, limited, expanded, and integrated – that reconcile the plurality of field logics and maintain field legitimacy. We make novel contributions to theory on the intersection of field logic plurality and business models for sustainability.

Theoretical Framing

Logic plurality in organizational fields

Prior literature has established that institutional logics, 'socially constructed, historical patterns of material practices, assumptions, values, beliefs and rules', shape and co-evolve with the structure of organizational fields (Ocasio & Thornton, 1999, p. 804). Organizational fields are contextualized and negotiated spaces where organizations and actors purposefully interact and engage in debate, developing field level understandings or logics of shared cultural and normative practices (Battilana & Lee, 2014; Scott, 2010). They define which actors to engage with, which problems to debate, which solutions are appropriate, and result from bidirectional processes in which actors influence field structures, frames, and logics that in turn influence field actors (Gray, Purdy & Ansari, 2015; Purdy, Ansari & Gray, 2019). Whereas prior literature understood fields to have a dominant logic and homogeneous organizations due to isomorphic pressure for organizational members to create field legitimacy (Meyer & Rowan, 1977; DiMaggio & Powell, 1983), more recent literature has shown that fields consist of multiple logics causing conflicting tensions, institutional plurality, and organizational heterogeneity (Laasch, 2018b; Greenwood et al, 2010).

Recently, scholars on organizational fields have begun to distinguish between types of fields – exchange and issue fields (Zietsma et al, 2017). The focal interest of exchange fields is the coordination and interaction with exchange partners, such as customers or suppliers who share common meanings, practices, and conventions. In contrast, issue fields center on common issues (e.g. climate change or plastic waste) rather than exchange relationships and may extend across different exchange fields (O'Sullivan & O'Dwyer, 2015; Quarshie, Salmi & Wu, 2019; Wooten & Hoffman, 2008; Zietsma et al. 2017). Issue fields affect institutional processes of field formation differently and having a temporary nature, they may dissolve or eventually be absorbed into exchange fields. In issue fields, shared meanings, practices, and norms are negotiated, contested and dynamic. In contrast to exchange fields that have more shared and stable institutions, issue fields are usually highly pluralistic with a diverse set of actors and multiple, conflicting logics.

In institutional plurality, exchange and issue field logics co-exist, co-evolve, compete, or replace other logics (Meyer and Höllerer; 2010). Institutional plurality in fields generates spaces for institutional innovation and change (Battilana et al, 2015; Cartel, Boxenbaum & Aggeri, 2019; Tracey, Phillips & Jarvis, 2011; York et al, 2016), creating conditions for hybrid organizations, that involve many stakeholders, pursue conflicting goals, and engage in inconsistent activities, to flourish (Mair et al, 2015; Besharov & Smith, 2014). In reconciling institutional plurality, field level actors purposefully frame courses of action and identities to mobilize others to follow suit and thereby maintain their field legitimacy (Cornelissen & Werner, 2016; Kodeih & Greenwood, 2014). Increasingly business models are reflections of these responses as field actors search for ways to respond to institutional complexity and plurality (Ocasio & Radoynovska, 2016; Stål & Corvellec, 2018). We align with the argument in the literature that field level actors (such as sustainable entrepreneurs in de novo and incumbent firms) navigate institutional plurality, reconcile competing logics, and engage in legitimization strategies to establish organizational and field level identities and business models consistent with the institutional logics of the field (Laasch & Pinkse, 2020).

Field-level logics and business models for sustainability

Business models are conceptualizations of organizational value systems or logics representing how firms create, deliver and capture value (Emerson, 2003; George & Bock, 2011; George et al, 2021;

Lüdeke-Freund & Dembek, 2017) and are shaped by a variety of institutional logics. Business models for sustainability (BMfS) are inherently hybrid organizations that combine two or more heterogeneous logics, for example social and commercial logics or ecological and commercial logics or a combination thereof (Battilana & Lee, 2014; Bocken et al, 2014; Pache & Santos, 2010; Laasch, 2018b; Stubbs & Cocklin, 2008). Normative elements of BMfS include having a blended value proposition that incorporates ecological, social and economic benefits, uses principles of sustainable supply chain management, maintains close relationships with customers and suppliers, and shares economic costs and benefits fairly among stakeholders (Schaltegger, Hansen & Lüdeke-Freund, 2016). It can be assumed that multiple, complex, and conflicting logics that require actors to make concessions are at play in hybrid organizations that employ BMfS (Pache & Santos, 2013).

Studies have shown that to cope with institutional plurality and conflicting logics, hybrid organizations are highly reflexive and strategically isomorphic, aligning and distancing themselves from logics when advantageous. Pache & Santos (2010) studied four social enterprises in France and showed that hybrid organizations engage in selectively coupling field level logic elements to gain field legitimacy and selectively decoupling when the logic is incongruent with their values. A study from Vaskelainen and Münzel (2018) on business model development in the German carsharing industry found that institutional logics empower some business models and inhibit others, showing that trajectories of business model development relate to the actors' adherence to prevalent institutional logics. Their findings align with the claim in the literature that institutional plurality leads to greater organizational heterogeneity rather than isomorphism (Ocasio & Radoynovska, 2016) as actors prioritize institutional logics and make distinct combinations (York, O'Neil & Sarasvathy, 2016). Business models, and business models for sustainability, provide opportunities for organizations to respond to institutional plurality and to create innovative solutions to complex problems (Desa, 2012; Roome & Louche, 2016).

In the literature on business model innovation (BMI), business models are argued to function as vehicles to boost innovative solutions concerning processes, products, services, or the business model itself (Boons & Lüdeke-Freund, 2013; Evans et al, 2017; Pieroni, McAloone & Pigosso, 2019; Snihur & Wiklund, 2019). Much literature has theorized and studied business model innovation occurring from exogenous shocks and BMI has been applied to specific domains in need of fundamental change, such as sustainability and circular economy (Geissdoerfer et al, 2017; Pieroni et al, 2019). We argue that BMI also drives transformational change in fields and facilitates heterogeneity and co-existence of multiple institutional logics and heed the call in the literature to focus on individual organizations and their influence on field level dynamics (Laasch, 2018b).

Methodology

We conducted an inductive, longitudinal case study to explore the interplay of field level change and BMfS (Yin, 2003). We focus on a single sector, the fashion industry, following examples in prior studies (Grodal & O'Mahoney, 2017; Lee, Ramos & Vaccaro, 2018; Ozcan & Gurses, 2018). The fashion industry offers an ideal setting for several reasons. First the fashion industry, which generates 1.5 trillion Euros in annual revenue and employs 60 million people in its value chain (Global Fashion Agenda, 2017, 2020), garners much criticism from society, media and stakeholders for its negative social and environmental impacts. On the environmental side, the production of fashion products contributes to water overconsumption, toxic chemical use and textile waste and occurs in production countries where workers are often subjected to overtime, a lack of living wages and unsafe working conditions. The fashion industry's pursuit of economic growth at the

expense of people and planet has increasingly moved to the center of attention. Scandals such as child labor or the Rana Plaza factory collapse have raised consumer awareness of the existing perils of production and put companies under collective pressure from stakeholders and activist groups to change.

Second, against this backdrop, there is a growing interest among industry players to move towards circular production and business models. The prevalent fast fashion business model fundamentally changed consumption of fashion products and increased the use of raw materials (Hvass, 2016; Hvass & Pedersen, 2019). Circular business models that extend product lifecycles, recycle and regenerate resources offer solutions to the pressing sustainability issues that plague the fashion industry (Berg et al, 2020). Adopting a circular logic, instead of a linear one that assumes endless growth, consumption, and extraction of raw materials, is particularly significant for changing the organizational field.

Data collection

We collected qualitative data over a 5-year period using multiple methods. Our initial data collection focused on understanding the use of recycled waste in textile products and business models. As we engaged in the field, our attention shifted from recycled waste to understanding circularity in product design, production, and business models. We gathered data from three main sources – observations of field events, in-depth interviews, and industry newsletters. From 2019 to 2021, we attended and observed several field configuration events (FCEs) in Denmark and the Netherlands. We conducted semi-structured in-depth interviews with sustainable fashion entrepreneurs of de novo firms and sustainability managers in incumbent firms. We purposefully selected sustainable fashion firms that used business models to create value from waste (Bocken et al, 2014). We asked questions about circular business models and the opportunities and challenges of using waste materials. We also collected secondary data from the Fashion Sustainability Week in Review (FSWIR) twice-weekly newsletter from 2016 to 2021. This dataset consisted of 290 newsletters. We performed keyword searches for ‘circular’, ‘recycling’, ‘waste’, ‘resale’, ‘rental’ and ‘take back’ that resulted in 331 news items covering 26 countries. We compiled a list of incumbents and collected additional data from in-depth interviews, media and reports about selected incumbents. All interviews were recorded and transcribed for coding and analysis. In total, we conducted 27 interviews with different industry actors – sustainable entrepreneurs, material suppliers, incumbents, and field experts.

Data analysis

The stages of data analysis occurred iteratively throughout the data collection period. We moved from the detailed codes to axial codes and identified eight second order themes (Gioia et al, 2013) to make sense of the data. We also developed temporal mapping of the industry based on the FSWIR news items (figure 1) and identified overall trends in the industry discourse (figure 2). We observed that recycling is a contested concept of circular logic, and we witnessed a shift from recycling as closed loop circularity, where the value of waste resources is maintained within the production system to recycling as open loop circularity, where waste from other industries enters textile production, or where textile waste is used for products with lower value external to the industry. We also saw a rise of criticism about overproduction and overconsumption in the fashion industry with the fast fashion model becoming symbolic for linear logic. The rising sentiment called for more than recycling alone and shifted attention and discourse to circular business models, particularly rental and resale business models. We grouped the news items into four categories –

recycling, circularity, rental, and resale – that fold into two overarching dimensions: field logics and business models for sustainability. This combination of analyses allowed us to reflectively tease out meanings and findings and guided our theorizing about the interplay between field level logics, BMfS and organizational field change.

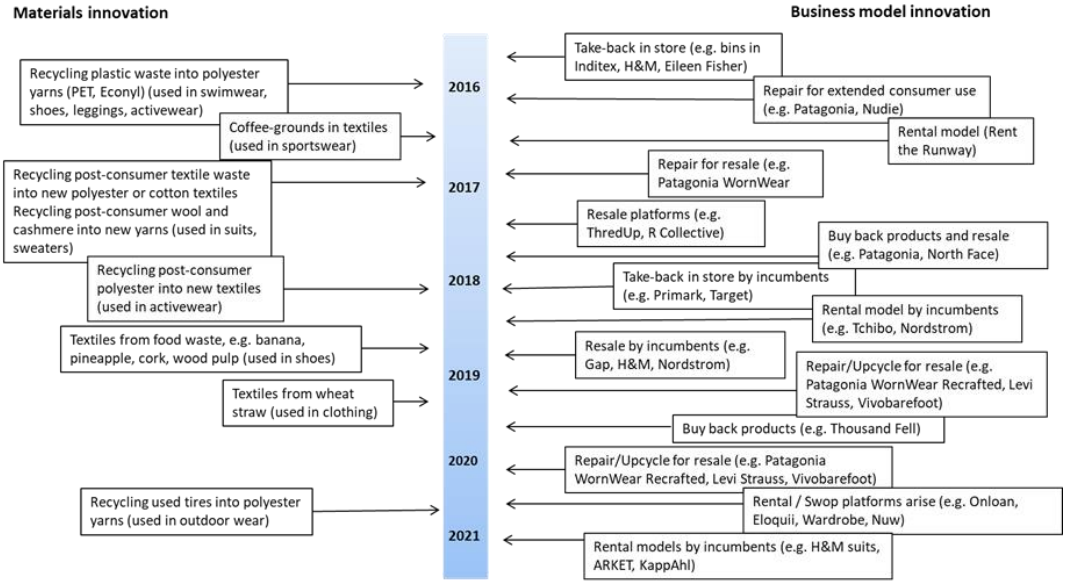

Figure 1. Temporal mapping of news items on material innovation and business model innovation

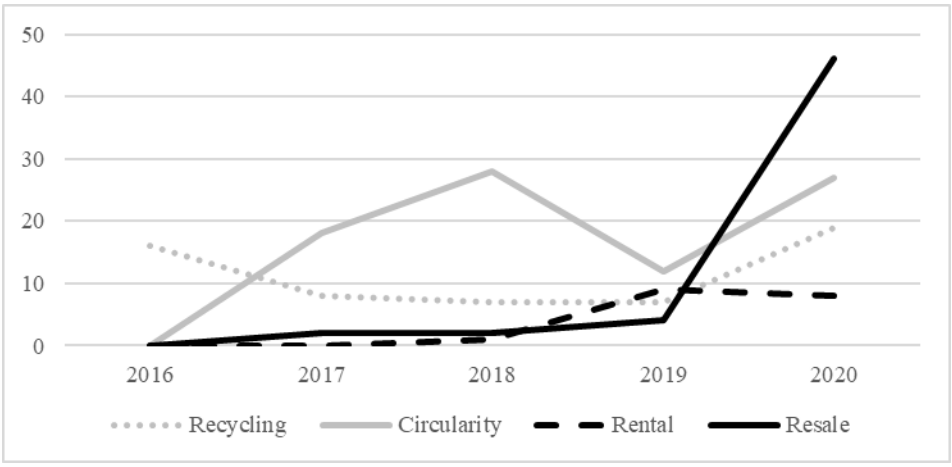

Figure 2. Number of coded news items by year, n=214

Findings

We observed how logics co-exist in an organizational field and in business models for sustainability and how de novo and incumbent firms respond to shifts in dominant field logic. The dominant field logic in our case study is the linear logic, but this logic has been consistently challenged since the mid 2000s and de novo firms entered the industry using BMfS that primarily focused on using more sustainable virgin materials (e.g. organic cotton) or recycled materials. Our data analysis and the findings we discuss in this section trace how the discourse on circular logics shifts and how de novo and incumbent firms respond to the changing field logic.

Phase 1: Framing recycled materials as 'closed loop' circularity

De novo firms began incorporating the use of recycled fabrics in product collections as far back as 2008 and claimed to be more sustainable than incumbents because they used organic virgin materials (e.g. cotton) or recycled polyester from polyethylene terephthalate (PET) and fishing nets or recycled pre-consumer and post-consumer textiles. The founder of DEEL explained the rationale for the materials they use, "… we basically work with 100% organic cotton or 100% recycled polyester, because … I can theoretically put a synthetic product back into the cycle, provided it is pure fiber, 100% polyester … [and] 100% cotton." The purposeful decision to use 'pure' materials, whether recycled or virgin, indicated the intention to be sustainable and circular, returning materials back into the production cycle for reuse.

Small de novo firms responded swiftly to innovative opportunities to use recycled materials. Data from our interviews shows that BMfS in de novo firms aimed to influence the broader field, especially in the use of innovative recycled materials. The founders we interviewed described their role in the industry as innovators:

"The more small businesses like ours disrupt the industry, the more the bigger players like Nike and Adidas will feel pressure to follow suit. We hope that by paving the way, we can encourage all fashion retailers to step away from 'fast fashion' and start utilizing the raw materials we have available to us." (SUDRI)

Small brands, as de novo or incumbent innovators, experimented with new materials or business models but lacked the volumes to drive the adoption of the innovation. Large brands, primarily multinational incumbent firms, provided volume and economies of scale, influencing broader field level change. From our interviews with incumbents, a respondent explained a clear distinction between the roles of small and large brands.

"If you think of small brands that are on the leading edge and trying to prove that things are possible …, it can be hard for larger brands like ourselves to follow that same strategy. We have a really hard time being first to market with much of anything. With materials that are new, you see brands like Allbirds able to have this pipeline of cool product launches with novel materials, but they are small and nimble and able to invest. We are just a different beast … They [small firms] can partner with material innovators, prove that something is gonna work for a commercial grade product and maybe they can't give that supplier the largest volume, [but] then I'm totally happy being a fast follower." (PAGI)

By 2016 several incumbent firms had launched collections with recycled materials, particularly in denim products because they contain nearly 100% cotton content which is more favorable for recycling and in sportswear because they can incorporate recycled PET in polyester blends. For example, Adidas launched a shoe consisting of 95% recycled plastic picked up off beaches of Maldives and Patagonia launched the Re\\\Collection. H&M also introduced a line of activewear made from recycled polyester and announced in its 2018 sustainability report its mission to 'close the loop'.

In this first phase, the use of recycled material in new products was an initial step towards circular logic in business models and it was firmly established in BMfS of small sustainable fashion firms. In contrast, large incumbents launched capsule collections but for the most part the linear logic in incumbents' business models dominated, leading to criticism and questions from various field actors, such as activists and small firms, about their sustainability ambitions and claims.

"The big firms are now, in the last couple of years, they are pushing [sustainability]. [But] I also wonder [about] the percentage that they are actually doing …" (YUKI)

Phase 2: Reframing recycling as 'open loop'

From our dataset of news items, we saw a rise of criticism from activists, industry consultants and expert organizations about the potential environmental benefits of recycling textiles and fibers. In 2016, Greenpeace brought attention to the 'illusion' of recycling and called out, "Fast fashion is drowning the world", arguing that the volume of recycled fibers is not sufficient to have sustainable impact given the growing consumption and disposal of clothing. Shortly thereafter, Greenpeace published two reports, *Timeout for Fast Fashion* and *Fashion at the Crossroads*, intentionally shifting the discourse in the industry away from the 'myth of re-use and recycling' and towards the problem of overconsumption fueled by the fast fashion model.

Criticism about using recycled plastic waste also came from another angle as researchers and experts published studies highlighting the harmful effects of microfibers from recycled PET in fabrics ending up in oceans through laundry wastewater. Mainstream news outlets, like The Guardian, Vogue, Forbes and FastCompany, published stories on the shortcomings of recycling to solve the industry's sustainability problems, for instance, an article published in FastCompany pointed out "… while recycling is important, it misses the mark" in reducing emissions.

As the public discourse continued and emphasized recycling as only a partial solution to the growing sustainability issues in the industry, attention shifted to slowing fashion down. In 2020, the United Nations Environment Programme published a report about "the effects of an industry that is engineered to overproduce". The media (Reuters) drew parallels between the fashion industry and 'big oil', stating that fashion finds itself in the same conundrum, "the only way to save the planet is to scale back production". The recycling solution is reframed not as a closed loop circular solution (e.g. from textile-to-textile) but as an open loop circular solution, and as one that allows fast fashion to maintain a business model that relies on overproduction and overconsumption. Industry discourse contrasted recycling in opposition to circularity, establishing the notion that recycling addresses sustainability as an 'isolated' problem in the fashion system, whereas circularity is a more 'holistic' approach to the issues. In other words, recycling plays a role but consumption, product design, business models, the whole system needed radical transformation to address the impending sustainability challenges in the industry.

Our data showed various responses to the reframing of recycling. The founders of de novo firms in our sample had deep convictions about sustainable fashion products and considered themselves to be on the periphery of the industry and dissociated their firms and BMfS from fast fashion or the general fashion industry. The founder from NAVE referred to this dissociation explicitly as, "… so in the real fashion industry, not the sustainable fashion industry …" and emphasized that in the real fashion industry the problem is, "that people don't value their clothing, which translates into overconsumption." All the de novo firms considered their BMfS to be opposed to the (fast) fashion industry, focusing on slow fashion, classic styles, and durable quality.

I wanted to do classic styles also to support the slow fashion. (TELCAR)

[We] believe that clothing should be of a high quality and last a long time, instead of being cheap and disposable. (SUDRI)

However, deriving value from waste and using recycled materials was an essential component of their products and the rationale of their BMfS. Their responses to the changing discourse around recycling, varied depending on their specific context and product markets. For example, the founder of AIR aligned with the changing discourse as she focused on upcycling textiles for the

upper part of shoes specifically to avoid recycling, "… before recycling, there should be another step. Like before we start … breaking it down to the fiber level, we have all these fabrics that are in really good condition that we can actually use." She also held strong opinions about ocean plastics in fabrics, stating that she "would not use it for fashion" but for other products like "… chairs … that do not release microfibers as much as clothing". In her view, a circular logic considered more than "what we use [recycled materials] for, not just re-circulating to reach circular, but re-circulating in the right way."

Alternatively, DISTOC, who produces sustainable hosiery with up to 88% of recycled polyester, distanced their firm from the discourse by acknowledging the challenges of producing fully circular hosiery. Hosiery material is very delicate and although they "employ strategies that will make them last longer", like toe enforcements, the product has a relatively short life cycle and is discarded after a few uses. A lack of technological innovation makes it difficult to recycle hosiery products into new materials because it's a blended fabric. Additionally, since discarded hosiery is mostly incinerated, DISTOC started a Recycling Club for its customers to return discarded hosiery at end of life, which they then downcycled into insulation for fiberglass tanks, or, more recently, upcycled into designer tables.

To address the issue of microfibers from plastics in fabrics, DISTOC generalized the problem, stating, "… I mean, all synthetics will release micro plastics … there's nothing that I know of that we can do to help stop that other than don't wear synthetics. [But] … we are moving into more of the natural fiber line." The respondent emphasized focusing on issues that they could impact, and that the microfiber issue was not the appropriate problem for them.

> "… there are many problems to be solved … and you can't solve them all. … We have to focus on other things like making sure that hosiery does not end up in landfill and finding a way to bring our recycling program [to send back hosiery] to as many people around the world as possible." (DISTOC)

In phase 2, we observed changes to the broader industry discourse that redefined recycling as a partial solution to achieving circularity. The discourse touted the advantages of a circular fashion system and circularity permeated industry fora, such as Copenhagen Fashion Summit. Field actors committed to pledges and agreements to transform to a circular fashion industry and multistakeholder collaborations focusing on circular solutions increased. Leading incumbents announced ambitious sustainability goals. For example, Nike announced it would double its business while reducing by half its environmental impact and, in an interview in Vogue, the CEO of H&M argued that moving towards circularity would allow H&M to "decouple growth and production of garments from the use of natural resources" and to address overproduction.

Phase 3: Integrating circularity in business models

The discourse on sustainability challenges catalyzed a shift among field actors towards using a circular logic and triggered business model innovation. The shift is particularly pronounced in the number of take-back systems that incumbents initiated since 2017. Take-back systems are essential for circular business models as they provide feedstock as either final products for rental and resale business models or input materials for upcycling, downcycling and recycling. However, the small de novo firms in our sample that had established BMfS based on recycling waste faced difficulties in incorporating more holistic elements of circular business models. A few incorporated take-back systems, such as DISTOC and MOWS, but they primarily downcycled the collected products. For DISTOC – who implemented a take-back program at the time of their founding in 2013 – there were barriers to closed loop circularity. As already discussed, making new hosiery from old hosiery is not

technologically feasible and hosiery is a product that cannot be easily resold in second-hand markets.

NAVE shared a similar dilemma. The founder considered starting a take-back scheme by offering incentives, such as a discount if customers sent back swimwear for recycling, but hesitated because of the effort involved in "becoming our own recycling plant". Another barrier to integrating more circularity into NAVE's business model was the resale potential of swimwear products. However, TELCAR, another de novo firm in our sample that also produces swimwear, did not see the same barrier as NAVE in reselling swimwear. All in all, from our interview data, we noted that the small firms faced limitations in expanding their business models to incorporate more circularity, due to their product category, resources and capabilities or a combination thereof.

Incumbents, on the other hand, engaged in extensive business model innovation to incorporate circularity. While well-known industry front runners, Patagonia and Eileen Fisher, started take-back systems prior to 2010 and had established circular business models, large incumbent brands started to experiment with circularity. From the incumbents' perspective, a circular logic is compatible with the growth model that is inherent in the fast fashion system. The incumbents we interviewed were "excited about the potential for circularity to grow", describing it as different than the 'usual sustainability work' and as a 'business opportunity'. For incumbents, circular business model innovation also effected changes in circular product design and material recirculation, with the promise of impacting the field level logic change over time, as explained by one of the incumbents we interviewed.

"Circularity is very important and the ultimate goal is to be circular by design. It's a business enabler for us, and systemic and the industry needs to be circular." (STEL)

Our data pointed to different patterns of experimentation and interaction between field actors. First, there was an increasing number of partnerships between incumbents and de novo firms to establish take-back systems and introduce rental or resale models. However, even though several large incumbent brands such as Zara (Inditex), H&M, Target and Primark had scaled up their take-back systems worldwide, only H&M engaged in circular business model innovation. They experimented with rental for women's dresses, children's wear, and men's suits, and with resale by partnering with the online resale platform Farfetch. Large retailers such as Tchibo, Nordstrom, Galerie Lafeyette and Selfridges also experimented with rental models by partnering with online rental platforms such as HURR Collective or Rent the Runway.

Our data shows that the field level shift towards circular logic in the fashion industry is an iterative interplay between de novo and incumbent firms, where issue and exchange fields intersect. The founders of the de novo firms in our sample recognized their role as innovators and advocates of the circular logic, as exemplified below.

"When it comes to fostering systemic change, typically it's the small-medium business that 'do' and then the large corporates follow. Small businesses like [mine] may only have a small market share, but with the right marketing and customer loyalty, we can spread the word about what we are doing and once consumers become accustomed to a certain level of quality, diversity, and ethics in their purchases, it will be them who in turn put pressure on the large corporates to start providing that same level. It is once the large corporates are on board that this style of fashion production will become the norm. …" (SUDRI)

PAGI elaborated on this interplay of incumbent and de novo firms in terms of the roles they play in the ecosystem, emphasizing that "firms of different sizes fill a different niche" and all together they move the industry forward.

"… larger firms have the advantage of reaching more customers and if they are going to play a role in take back and collection side of things, they can do so much more so much faster than a small firm doing the same. I guess what is inspiring is on recommerce, the firms that have started to create white label sites within their products, like North Face's Renew programme, Patagonia WornWear, … if the goal is to take back your own product and somehow get that to a secondary consumer, then a small brand has an advantage. But if it's to drag the shift towards just getting product out of landfill, I don't think the small companies can really shift that equation. They are just too small to make a difference." (PAGI)

Discussion

We argue that field level logics are influenced by the interplay between de novo and incumbent firms and by their responses to tensions arising from logic plurality. Our study traced the circular logic discourse and uncovered a shift in the discourse that diverted attention and resources from recycling and materials innovation to implementing circular business models. The circular logic co-existed, complemented, and conflicted with linear logic and field actors reconciled the tensions in the field logics through a variety of hybridized business model responses. By juxtaposing the degree of field logic tension with the degree of business model innovation, we identify four business model hybridization responses – constrained, limited, expanded, and integrated – that actors engaged in to maintain legitimacy (figure 3).

Business model responses to emerging field logic

When the emerging field logic has a high degree of tension with the existing logic of the business model (a conflicting logic), we witnessed two responses in business model innovation, a constrained response and an expanded response. A *constrained response* occurred when actors lacked resources, capabilities, or technology to adapt to the emerging logic and used selective decoupling to dissociate from the logic and maintain legitimacy. For example, the large incumbent firms were constrained in their efforts to produce collections using recycling textiles, primarily due to maintaining scale and volume for their extant business models. However, an *expanded response* occurred when actors perceived opportunities for expansion that were compatible with the existing business model logic and had slack resources to direct towards business model innovation. In other words, the emerging field logic could co-exist with the existing business model logic, resulting in greater business model hybridization. This occurred in several incumbent firms as they experimented with a variety of responses to the rise of the rental and resale circular business models, effectively combining linear and circular logics and expanding their business models.

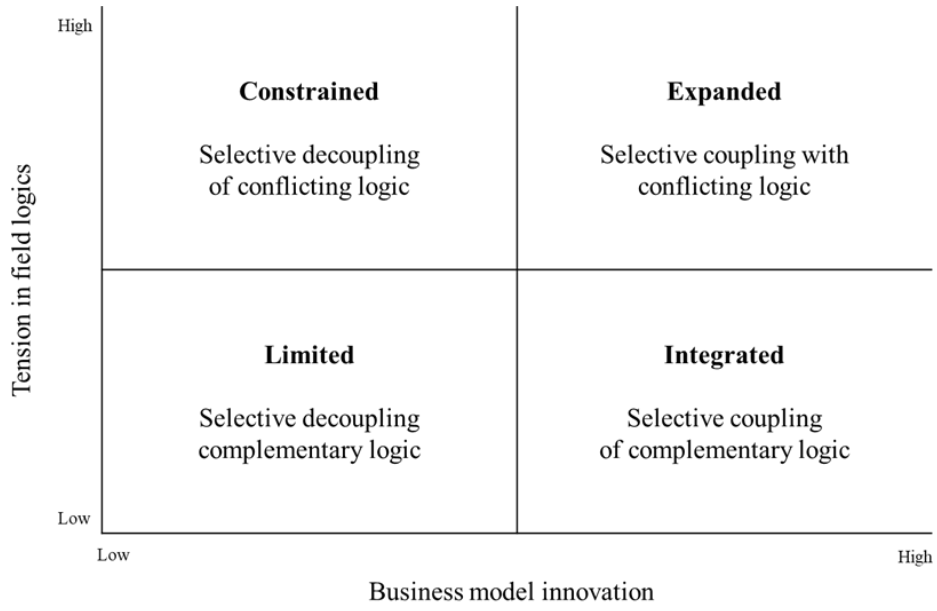

Figure 3. Business model response to changing field logic

When the emerging field logic has a low degree of tension with the existing business model, we also identified two responses on business model innovation: limited and integrated. In these responses, the emerging logic is complementary to the existing business model logic. As in the constrained response, a *limited response* in business model innovation occurred due to lack of resources, capabilities, or technology, but the complementary nature of the logics allowed them to selectively couple elements of the emerging logic. For example, even though the small de novo firms could not adopt rental or resale circular business models due to resources, capability, or technology limitations, they selectively coupled with slow fashion, which extends product life and addresses overproduction, to maintain the legitimacy of their BMfS in the emerging circular logic. The high level of complementary between the circular logic and their business models limited productive tensions and space for innovation in their business models. Lastly, an *integrated response* occurred when the emerging logic is congruent with the existing business model logic and there are no resource constraints to integrating the emerging logic. For example, frontrunner incumbents in circular or sustainable fashion, such as Patagonia or Eileen Fisher, easily integrated circular business models (such as repair and resale models) adhering to the emerging circular logic. New entrants based on circular business models also fall into this category, as their firms entered the field with BMfS adhering to the emerging logic. The emerging logic is an integrated part of the existing business model.

Contributions

Our findings make contributions to the extant work on organizational field logic and business models for sustainability, highlighting the interplay of actors in establishing, reinforcing and renegotiating spaces for experimentation and innovation (Ansari, Wijen & Gray, 2013; Le Ber & Branzei, 2010; Litrico & David, 2017). By showing how business models (for sustainability) adapt to shifting field logics, we advance our understanding of how logic plurality co-exists and persists in organizational fields.

First, our findings build on recent work of institutional complexity in organizational fields and business model heterogeneity (Laasch & Pinkse, 2017; Ocasio & Radoynovska, 2016; Vaskelainen & Münzel, 2018) and provide empirical evidence of the hybridization of business models in response

to logic plurality. Our study also makes contributions to how fields change and evolve over time (Zietsma et al, 2017), where we show that field discourse shapes the speed at which field change occurs and defines the negotiated space of experimentation. We also show that issue field logic evolution, where shared meanings and understandings are continuously contested and redefined, is not linear.

Second, our findings contribute to the literatures on business models for sustainability and business model innovation, extending our understanding of business models (for sustainability) as mechanisms for field level change that actors use to reconcile emerging and shifting logics. In this regard, we provide empirical evidence to the theoretical assumptions put forth in the literature that business models mediate innovation in processes, products, or services (Boons & Lüdeke-Freund. 2013; Chesbrough & Rosenbloom, 2002; Doganova & Eyquem-Renault, 2009; Lüdeke-Freund, 2020; Snihur & Wiklund, 2019), unlocking and capturing innovative potential to improve economic, ecological, and social sustainability. We also extend prior work on circular business models (Bocken et al., 2016; Geissdoerfer et al., 2017) by showing that systemic change can only be achieved when circular thinking is implemented in both products and business models.

Conclusion

To conclude, we conducted a field study of the fashion industry and focused on the circular logic that is emerging in the field. Our findings showed that the discourse used to define circular logic shifted attention from recycling materials to circular business models. We uncovered how de novo and incumbent firms responded to the changing circular logic of the field through business model (for sustainability) innovation. The meanings and understandings of circular logic, that co-exist, complement, or conflict with other existing logics, are dynamic and continuously negotiated by field actors. Our study brings together disparate literatures on organizational fields and business models for sustainability and argues that business models for sustainability influence organizational field change.

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Proliferating circularity efforts

Coordinating multi-value creation in multi-actor contexts

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Abstract

In this paper, we highlight the growing urgency of sustainability transitions in general and circularity transitions in particular, which is hardly taking shape in practice. We explore new pathways to accelerate such transition, focusing on a regional scale. We frame the lack of change as a multi-faceted, wicked, problem or organisation. Two specific aspects of increasing complexity are explored: extension of the value set taken into consideration by actors, and expansion of actor types involved. Our value-actor matrix that illustrates this two-dimensional increase of complexity and points to societal coordination as the main problem of circularity transitions. We define four criteria for new coordination models: integration of top-down and bottom-up efforts, scalability from local to global, diplomacy between ideological and sectoral coordination and intuitiveness for rapid proliferation. We use these to analyse five cases, leading to the identification of a common cause of the lack of change. Next, the concept of task democracy is explored, attempting to fix the cause and customise it for a circular economy. The resulting framework takes shape in an open-source manifesto for product councils, on local and regional scales. This research takes large and sometimes speculative steps and the result is largely untested. Yet it shows one pathway to acceleration, which may inspire further research.

Keywords

Circular economy, multi-value creation, sustainable regional development, task democracy, value-actor matrix

Introduction

To many of us, a **circular economy** is the ideal of keeping precious or harmful materials in endless recycling, thus preventing waste and emissions, and preserving scarce natural resources (in line with e.g., Stahel, 1982). This concept has been studied from many viewpoints, ranging from technology and product design (e.g., Braungart and McDonough, 2002), via business models and business strategy (e.g., Jonker and Faber, 2021) to circular economy policy (e.g. European Parliament, 2015) and the UN sustainable development goals (UN, 2015). In all these approaches it becomes clear that the problem of realising a circular economy is a problem in which many actors are involved; it is a societal multi-actor problem. In this paper, we focus on the intermediate (regional) level, where industry, consumers and government meet each other and where joint action can be taken. It is at this level we want to find out which factors contribute to sustainable development. We perceive sustainable regional development as creating economic, ecological and social value, for and by regional actors (e.g., Jovovic, Draskovic, Delibasic, and Jovovic, 2017).

We consider the issues of a circular economy and sustainable development as two sides of the same coin. While in practice, academia, and governmental arenas the two topics are commonly debated in separate discourses (Jonker and Faber, 2021), they have more in common than they differ. A circular economy principally focuses on organising value preservation, thus minimising the use of natural resources, and eliminating the concept of waste (Stahel, 1982). The ambition of minimising environmental impact aligns with early calls for sustainable development (e.g., Meadows, Meadows, Randers, and Behrens, 1972) and more recent stipulations of the safe operating space for humanity (Rockström, Steffen, Noone, Persson, Chaplin, et al., 2009). Consequently, we switch back and forth between both concepts of sustainable development and circular economy throughout this paper. Next to their common roots and objectives, this became inevitable as we focus on societal coordination of circular economy. This is a matter of political choice, which inherently interweaves the two issues.

The **urgency** of sustainable development in general, is more than evident, regarding the increasing number of and deepening of global crises. Taking action on this is rapidly developing from optional to existential, especially for hunger, climate change and biodiversity (IPCC, 2022). However, global response over the past decades has been inadequate. For circular economy too, the pressure is on. Global progress on SDG 12 (Responsible Consumption and Production) is measured as negative at -0.4% since 2015, while most other SDGs have small positive index scores (Sachs et al., 2021). In The Netherlands, only limited progress is shown during the past decade, while the objective is to reach a fully circular economy by 2050 (Planbureau voor de Leefomgeving, 2021). Even a modest measure like introducing a recycling deposit on small PET bottles took 20 years (Ministerie van Infrastructuur en Waterstaat, 2020). Other problematic examples include plastics recycling, recycling of chemically bonded materials, battery recycling, e-waste and nuclear waste. In all of these examples, we see a wider array of actors involved, besides producer and consumer, and we see that in trying to realize something circular not just the national or local government is involved. The pattern that unfolds shows that circularity is a multi-level and multi-actor topic, riddled with technological challenges and conflicts of interest. Even in early stages, when low hanging fruit is abundant, society is mostly unable to get up to speed with transitions towards circularity.

This paper aims to analyse this dramatic lack of progress and to identify strategies that may help to **drastically speed up circularity everywhere**. We do not consider political feasibility or economic realism yet, but start from the necessary future result and work our way back to see what would be needed, postponing the reality check until we arrive at current options. Our interest is exploring the whole field of options, including if needed uncharted territories, and finding new pathways for circular economy policies.

The problem of inadequate global urgency response can be seen as a **wicked problem** (Conklin, 2003; Rittel and Webber, 1973). This implies that a repair plan, even if it would work, has a limited chance of getting accepted. In other words, both the problem and the solutions are political issues. Given the urgency, however, the academic research community cannot limit itself to reductionism, to solving partial problems in technology or legislation in the hope this will contribute to fixing the whole thing. Even presenting holistic models and leaving decision-making to politics will not do. More is needed, particularly concerning societal coordination and political problem-solving. To start with, we need an overarching perspective to see all facets, find blind spots and hidden problems and identify new connections and new synergies.

The daunting complexity of coordinating circularity efforts

What is complex and dynamic in a circular economy?

Classified as a wicked problem (Jonker and Faber, 2021), the complexities and dynamics of a circular economy span a varied array of aspects. To start with **technology**, we observe a wide range of product families that needs to be circular. This includes every manufactured object in our daily lives. Many products are complex in themselves, consisting of assembled parts or complex mixtures or processed materials. The components and parts may originate from everywhere on the globe and may travel long distances. Also, products change all the time, driven by innovation, fashion or competition.

Next, we identify the complexity of **manufacturing**, which is done by countless businesses in competitive markets. Entrepreneurs want to stay in business and have more to think of than circularity alone. Standardisation, for instance, can be desirable for circularity but does not necessarily match each company's strategy. Intellectual property and business data need to be protected, while circularity demands chain transparency and life cycle analysis (Lokesh, Matharu, Kookos, Ladakis, et al., 2020). The natural entrepreneurial reflex to fend off competitors while winning the customer makes eager to lower costs. This fosters a tendency to externalise costs, for instance by not bothering about environmental effects. This way, capitalist ownership of businesses has since long led to short-sightedness (e.g., Mintzberg, 2015), resulting in privatising profits while socialising costs (Coase, 1960).

Furthermore, there is the complexity of **government regulation** of dynamic markets. Countries use their political system to regulate their economy. This may include circularity and transitions (e.g., Ministerie van Infrastructuur en Milieu, 2016). Transition, in turn, needs a level playing field, which

requires more regulation, preferably internationally. An example is the effort of the European Parliament to establish consumer rights to repair (European Parliament, 2022). Moreover, governments must deal with geopolitical issues, conflicts and sanctions, circumstances that often outweigh the urgency of circularity.

The **demand side** of markets has complexities of its own. Theoretically, demand is a dominant market power and decides what is manufactured. However, in practice, consumers are sensitive to marketing efforts and fashion and are easily overrun by supply push when they are not or weakly united. Government regulation and product certification for fair trade, product safety and circularity are needed to maintain the balance.

Finally, knowledge about circularity needs to be developed and transferred, which asks for diffusion in **curricula**. So far, sustainable development has reached primary and secondary education (Faber, van der Gaast, Gelderblom, de Graaf, et al., 2017), but in technical education, industrial design, and especially business and economics education, progress towards integration seems to be slow.

In summary, the complexity of a circular economy lies not just in its economical or technological aspects. It is also embedded in the involvement of all of society and in numerous delicate **balances of interests** in which the need for circularity is just one force, and in many cases not the most powerful.

Changing value systems add more complexity

Apart from the complexity of the economy and the strong values of innovation and growth, there is the growing weight and influence of social and ecological values, fuelled by growing awareness of the devastating consequences of ongoing growth in a confined system (Meadows, Meadows, Randers, and Behrens, 1972; Meadows, Meadows, and Randers, 1992; Meadows, Randers, and Meadows, 2005). Shifting values have already influenced how we measure progress, as can be seen in the set of SDG indicators and common critiques on GDP as an indicator of prosperity (van den Bergh, 2009). On the other hand, social, ecological and economical capital are uncomparable and have **no common currency**. Therefore, societies generally revert to trading in the most immediate currency, which is financial.

For instance, Stimson, Stough and Roberts (2006) provide a comprehensive understanding of regional development, explaining the main components and their dynamics, and providing various tools to intervene. However, they measure development mostly in growth of economic production. The same pattern is visible in political research, where conciliating social, ecological and economic development is seen as a challenge for politics and government, requiring participation of civil society and citizens (e.g., While, Jonas, and Gibbs, 2010). But here too we observe that regional development almost exclusively translates to economic-financial indicators. In other words, sustainable development is commonly measured and treated as a **one-dimensional issue** in both economic and political arenas, while sustainability by nature is a multi-value phenomenon. This is complicated further through the variety of actors involved, who adhere to a wide variety of values. In the next section, we suggest a means to visualise and reduce this complexity, developing a conceptual lens that enables the simultaneous identification of regional actors and their values.

A value-actor matrix

As indicated, sustainability (and circularity) is a matter not just for companies or governments, nor of single values. Instead, it brings to the fore a multidimensional perspective on development. In one dimension, the number and type of involved groups are expanding from market players and government to all actors of society. Simultaneously, environmental, social, and economic values together form a new playing field, each bringing forth their complexities and interdependencies between them. The need to accommodate multiple, different actors in realising their values politicises the issue of sustainability. We visualise this in a 'value-actor matrix' (Figure 1), where the area of concern has expanded in two directions.

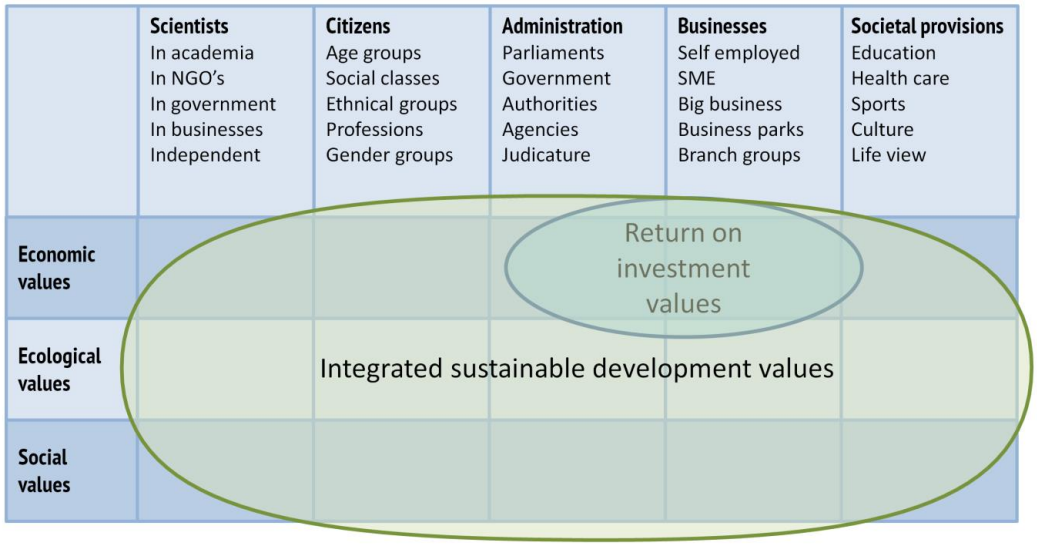

Figure 1 Value-actor matrix

The presented matrix captures the complexity of sustainable development in social contexts. Firstly, the actor dimension identifies the various segments of this context. We discern the segments of (1) scientists, (2) citizens, (3) administration, (4) businesses, and (5) societal provisions: education, health care, sports, culture, and life view (Bootsma, 2021). Each segment forms a specific intersection of societal actors, stipulating their roles and activities. The actor dimension intends to reduce societal complexity, bringing conceptual order to the increasing connectivity between societal actors. Secondly, the value dimension identifies the three values that span sustainable development: environmental, social, and economic (e.g., Elkington, 1999; WCED, 1987). Together, both dimensions give shape to an actor-value matrix that on the one hand provides a societal segmentation that enables us to identify relevant regional actors. On the other hand, it allows for a more in-depth understanding and identification of the values connected to each of the actors. In this way, we argue that the value-actor matrix allows us to harness some of the complexities that emerge from the common and collective strive for sustainable development. This stands in stark contrast to the traditional, single actor (business) and single value (economic) orientation on regional development we have been accustomed to (Stimson et al., 2006). A consequence of this observation is that the shift to a multi-actor and multi-value approach to development will no longer allow it to be managed traditionally. This calls for a new paradigm of understanding and coordination across actors and values.

Challenges to a circular economy

We now have a basic understanding of the two-dimensional increase of complexity of sustainable development and circular economy, and the objective of understanding and coordinating across actors and values. Given the urgencies, any new framework for coordination will need to proliferate at a significant speed. This implies that, apart from political will and decision making, it should in itself be easily deployed across scale levels and it should easily 'hype' horizontally between areas. To achieve this, the coordination concept needs to be *multi-value* and *multi-actor* and *integrative*, *scalable*, *diplomatic* and *intuitive*.

Integration is about joining top-down and bottom-up efforts. To realise the intended integration, bottom-up efforts need to be *expansive*: including both more actor types and more value types. For instance, a regional circularity initiative of a business branch organisation should not only involve the supply side but the demand side as well. Likewise, top-down efforts should be more *comprehensive*: taking the full set of actors and values into account, from the onset. An example would be a government programme for circularity with a democratic steering committee representing all sectors of society. Without coordination, both expansive bottom-up efforts and comprehensive top-down efforts will run into a multiplication of the number of actors and interests involved. The coordination concept needs to recognise this and should protect efforts from unrealistic ambitions. The concept should also nudge bottom-up and top-down efforts to support each other, e.g., by inviting both effort types to the same table.

Scalability implies that the value-actor matrix itself needs to be scalable. This already holds for the 'people, planet, profit' value set, which is being referred to in countless local initiatives as well as globally in UN goals and policies. Scalability also asks for connectivity with peers, both horizontally in neighbouring areas and vertically in larger and smaller areas.

Diplomacy in coordination between bottom-up and top-down efforts is crucial. The top-down democratic government already is a delicate balancing act between ideological perspectives. Adding bottom-up initiatives complicates the play further as bottom-up chiefly organises on a sectoral basis, around social groups such as citizens, farmers, or industry. At meeting points, this incompatibility may yield friction. An example is the widespread criticism of national politicians regarding sectoral agreements (Koole, 2019). In the same spirit, sectoral representation often is negatively framed as self-interest, while ideological parties are seen as protectors of common interest (Grant, 2020). Another challenge in coordinating top-down and bottom-up efforts is decreased trust in democracy. Both entrepreneurs and bottom-up activists often prefer autonomous peer projects, above engagement in government programmes. An example is the rise of cooperatives. So, new concepts for coordination of circular economy transitions need to reconcile not only top-down and bottom-up efforts and scale differences, but also the ideological and the sectoral dimension of organising transitions.

These already complex requirements lead to one more criterion for coordination frameworks, which is that they need to be **intuitive**. While they call for a new mindset, an article, webinar or lecture should be sufficient to transfer the big idea. If this level of portability can be achieved,

adding small scale examples and visionary leadership might be sufficient to trigger rapid proliferation.

In short, for the sake of rapid proliferation, new coordination models for circular economy need to be multi-value and multi-actor, and need to fulfil the four requirements of (1) integration between top-down and bottom-up efforts, (2) scalability from local to global, (3) diplomacy between ideological and sectoral coordination and (4) align with the intuitiveness of the parties involved.

Examples of current bottom-up and top-down efforts for circularity

To illustrate the way top-down and bottom-up initiatives unfold, we briefly touch upon some examples, revolving around the need for coordination. We present five cases of mixed bottom-up and top-down efforts for circularity and investigate to what extent coordination is multi-value, multi-actor, **integrative, scalable, diplomatic** and **intuitive**.

Case: Appingedam

(1) In the Dutch city of Appingedam, local entrepreneurs devised a plan to revitalize the local economy and spur a wider regional development (Pennink and Gerrits, 2021). Their first step was to stimulate local customers to visit their shops more often, making them more aware of their products and attracting them to shop, optionally winning a prize. The introduced loyalty card idea was a starting point in creating shared value between local entrepreneurs and local consumers. The principal objective of this loyalty card has been to create a loyal group of returning customers for local retailers. Currently, the card's potential application for a wider array of uses is explored, including the incorporation of other values besides financial benefits. One direction is a possible extension of the loyalty card to enable shared value creation between local citizens and local NGOs. The underlying rationale for these explorations is to gain further insight into how sustainable regional development may take shape. Preliminary analysis shows how specific actors and values (dis)connect. As the loyalty card started as a top-down approach the extensions into other dimensions of shared values have to be discussed further with NGOs and local citizens. This opens the possibility to realise a bottom-up effort as well. The question that remains unanswered as of yet is how these ideas and actions regarding shared value creation around the loyalty card, involving a wide range of local actors, will be coordinated.

The Appingedam effort started as a bottom-up, business economic effort. Then the value set was expanded, and thereafter the actor set. While several actor groups are mentioned, coordination seems absent. There is some integration, however, as there is contact between bottom-up (entrepreneurs) and top-down (politicians). On the other hand, the critical note on politicians signifies the absence of diplomacy. Scalability is no factor here. A loyalty card can be considered an intuitive aid in achieving coordination.

Case: Energy cooperatives

(2) Our second example concerns a study of six energy cooperatives in the Netherlands and Belgium and illustrates a bottom-up effort towards regional development (Pennink and Gerrits, 2021). This study shows that cooperatives may be quite successful in realizing green energy solutions on a regional scale, building on a value set that includes economic, social and environmental values. Their constituency not only includes homeowners and businesses within the region but also outside actors. It appears that more recently established cooperatives have a more complete value set and a larger working area. Older cooperatives are more locally focused.

Similar to the previous example, energy cooperatives started as bottom-up, but now eventually with a fully expanded value set and a partially extended actor set. Interesting is that value set expansion correlates with territorial expansion. A limitation of cooperatives is their entrepreneurial character. In practice, not all perspectives of society are included. Missing actors are scientists, administration and societal provisions. The cooperatives focus and rely on the government and others for additional coordination. This illustrates some of the possible diplomatic tensions between the bottom-up (the initiatives of cooperatives) and the top-down setting for all kinds of regulations related to the production and delivery of energy as stipulated in government regulations.

Case: RIS3 Strategies

(3) Following the 2008 financial crisis, the EU developed the National/Regional Research and Innovation Strategies for Smart Specialisation (RIS3 strategies). A popular class of models for implementing RIS3 is the helix family, evolving from triple to quadruple and quintuple variants. Despite this shift from technological to social innovation and despite their growing emphasis on citizen participation and civil society, there is limited progress in involving citizen groups (Roman, Varga, Cvijanivić, and Reid, 2020).

While strengthening democracy is stressed, the helix models take the nature of government and political decision making as a given. Also, citizen participation seems to be mostly about awareness and involvement in decision making and does not pose a responsibility or task in e.g., self-organising to adjust lifestyles or raising kids with sustainability values.

Case: Concrete recycling

An early example of a circularity campaign in the municipality of Groningen, the Netherlands, was about circular concrete for building purposes. The project was triggered by a concrete recycling company on one side of a canal, unable to supply to the concrete plant on the other side of the canal. They complained that all recycled concrete was ordered by road constructors, which in their view was downcycling valuable building material. Designing a campaign resulted after two years of delays in a covenant, stating promises by local government and supply and demand actors, to keep concrete from demolition clean and reuse it as an ingredient of fresh concrete. The regional concrete knowledge centre participated in the project to monitor concrete quality (Vereniging Noorden Duurzaam, 2013). The covenant resulted in a near 20% drop in gravel import to the municipality for a year or two. Eventually, gravel suppliers outside the municipality lowered their prices to counter their decreasing turnover, in which they succeeded. However, in the meantime,

the concept of a 'concrete chain table' was copied to three provinces and was developed independently in seven cities throughout the Netherlands. Most tables still exist and started many new efforts for concrete circularity.

The concrete recycling effort started bottom-up with a partially expanded value set, without a social component. The actor set was almost complete, only education was missing. As local government was involved and an industry-wide covenant was reached, this effort can be considered both bottom-up and top-down. The covenant was an intuitive coordination mechanism, together with process guidance provided by Noorden Duurzaam's predecessor. This case shows that the combination of integrative, scalable and intuitive coordination, even when acceptance initially is low, may correlate with fast proliferation.

Case: Food council

In the USA, Canada, the UK and Germany, many food councils are active. Following a congress about network building between food councils, a guide was published on how to set up such a council, calling for food democracy and systemic coordination (Thurn, Oertel, and Pohl, 2018). Research in Luxembourg showed that people see the creation of a democratic Food policy council as an opportunity for positive developments toward a sustainable and equitable food system transition (Pax and Reckinger, 2022). The researchers suggest forming a national Food policy council as a platform for independent cooperation among equal partners from the three sectors of Luxembourg's food system: policy and administration, research and civil society; production, transformation, gastronomy, and trade. This idea was picked up by government and has been included in a draft policy and law texts. Both the German and the Luxembourg research show that food councils are viable and are gaining momentum.

Similar to the concrete chain tables, food councils are integrative and intuitive meeting points of top-down and bottom-up efforts. The coordination features a fully expanded value set ('sustainable and equitable') and a complete actor set as well, although education involvement is not mentioned. Scalability and proliferation are demonstrated by the idea of a national food council.

Conclusion: circularity requires new coordination on a societal scale

Both examples shed some light on a context in which the strive to realise sustainable regional development is visible. However, they also highlight that this strive is hampered by a lack of coordination across (1) multiple actors operating at different levels of society, and (2) multiple values simultaneously. Current coordination structures either are unable to handle the complexities that come along with addressing multiple values or do not allow for coordination across a variety of actors.

We have no pretensions that the set of examples is representative of all efforts for a circular economy. However, we argue that they bring to the fore sufficient variation in terms of the criteria set. They are more and less multi-value, multi-actor, integrative, scalable, diplomatic and intuitive.

At first sight, there even seems to be a positive correlation between the fulfilment of the criteria and transition progress or impact. This gives some hope that the chosen criteria may predict success or even guide us to successful coordination methods. On the other hand, none of the examples shows rapid vertical deployment or hyped horizontal proliferation, even when the effort would get high marks in the assessment. Could there be a common cause? That is what we will look out for in the next section.

Exploring task democracy as a coordination strategy

The problem of liberal democracy

We are on a search for new pathways to drastically speed up circularity. Thus far we avoided the complexity trap caused by the expansion of values and actors. We concluded that conjunction is needed between bottom-up initiatives and a new type of society level coordination. In this section, we concentrate on coordination. We investigate the **task democracy** concept that is being developed by the Noorden Duurzaam association (Bootsma, 2022)[5]. Before presenting this approach, we elaborate on why current political arenas and the decision-making taking place within may chiefly be unfit to initiate and guide us through the transition towards a sustainable society.

About half of the world's countries are electoral or liberal democracies (Roser and Herre, 2013). These countries have parliaments where political parties establish or control government. During elections, these parties compete for seats by seducing voters with their ideas. The seduction itself is done by making attractive promises and asking for as few sacrifices as possible to be trustworthy. This is smart because policy promises are generally the least costly way for parties to secure electoral support (Strom, 1990). Parties differ in the kind of promises made and sacrifices asked so voters have a real choice. All is well as long as promises made will pay off to us, within the next term or the foreseeable future. Things get different when they do not, for instance when sacrifices are asked for future generations, for ecosystems we cannot see or for people elsewhere on the planet. In those cases, **imposing costs without a clear view of the pay-offs has the risk of losing votes**. As a result, most or all parties are reluctant to ask for sacrifices for sustainability, even while sustainability is widely considered a core value. This collective bias creates a blind spot in societies. We consider our destructive lifestyle as normal and claim it as a right, while at the same time we are willing to turn down our energy consumption when democracy, another core value, is at stake at Europe's borders. The difference: sustainability is about elsewhere and later; democracy is about here and now (see also de Geus, 2001).

This indicates that **ideological competition results in failing leadership for sustainability**. Liberal and electoral democratic political systems tend to postpone necessary sustainability transitions until too late. As the behaviour of the system has not changed much during half a century of scientific warnings about dangerous climate change (e.g., IPCC, 2022), it probably will not fix itself; this is bad news. Some consolation is that other political systems are not doing any better. It seems that in our search for new pathways for circularity we can strikethrough ideological competition as

[5] The Noorden Duurzaam association is a regional think tank for sustainable development in the North of The Netherlands. Established in 2013, the association gradually expanded its field of interest from sustainable product design and circular economy into political transition management, coordination theory and experiments. The task democracy theory and concept is under active joint development by Noord Duurzaam and several governments, universities, NGO's and consultancies in The Netherlands. Knowledge is shared as open source. Task democracy resembles the well-known helix models but has a different background and purpose. While helix models are innovation and business centred and are used to build collaboration networks, the task democracy model is transition and society centred and is intended for political collaboration to realise transition campaigns.

a coordination mechanism, as it is a common cause of dangerous delays. Yet, do we have an alternative?

An alternative way of coordinating

Back in the 13th century, among the best places to be in Europe were the North of Italy and the coastal area of the Netherlands (Prak, 2018). Both areas had growing populations, emerging cities and prosperous economies. In the Netherlands, however, about every 15 years massive storms and floods would take heavy tolls. The ultimate response was building and maintaining dykes, by that time a project of unprecedented proportions. It required contributions from landowners in the area that needed protection. As all landowners had an obligation to maintain their piece of the dyke, all had access to the general assembly of their local water authority, where dyke wardens were elected, conflicts were settled and tasks were assigned. Division of tasks was a key to success. Farmers needed to keep their waterways clear. Villagers needed to help build dykes. Rich landowners, often citizens, had to pay for the project (Soens, 2006). In coordinating these efforts, competition between the three actor groups was of no use, as eliminating one would jeopardise the undertaking. Mutual dependency, **collaboration and task division** were more important. Eventually, this resulted in democratic water authorities with boards consisting of actor sections having fixed seats, representing interest groups, or better: task groups. Elections were held within each sector. This coordination system is still in operation and has survived power shifts, turmoil and wars. Surprisingly, this type of democracy has no name. The water authorities in The Netherlands are referred to as 'functional democracies' but only to indicate they serve a specific public function, i.e., water management. The Noorden Duurzaam association reverse engineered and reconstructed this system to find out whether it is up to the existential threats of the 21st century, and named it 'task democracy'.

The redesigned theory of task democracy consists of a sector model, a process model and a maturity model (Bootsma, 2022). The **actor model** holds five societal sectors collectively responsible for sustainable development: science, citizens, government, businesses and societal provisions. They each have indispensable, unique and non-transferable transition tasks, as indicated in Table 1. They coordinate their efforts in a task democratic board, council or chamber of parliament.

Actor groups	**Sustainability transition tasks**
Scientists - in academia, NGOs, government, businesses or independent	Measure economic, ecological and social capital, predict the future, identify development pathways
Citizens - age groups, social classes, ethnical groups, professions, gender groups	Collectively adjust lifestyle, raise new generations with sustainability values
Administration - parliaments, government, authorities, agencies, judicature	Forbid or tax what is unsustainable, encourage and subsidise what is sustainable, ensure a level playing field

Businesses – self-employed, SME, business parks, branch associations, big business, multinationals	Innovate products, business models and organisation models for sustainability impact
Societal provisions - health care, education, sports, culture, life view	Inspire people, qualify students, build and connect communities, and include everyone.

Table 1 Task democratic sector model

Mutual dependency, in-transferability of tasks and thus lack of internal competition create equality between the actor groups. Only joint effort will yield results. To strengthen and secure this basis for solidarity and collaboration, the five actor groups must have equal rights in a task democratic board or assembly. Therefore, even when the groups would have unequal numbers of representatives, the groups have equal voting power. Any other ratio would create continuous debate and would be detrimental to solidarity, ownership and willingness to participate and contribute.

A task democratic parliament or board has, according to a cyclic **process model**, three main tasks. The first is prioritising sustainability issues by voting, to set an agenda. Second is developing and realising society-wide campaigns, in which each sector mobilises its members and in which sectors compensate each other rather than compromise the shared objective. Third is collecting data to be able to adjust and provide input for agenda setting and campaign design.

Task democracy may be applied small scale in for instance foundations, cooperatives and district councils. On a larger scale, it may be used as a design pattern for an additional permanent chamber of the municipal or province council or national parliament. This would create a new duality: ideological democratic chambers focusing on here and now matters; task democratic chambers preparing campaigns for elsewhere and later. The impact of this duality may be similar to that of the recent implementation of citizen fora in e.g. Ireland, where a citizen forum paved the way for new legislation (Hendriks, Jacobs, and Michels, 2021).

Results so far

Roleplay experiments have shown the model may evoke a change of attitude among participants. In the absence of ideological competition, and given sectoral interdependence, task division and collaboration appear to emerge more naturally. Currently, several experiments are designed, including applications for local circular economy and for municipal districts, where council structures are not prescribed by legislation. Proposals, however, meet resistance as well: council members may fear a loss of power when more sectors are involved; local politicians may hesitate to experiment with the unknown; civil servants may compare stronger district democracy with easier managing bilateral relations.

Current proposals for getting started with task democracy involve debate, role play, simulation and offline testing on real cases. Other options are writing up statutes including meeting rules, developing formal relations with other institutes, appointing an independent chairperson, installing a core team or presidency, organising internal and external communication, et cetera.

To summarise, task democracy is an attempt at an integrated governance approach for sustainable development, in an early stage of development. It builds on collaboration and task division, rather than competition. As a concept for coordination, it covers all of the value-actor matrix, involving actors from all societal sectors and inviting them to work on economic, social and ecological issues. The core question in our search for pathways, however, is whether it will help fix the common cause of the slow transition to circularity. In the next section, we explore this.

Towards a new framework: “Task democracy” for regional circular economy

In this section, we customise the theory of task democracy for use in circular economy transitions, with fast proliferation in mind. That may well turn out to be overly ambitious, but since urgencies make rapid change important, the fast track is worth exploring.

The circular economy framework we want to construct from the task democracy theory needs to be, following the criteria set above, integrative, scalable, diplomatic and intuitive. We discuss these requirements separately.

Integration of bottom-up and top-down efforts in the task democracy theory can be established, among other factors, during the collective design of transition campaigns. To illustrate this, we present a brainstorm canvas, see Figure 1. The brainstorm of a task democratic campaign design team, consisting of participants from five sectors, starts with an objective (top left corner), shared values (centre) and a territorial domain (top right corner). Then, in three steps the campaign is designed. At first, actors are written down outside the coloured circle. Second, their possible bottom-up campaign contributions are written down inside the circle. Third, arrows are drawn to indicate supportive relations between contributions. Working this way, the team sees synergy emerging, in a process that creates ownership. Following the brainstorm, the campaign design is cleaned up and presented by sector representatives to their constituency, to get feedback and support. Once the design has stabilised the campaign can be kicked off. At Noorden Duurzaam, this process was developed for circularity projects in the first place. We include it in the framework as it is.

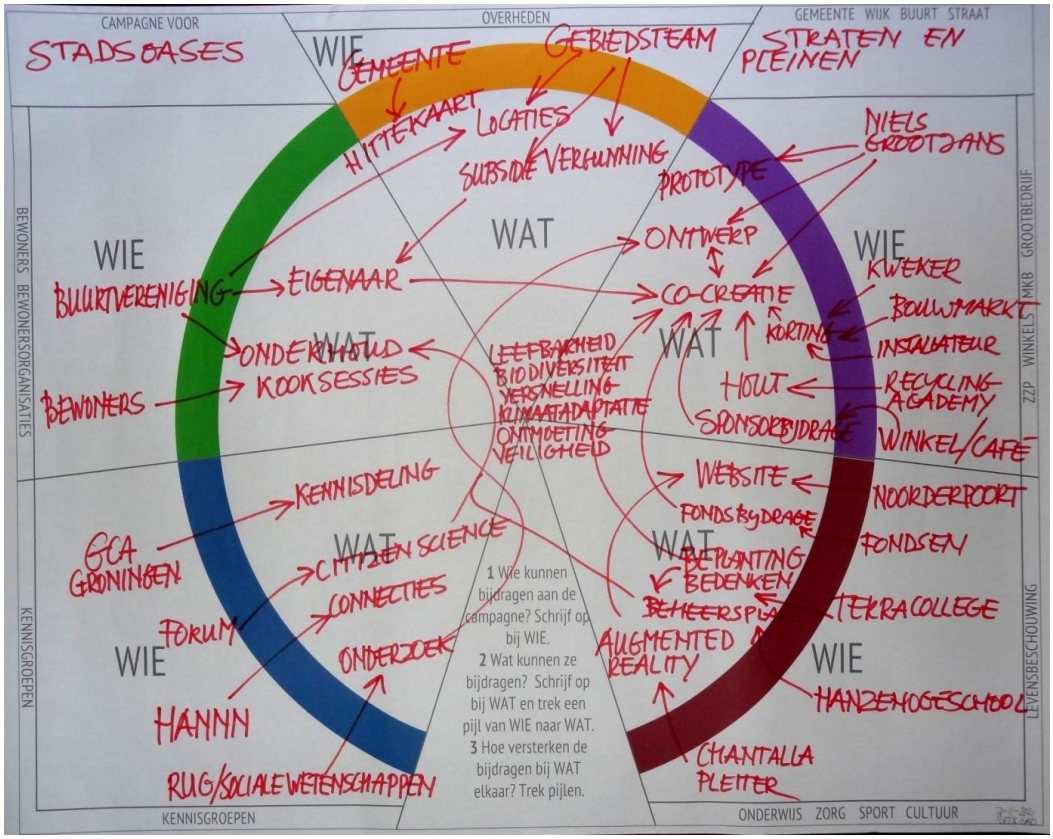

Figure 2 Task democratic brainstorm canvas

Scalability in circular product chain coordination needs special attention, as in a globalised economy, larger geographical scales often include more sections of product chains. For instance: on a local scale, often retail and consumers are found; on a regional scale, logistics and recycling may be added; on a larger scale wholesale and manufacturing can come into play; globally often mineral resources join in. A framework for the coordination of circularity can therefore not require all chain sections to be present or active at all levels. In customising the task democracy model, this means that filling in the five-sector model is not circumstantial, not conceptual. In a municipality, for instance, a product chain may involve (1) local experts, (2) a local consumer group, (3) the municipality, (4) a product family committee of the local business network, (5) the collective of local education.

We used the term **diplomacy** to indicate reconciliation of the ideological and sectoral dimensions in organising transitions. While this is a central matter in the all-encompassing concept of sustainable development, it is slightly less complex in a circular economy, which has sectoral division lines by nature, just like task democracy. Customising task democracy for a circular economy is therefore pretty straightforward. On the other hand, sectoral agreements may, as we saw, have trouble getting accepted in politics. Here, the added value of task democracy is that it transforms product chains from business centred phenomena to society-wide phenomena, through an actor model that guarantees equal influence to science, citizens, administration, businesses and societal provisions. Solid democracy brings organised product chains on par with parliaments and governments of their scale, where tax money is converted into transition budgets and where legislation comes from.

From the ingredients we have seen so far, a new and hopefully **intuitive** framework for a circular economy can be constructed. The framework is presented below in the shape of a manifesto, a set of statements that may be squeezed into a one-page table for overview and easy access. The set is structured as a narrative and starts with challenges, objectives and values, runs through actors and organisation, and arrives via process and methods at practical aspects of institutionalising.

Task democratic circular economy manifesto		
Global challenge	Mankind faces existential threats: massive disruption of society as a result of climate change, pollution, resource depletion and injustice.	
Global goals	The UN calls for sustainable development, which is SDG 12 (Sustainable Consumption And Production) includes a circular economy. Taking action is urgent.	
Product chain	In this manifesto we consider the product family of _____, *[Fill in a product family. On local level, choose from food, clothing, cosmetics, housing, electronics, etc. On regional and higer levels, focus may be on smaller product groups, like plastics, or plastics families]*	
Administrative territory	in the administrative territory _____. *[Fill in your area here, in a local to global range].*	
Actor groups	We are actors in this product chain: scientists, citizens, administrators, businesses and societal provisions. We have the following indispensable, unique and non-transferable transition tasks in organising necessary transitions:	
Scientists	In academia, NGOs, government, businesses or independent.	We measure economic, ecological and social capital, predict the future, and identify development pathways.
Citizens	Age groups, social classes, ethnical groups, professions, and gender groups.	We collectively adjust lifestyle and raise new generations with sustainability values.
Administration	Parliaments, government, authorities, agencies, judicature.	We forbid or tax what is unsustainable, encourage and subsidise what is sustainable, and ensure a level playing field.
Businesses	Self-employed, SME, business parks, branch associations, big business, multinationals	We innovate products, business models and organisation models for sustainability impact.

Societal provisions	Health care, education, sports, culture, life view.	We inspire people, qualify students, build and connect communities, and include everyone.
Coordination	In these tasks, we as actor groups are mutually dependent. We want to coordinate our efforts, building on shared values of sustainability, democracy and solidarity.	
Product council	Together, we establish a permanent democratic product council in which our five actor groups have equal voting power. Each group appoints elected representatives. The council has an independent chairperson. Meetings and archives are open to the public and the press.	
Organisation	The council is governed by a statute that details this manifesto and establishes a presidency, a secretariat and internal rulings.	
Core tasks	The council has three core tasks: democratically prioritising sustainability issues of our product chain; organising society-wide transition campaigns in our administrative area, and collecting and sharing data to learn and adjust.	
Transition method	The council's main output is transition campaigns for circularity and sustainability in our product chain, designed by campaign teams in which our five actor groups participate. The teams brainstorm to find synergy in combining voluntary actor group contributions, including government funding. Each actor group gathers feedback on campaign plans from their constituency and asks for support and participation. Campaigns are kicked off publicly and are monitored by the council.	
Campaign topics	Campaigns may focus on for instance fundamental and applied research, public awareness of the need for circularity, chain transparency, consumer self-organisation, level playing field, standardisation, legislation and taxes, circular product and process design, recycling logistics, circular business models, integration in education curricula.	
Connectivity and proliferation	The council is supported by a peer council in the encompassing area, supports peer councils in sub-area and maintains contacts with peer councils in neighbouring areas. If peer councils are absent, the council may help initiate these.	
Council status	The council asks for recognition by the highest democratic institution of our administrative area - being one of five founders of the council. The recognition should entitle to government facilitation of the council and sharing of administrative information.	
Finance	The council has an organisation budget and a transition budget. Both budgets are fed by voluntary contributions from the five actor groups, depending on	

	their carrying capacity. In absence of a transition budget, transition campaigns seek their funding from the five actor groups.
Origin	This manifesto is derived from the Task democratic circular economy manifesto v1.0, 2022, published at the NBM2022 congress in Rome. Reuse is allowed and advised, under a CC-BY-SA license.

Table 2 Manifesto for regional circular economy policy

Conclusions and new things to learn

The limitations: big steps, little research, political neutral?

In this paper, we highlighted the growing urgency of sustainability transitions in general and circularity transitions in particular. In search of new pathways, we analysed the lack of change as a wicked problem. We presented a value-actor matrix that illustrates a two-dimensional increase in complexity. That made us see societal coordination as the main problem of circularity transitions. We defined four criteria for new coordination models: integration, scalability, diplomacy and intuitiveness. Using these to review several cases brought up a common cause of the lack of change. Next, we investigated a potential coordination model to resolve the issue of societal coordination: the theory of task democracy. We customised it for a circular economy, in the shape of an open-source manifesto.

While this approach produces a thinkable pathway, it has quite a few limitations. We have taken big steps to arrive at a conceptualisation that can be tested and falsified or improved in practice. The intermediate assumptions, like the four criteria and the task democracy theory, are arguably speculative and provide no ground for hard conclusions yet. Still, given the urgency of sustainability, shortcuts to experimenting may help detect and denounce alternative pathways for transition, thus accelerating knowledge development and ultimately creating necessary change.

Further research could fill in on assumptions in this paper. These include lack of change, which needs more academic and public attention; the value-actor matrix; the intermediate conclusion that coordination is the main problem; the four criteria for societal coordination of circularity; the role of small wins and visionary leadership; the task democracy theory and finally the translation into a working model for product chain councils. We invite researchers, policymakers and practitioners to get in touch.

Disclaimer

This paper partly builds on work in progress on the task democracy concept, developed by the Noorden Duurzaam association, a Dutch non-profit NGO. This concept is developed as an open-source concept and may be used freely under the Creative Commons 4.0 license CC-BY-SA. Peter Bootsma and Niels Faber, both authors of this paper, are board members of the Noorden Duurzaam

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Calculating Circular Value In Co-Creation With The Construction Industry

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Abstract

Alternative business models have a hard time setting foot in the construction industry due to attractive interest rates of mortgages as well as the long life times of buildings. The development of new buildings is a significant investment for property owners and developers. As a result caution is naturally taken to stay within budget and reducing costs. Despite of the focus on costs, the value of circularity is often discredited during decision-making. The author intends to give circularity a stronger vote in the decision-making process by making its value more concrete.

This paper came about by desk research and co-creation sessions with varying stakeholders involved in the Dutch and Belgian construction industries. The co-creation sessions were an attempt to iteratively learn how to calculate and approximate the value of circularity, simply by doing it.

Benchmarks were a helpful tool for initiators to make decisions and relative estimates with more ease. Stakeholders with a financial responsibility can more easily be engaged by the use of calculators. Participants enjoyed being able to directly see the impact of changing a parameter to the outcome, such as Circular Value. The efforts have resulted in two finalized calculators: the End of Life Calculator and the Flexibility Calculator. Those can be freely used by initiators and other stakeholders in the construction industry.

The calculators are planned to be further tested and improved with the broader construction industry. This is planned in a research collaboration between HZ University of Applied Sciences and Avans University of Applied Sciences.

Keywords

circularity, construction industry, co-creation, calculator, circular value

Introduction

Significant impact on the environment and scarce material usage is made if the construction industry moves towards circularity. A financial incentive that comes from the inherent added value of circularity might allow a transition with more limited governmental subsidies. If you zoom into Europe, the construction sector is responsible for about a third of total waste streams. On average, a mere 50% of this volume is recycled and the rest is put into landfills or incinerated (Kozlovská and Spišáková, 2013). Next to the visible materials, embedded energy as well as labor are going to waste in the process of incineration. This destroys significant potential economic value along the way. Looking at the environmental impact, circularity has the potential to reduce virgin material use to about half, reduce energy consumption by around 40% and reduce CO2 emissions by 35% (Herczeg et al., 2014).

By talking to and engaging with initiators of building projects the author has learned that developing a new building is a significant investment to property owners and developers. As a result caution at staying within budget and reducing costs is naturally taken. The value of circularity is often discredited in the decision-making process while flexibility, as well as remountability can increase the value of a construction during and at the end of its functional life.

There is value in circular building principles. Flexibility can be used to keep the building functional to its users over its lifetime and make it potentially live longer. In the Netherlands a building changes owner every 25 years on average (Van Oort et al., 2008). A building can be flexible at the location where it has been first built, by changing function or floor plans but also by moving the building to another location after disassembly. Remountability of the building makes disassembly at the end of the functional life of a building possible, which can result in a higher residual financial value by reducing labour costs for reuse. In order to make remountability come to fruition a digital Building Information Model (BIM) as well as a dissassembly plan including labeling of building elements is essential (Draaijer, 2020).

During interviews that were held by the author and colleagues in 2020 we learned that alternative business models were considered by property owners and developers but not used in practice (Koster, et al. 2020). Alternatives such as leasing from suppliers or co-owning were explored by these initiators. In practice we observed that these circular principles do not lead to alternative business models for parties in the construction industry thus far. This may change, but in the interviews it was learned that the building is mostly owned by the initiator and paid for by a mortgage. Reasons for choosing these relatively common business model are due to attractive interest rates of mortgages in the time of writing. Suppliers that want to maintain ownership through leasing or rental generally have a higher interest rate resulting in higher costs for the property owner. Additionally, the lifetime of buildings is generally very long (at least 50 years). Suppliers take risk premiums to compensate for the uncertainty of being responsible for a construction over a long life (Koster & Schrotenboer, 2022). The circular challenge of a long life of buildings is confirmed by a research of the European Environment Agency in 2020.

Based on qualitative learnings in interviews as well as desk research we investigated the need to get grip on the value of circularity by building initiators. In this paper the learnings of co-creation

sessions, in which we iteratively developed calculators to help approximate the potential Circular Value, are shared. The study is part of the Interreg 2 Seas CBCI project (Circular Bio-based Construction Industry), a project that applies the design research methodology.

Method

This paper came about by desk research and co-creation sessions with people involved in exemplary projects (case studies) in the Dutch and Belgian construction industries. The co-creation sessions were an attempt to calculate the circular value within four potential topics: Flexibility, End-Of-Life, Failure Costs/Integral & Health. These topics were identified in prior research of the author in a White Paper called “Five essentials for successful circular bio-based construction initiatives.”. The goal of the co-creation sessions was to learn by doing and find out what the parameters for the calculations should be, what functional needs the potential users have, as well as reflecting on the applicability of the outcome.

The initial structure of the calculators looks as follows:

Investment Parameters that calculate the required investment & costs
Value Parameters to calculate the value / revenue
Results Business case outcome

The aim of the co-creation sessions was to iteratively improve the structure as well the parameters that make up the categories such as ‘costs for conversion to new scenario’. In Figure 1 the first version of the calculator before the co-creation sessions can be seen here.

Figure 1: Initial version of the Flexibility Calculator

FUTURE FLEXIBILITY - CIRCULAR CALCULATOR		
VALUE: FUTURE FLEXIBLE SCENARIO	**Value**	**Source**
Expected time you own the building	25 y	Van Oort, F., Ponds, R., Vlie
Chance the scenario is used within the 25 y		
Requiered investment if the building is not circular remountable		
Flexibility value (chance adjusted)	€ -	
INVESTMENT		
Total investment without remountability		
Additional investment preparing for remountability	10%	KU Leuven LL (see sheet)
Cost for conversion to new senario		
Flexibility investment (chance adjusted)	€ -	
RESULTS		
BUSINESS CASE	€ -	
Interest rate for the additional investment	2%	
Mortage years	30 y	
Flexibility annual conversion cost (chance adjusted)	€ -	
Flexibility annual value (chance adjusted)	€ -	
ANNUAL CASHFLOW	€ -	

Eight separate co-creation sessions were held in 2021. These sessions included 22 attendees (of which 19 were unique attendees) with an initiating role in the construction development process of recent and ongoing building initiatives. These roles varied from property owners to architects, constructors and producers. The session topics were chosen by the initiators after being presented with the available calculator topics. Initiators were selected by convenience sampling. They were approached via the network of members of the Circular Biobased Construction Industry (CBCI) project. Table 1 contains an overview of the participants, their roles, organizations, case names and workshop topics.

Per case, co-creation sessions were held with initiators of the construction projects, totaling eight sessions. By an attempt to calculate the circular value for specific building projects, using Excel, we collected first-hand experience from and with people in several roles, including top management, project management as well as design. Every session we iterated upon the calculator made in Excel and enhanced the structure, parameters and underpinning evidence.

Table 1: Co-creation sessions, participants and topics

ID	Case	Date		#	Participant(s) role	Organization	Calculator topic(s)
A	Emergis Clinic	3-4-2021	NL	4	Controller Project Leader Project Engineer Program Manager	Emergis (initiator) Emergis (initiator) Jeras Ministry LNV	End of Life Flexibility
B	Ghent Living Lab	15-4-2021	BE	4	Architect Post-Doc Project Leader Researcher	KU Leuven (initiator) KU Leuven (initiator) KU Leuven (initiator) KU Leuven (initiator)	End of Life Flexibility
C	Waterweg	11-06-2021	NL	2	Founder Producer Founder Producer	Waterweg Waterweg	End of Life
D	Mobble	20-8-2021	BE	3	Director Constructor Director Constructor Director Project Dev.	Inhout Inhout Bast Coop	End of Life Flexibility
E	Fairm	9-9-2021	NL	1	Founder Producer	Fairm	End of Life Flexibility
F	Emergis Clinic	4-10-2021	NL	3	Architect Controller Project Engineer	Agrodome Emergis (initiator) Jeras	Health
G	Jeras	15-10-2021	NL	1	Project Engineer	Jeras	Failure Costs
H	‘t Centrum	18-11-2021	BE	5	Architect Consultant Engineer Director Project Coordinator Project Leader	WEST Architectuur Elva Consultancy TEN Kamp C (initiator) Kamp C (initiator)	End of Life Flexibility

Results

In this section you will find what we have learned during the co-creation sessions. First the individual learnings from the sessions are presented followed by the popularity of topics, ending with improvements to the structure of the calculators over time.

The knowledge gathered during the co-creation sessions is categorized in five topics; General (Table 2.1), Flexibility (Table 2.2), End-Of-Life (Table 2.3), Health (Table 2.4) and Failure Costs/Integral (Table 2.5). Per topic we show the learnings from session to session in a chronological order. The calculators were improved iteratively during and between sessions based on the feedback and questions of participants. Discussion topics were taken from one session to the next to test proposed changes with a broader group. An example of a discussion held several times was about the perception of value and that the financial aspect is just one of many more aspects such as

limiting climate impact as well as reducing scarce resource depletion. In table 2 you find the learnings and their respective session ID's matching with table 1 in the method section.

Table 2.1: **General** learnings from the co-creation sessions.

#	LEARNING	ID	Case
1.1	Benchmarks are useful because making estimates about the future is quite hard	A	Emergis Clinic
1.2	Optimistic and Pessimistic scenarios could be a helpful way to put the results in perspective		
1.3	Calculator outcomes that help to set goals, such as the break-even percentage of the remountability investment can be useful		
1.4	A distinction between investments and costs should be made. The investment is done at the start while the costs occur at the end of life or at the flexibility event		
1.5	Benchmarks on storage costs should be added		
1.6	Benchmarks on remountability costs should be added		
1.7	Complete business case should be on remountable part of the building only (this needs to be made explicit in the introduction)		
1.8	Feedback: we did an important exercise. With regards to improvements they would have to think about it in the coming days	B	Ghent LL
1.9	Quote: "What is interesting for us, if we can use this we would use it as an argument for investors to build more demountable" – Architect at KU Leuven		
1.10	Sometimes to many calculations are put in a single cel, helpful to split them out		
1.11	Many parameters still take quite some explanation to understand, formulation should be better		
1.12	These calculators are only helpful for us when there is a concrete project. Initiators are a better target audience for the calculator than producers such as *Waterweg*	C	Waterweg
1.13	Building sector material- & labour price increases(inflation) should be included for the results	D	Mobble
1.14	Discussed how the investment value should be alocated if an investment is made for End-of-life AND Flexible value (simplest way is 50-50)		
1.15	Adding internal rate of return in order to gain insights on the return of a project from a financial perspective is seen as interesting	F	Emergis
1.16	Discussion on true/indirect costs and whether this should be included (this was not done to keep it simple, relevant topic)		
1.17	For buildings that use other business models for utilities, such as rent for an HVAC the estimated remountability investment can be skewed or hard to determine	H	't Centrum

1.18	Leasehold expires after 40 years. After that there is the choice that the building goes to the owner of the land or they can demount it and sell the materials. So even though the building could last for 120 years, it is also reelvant to see what the value would be after 40 years because of the above fact
1.19	QUOTES: ”It was useful to do this exercise, effectively seeing that it works what we came up with and it is also the hard evidence to continue to propagate and promote it. I do think that this cautious assessment also indicates that it is certainly worth continuing with it [remountable building].” – Project Leader at Kamp C & ” I find it very interesting to see the value concretely, although I do realize that we have to make quite a few assumptions.” – Architect at WEST Architectuur
1.20	It is helpful to set the expected life-time or ownership time early on when filling in the calculator. This used to be at the end of the calculator

*Table 2.2: Learnings from the co-creation sessions with the **Flexibility** Calculator.*

#	LEARNING	ID	Case
2.1	For value we can use the amount that would be invested in future newly-built in a case without flexibility	A	Emergis Clinic
2.2	Value should be adjusted for the chances something occur. A differentiation can be made between changing location and function. Should value of reduced vacanacy of building added?		
2.3	Costs can be estimated with square meter prices and also adjusted for the chance of occurence		
2.4	Quote: "By taking into account flexibility we can optimize and/or guarantee our income streams from rental. A building or section of a building without functional value to the users has a value of 0 Euro's to us. This tool helps us calculate the value of flexibility." – Controller at Emergis		
2.5	Avoided replacement cost can also be sales revenue when the intention is to sell the building at the end of its first functional life in about 6 years	B	Ghent LL
2.6	Relocation- and function change chances vary from the first session. Interest for <vacancy or potential additional revenue.		
2.7	Bottom-up calculation for location- and function change had very similar results compared to Top-down approach (€/m2) in the first session		
2.8	The calculator also works for a planned end of the first functional use. With the Living Lab it's first functional end of life is already planned after several years		
2.9	A parameter for co-financing from the contractor company was added and tested but it turned out tto be confusing so it was taken out again		
2.10	Transport and storage should also be included as a parameter		
2.11	Maintenance / refurbishment costs was added and later during the session removed because this category also exists without a remountable building, not in scope	D	Mobble
2.12	Storage and transport costs should be explicitly made optional. When you can store on-site or if the building can be moved directly to a new place this is not needed	F	Emergis
2.13	Sales Value After First Life was hard to quantify as well as Income loss/cost reduction due to additional building speed. The last one was kept empty	H	't Centrum
2.14	Costs were relatively simple to estimate		
2.15	Addition that the building can be moved- or change function more than once during its functional life should be included		

*Table 2.3: Learnings from the co-creation sessions with the **End of Life** Calculator.*

#	LEARNING	ID	Case
3.1	Benchmarks for demolition costs found and added during the session	A	Emergis Clinic
3.2	Benchmarks on building life should be added		

3.3	Quote: "What I really like about the tool is that it doesn't claim to be able to calculate residual value, but instead it gives you percentages you need to realize in order to have a financially feasible case." – Project Manager at KU Leuven	B	Ghent LL
3.4	Avoided demolition costs as well as a distinction between demolition and demounting costs is a good one to be made		
3.5	Additional remountability investment is a hard concept, it is best to calculate this with total investment sum and add benchmarks		
3.6	Make a clearer distinction between the value of the materials and the potential sales value. Future Reusable % is hard to determine		
3.7	Deposits that are paid by initiators to suppliers should be added	C	Waterweg
3.8	It is helpful to be able to get an estimate for the end of life value. Benchmarks are seen as helpful	D	Mobble
3.9	It is interesting to add to the calculator ways to show that Biobased materials are cheaper to be disposed of than building waste if they can be composted (this is currently (2021) not possible)	E	Fairm
3.10	Percentage of bio-based materials being used is required in order to be able to calculate waste cost reduction with bio-based materials	F	Emergis
3.11	Deposit was not as relevant for the team because they assume to be able to sell the complete building as a package to a next owner. The end-of-life for this initiator wouldn't be that of the building	H	't Centrum
3.12	For estimating a biobased percentage, it is relevant to make an estimate by weight or volume. Volume was chosen as the easiest way to estimate. This was relatively hard to estimate		
3.13	Discussion whether they should take into account the initial investment or all building costs and replacements costs over the lifetime of the building. (initial was chosen)		
3.14	Prevented Regular Demolition Costs were relatively hard to estimate		
3.15	The opportunity to compost biobased building materials is seen as uncertain, but the team does expect that throughout the lifetime of the building this technology can mature and includes it (relatively small value)		

*Table 2.4: Learnings from the co-creation sessions with the **Health** Calculator.*

#	LEARNING	ID	Case
4.1	Biobased business case is hard to make in general and for Health specifically due to a lack of evidence. Fairm is a Biobased insulation producer	E	Fairm
4.2	The business case coming out of the calculator was impressive to them but the applicability for circularity is seen as low because the link between health and biobased materials is currently lacking scientific evidence (2021)	F	Emergis

4.3	Potential health improvements related to reduced CO2 levels by the HVAC could be taken into account by the constructor that joined the session. It would be something to take into account with the installations they select

*Table 2.5: Learnings from the co-creation sessions with **Failure Costs / Integral** Calculator.*

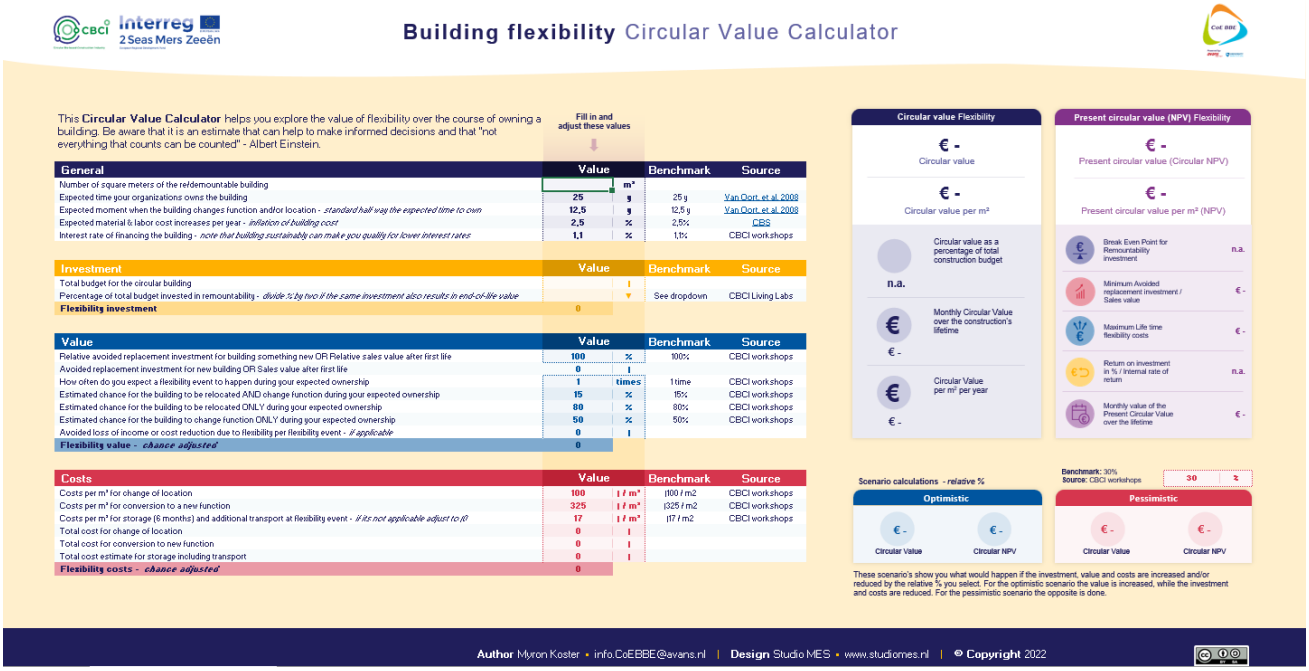
#	LEARNING	ID	Case
5.1	At the start of the project this assessment could best be done according to the constructor	G	Jeras
5.2	Failure cost calculator was tested but the results that came out were experieced as quite abstract and not very applicable in practice or to be related to circularity		
5.3	One of the parameters used for the calculator (Van Heel, Buijs & Wolf, 2019) was ”shared responsibility” this was confusing for the constructor. He is of the opinion that someone should carry the responsibility and that it shouldn't be shared. A sense of responsibility should be there but this is different from the formal sense		

Before the co-creation sessions initiators were presented with the four calculator topics. They could choose on which topic they wanted to focus for their specific building case. This has shown us that the Health as well as Failure Costs/Integral calculators were the least popular. These sessions were interesting to respectively two and one initiator(s), while the End of Life session was relevant for seven initiators and the flexibility session for five. During both of the least popular sessions we faced a challenge in relating the topic to circularity or biobased materials. This was due to a lack of evidence for the relation between health and bio-based for the health calculator and for the Failure Costs / Integral calculator this was related to the topic itself. Additionally, the output of the Failure Costs / Integral calculator was perceived as too abstract to be applicable for the participant.

After eight co-creation sessions as well as iterations, the final (flexibility) calculator is structured as can be seen in Figure 2. The final structure of the calculators consists of the following categories:

General Parameters that calculate the required investment & costs
Value Parameters to calculate the value / revenue
Results Business case outcome
Costs Here the costs of the calculator topic are approximated
Results (on the right) The outcome is shown as a business case and present value
Scenario’s (right) Estimating optimistic and pessimistic scenario’s (added later)

Figure 2: Overview of the finalized flexibility calculator



Compared to the first version of the calculator several categories have been added which emerged from the co-creation sessions. This includes the parameters of the topic General as well as a separate section for Costs. Since the costs occur at a later time, they have been consciously separated from the investments which they were initially part of. For the result section Net Present Value as well as Internal Rate of Return insights were added. This included the time aspect to the outcome of the calculations. Lastly Scenarios were added to the results to give users the possibility to make an optimistic and pessimistic approximation of the Circular Value.

Conclusions

The goal of the efforts made in this research was to learn by doing and find out what the parameters for practically useful circular calculators should be, what functional needs the potential users have, as well as reflecting on the applicability of the outcome.

The co-creation efforts have resulted in a set of calculators that can be used by participants in the construction industry. The author intends to give circularity a stronger vote in the decision making by making its value more concrete. It is important to realize that the outcomes of the calculator are an approximation, it is meant as a tool that can contribute to better informed decisions. In this regard the benchmarks were a very helpful tool to initiators making it easier for them to make decisions and relative choices at every parameter.

The approach of 'learning by doing' was very helpful. By trying to make calculations for a specific case and reflecting during the session we found out what was perceived as relevant and could, enrich the calculations. It is important to note that it has been a relative limited number of co-creation sessions that were held in the creation of the calculators. Even though the results are unlikely to be representative for the whole population, the dialogues and reflection between the (19) stakeholders with varying expertise contributed to the qualitative value of the calculators.

Over the course of the co-creation sessions it has been noted that the number of changes reduced from iteration to iteration. If we look at the change from the initial version to the latest version we notice that the results/outputs of the calculator got enriched with Present Value as well as scenario thinking. These tools can help in the decision-making process such as engaging stakeholders with a financial responsibility. The potential for directly seeing the impact of a change, as well as positive and negative scenarios was regarded by many attendees as useful. What became clear is that estimating the investment as well as costs was relatively simple but estimation of the value/revenue was experienced as a more complicated matter for the target audience.

Inclusion of a 'General' section helped stakeholders to set the boundaries of the calculation, it was perceived that it helped attendees in their understanding of the process. Benchmarks were experienced as a useful tool to deal with uncertainty and make decisions. The values of the parameters set in each session were averaged to create a benchmark that was used in the latest version of the calculator.

By letting initiators decide what calculator topics were relevant to work on we found that the most interest seems to be with the topics Flexibility and End of Life. These topics naturally got more attention than the other two topics. In the sessions that were held for these topics (Health and Failure Costs/Integral) we found a limited connection between the topics and circularity.

We found that calculators help initiators of building projects approximate the circular value. It is a means to get the value of circularity out of the shadows and can act as a discussion and decision-making tool. In order to make an impact in the construction industry the Flexibility Calculator as well as End of Life Calculator are freely accessible under a Creative Commons license (Attribution-ShareAlike).

Recommendations

Since the number of initiators involved in the development of the calculators is relatively limited further research should be aimed at a quantitative validation. This is planned in a collaboration between HZ University of Applied Sciences and Avans University of Applied Sciences. In this research the calculators will be used more widely to validate the applicability and intended impact of circular value in the broader construction industry.

The Health as well as Failure Costs Calculators can be developed further. First indications show that most value can be achieved in the health domain. It would be very valuable if further research is done to find evidence for the relation between bio-based materials and absenteeism as well as productivity in a non-residential context. Other circular calculator topics that could be of interest are Building-Life Extension, End of Life Value of Existing Buildings as well as a Maintenance & Replacement Costs calculator.

More research can be done on the lacking adoption of alternative business models, such as leasing and co-ownership, in the building sector. This lack of adoption seems to be related to factors such as the average life of a building as well as the maintenance costs in relation to the upfront investment. For the heating, ventilation and air conditioning installations (HVAC) in a building alternative business models are more common practice than for the construction. Comparing the construction industry to other industries could shine a light on these mechanisms. Additional

qualitative research amongst financial institutions can be another beneficial contributor to this topic.

A discussion held in multiple co-creation sessions was the definition of value. It was noted that the financial dimension of the calculator is one of many aspects, such as climate impact, experiential value or scarce material depletion. It is important that work concerning true costs and pricing, such as Life Cycle Analysis are continued.

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Blockchain Technology and Circular Economy

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Abstract

Can the blockchain be the infrastructure of the circular economy paradigm? In the present paper, we first explore the blockchain and circular economy concepts and consider why and how they could interact. Our inquiry of the literature provides a positive theoretical answer. However, shortcomings are also reviewed in terms of their practical implementation. Much will depend on how the blockchain technology and its functionalities (e.g., smart contracts, distributed autonomous organizations) will be able to support the circular economy ecosystem.

Keywords

Blockchain, Circular Economy, Supply Chain.

1. Introduction

Blockchain technologies promise to bring disruptive changes at several levels well beyond the realm of cryptocurrencies, in which they were first deployed. The academic literature exploring the potential institutional applications of blockchain technologies is in its infancy but is proliferating. We aim to tap into this stream, focusing on the exploration of the potential intertwining of blockchain technologies with the circular economy.

It has been claimed that government, governance, and classical economic paradigms are challenged by the possibilities that could potentially arise from the development of decentralized political and socio-economic systems (among many: Swan, 2015; Tapscott & Tapscott, 2016; Mougayar, 2016; Markey-Towler, 2018). A first systemic shift came with the Internet (Akgiray, 2019); the blockchain could prove to be the next step.

The application of this technology could result in a transformation[6] of the functioning of society, converging into decentralized networks run by trust machines[7]. Given that the blockchain has the chance to become the next dominating infrastructure, would the current market paradigm be modified? If so, how? The blockchain in its purest form (public) is completely horizontal and decentralized; therefore, there would be neither a central authority nor trusted intermediary, while nowadays hierarchy, often coupled with the linearity of processes, is intrinsic in societies and enterprise models. Thus, what impact can blockchain applications such as *autonomous agent*, *smart contracts* and *smart properties* or *distributed network organizations* have? Such applications are already being used in finance and cryptocurrencies, but the merging of these with the big paradigm of the circular economy shows the premise for unsettling current market mechanisms (e.g., creating the *circular supply chain* and *circular advantage)*. This paradigmatic shift should be based on a trusted, immutable and secure technological framework that needs to ensure benefits while minimizing weaknesses and risks; the blockchain. However, when considering the implementation of this technology several challenges must still be addressed to unlock its potential. The circular economy has also failed to show its full potential so far. Will the blockchain help to unlock it? Sustainability and circularity are two of the current societal challenges which can be addressed by the pairing of the blockchain with the concept of the circular economy (Faber and Jonker, 2019). How?

To answer this question, we aim to speculate and understand why blockchain technologies could be implemented in the circular economy. Research on the literature of both topics has been carried out in order to identify similarities, differences, and challenges to be faced for to the development of a relationship of mutual benefit between technology, market, and therefore society. The two concepts will be first introduced to then discuss and conclude why and how the topics could fit well according to our research. We believe this merger to be possible as long as the relevant challenges raised by the pairing of blockchain technologies and the principles of the circular economy are addressed properly. The circular economy ecosystem must still be built and the blockchain's unique qualities may play a crucial role in the large-scale implementation of this economic paradigm. However, there is still a long way to go. Future research suggestions will be presented at the end of this article.

2. Background

2.1 An overview of the blockchain

In 2008, Satoshi Nakamoto's paper, "Bitcoin: A Peer-to-Peer Electronic Cash System," formed the basis of modern blockchain-based cryptocurrency innovation. He established a distributed ledger representing a network consensus of every transaction that has ever occurred (Tapscott and Tapscott, 2016) without a trusted third party. Beck and Muller-Bloch (2017, p. 1) define the blockchain as "a distributed ledger or list of data records of transactions that may involve any kind of value, money, goods, property, or votes. The blockchain is shared in a decentralized network of

[6] Transformation is a process in which available capacities and competencies are rearranged to offer a new value proposition (Jonker and de Witte 2013, quoted in Faber and Jonker, 2019, p. 223).
[7] The definition was given by the Economist (The Trust Machine, Oct. 31, 2015)

computers and based on mathematics and advanced cryptography, where each transaction can be verified by the entire network."

In other words, it is a public record kept without the requirement of a public authority (Markey-Towler, 2017). In the emerging blockchain world, there is "apparently" no space for intermediaries, and trust moves from people to the network (and its features) and even objects on the network (Tapscott and Tapscott, 2016). That is why the blockchain has been defined as a machine for creating trust (Economist, 2015), capable of disrupting how we organize and coordinate human activities (Swan, 2015).

There are currently three different yet complementary definitions of the blockchain: 1) technical – as a transparent and immutable distributed ledger; 2) business – an exchange network; and 3) legal – it replaces third parties (Mougayar, 2016). Basically everything – tangible or intangible – could be transacted within the blockchain (Swan, 2015; Tapscott and Tapscott, 2016).

Blockchains can be considered as a coordinating institution for creating new economies (Berg and Berg, 2017) or as a new "general purpose technology" (Evans, 2014). Alternatively, it can be considered as "meta-technology because it affects other technologies, and it is made up of several technologies itself […] combining game theory, cryptography science, and software engineering" (Mougayar, 2016). How these elements are combined results in three possible outputs: public, private, and consortium blockchain. Moreover, the implementation of these three types is strictly intertwined with developing blockchain systems' capacities: "Blockchain 1.0, 2.0, and 3.0. Blockchain 1.0 is currency. […] Blockchain 2.0 is contracts, the entire slate of economic, market, and financial applications using the blockchain that are more extensive than simple cash transactions. […] Blockchain 3.0 is blockchain applications beyond currency, finance, and markets—particularly in the areas of government, health, science, literacy, culture, and art." (Swan, 2015). It means that blockchain provides three levels of application: (1) Blockchain 1.0: accounting; (2) Blockchain 2.0: contractual; (3) Blockchain 3.0: community level (Faber and Jonker, 2019). Nowadays, a new evolution is being developed: Blockchain 4.0, the result of the joint use of blockchain and artificial intelligence. These implementations in technology reflect the associated value proposition of the blockchain (Angelis and Ribeiro da Silva, 2018): transaction cost (1.0); Added services (2.0); Organization boundaries (3.0); Autonomous Decision-making (4.0)

However, whatever the category may be, blockchain implementation should follow the seven design principles identified by Tapscott and Tapscott (2016): 1) Networked integrity; 2) Distributed power; 3) Value as an incentive; 4) Security; 5) Privacy; 6) Rights preserved; 7) Inclusion.

Respecting these principles should ensure the situating of positive blockchain impacts into three broad categories: solving problems, creating opportunities, and applying capabilities (Mougayar, 2016). These impacts can be envisaged in every field of application, enhancing the capacities of societies of resilience and coordination. Hayek (1945) believed that the path to a functioning economy—or society—was decentralization and asserted that a decentralized economy complements the dispersed nature of information spread throughout society. Taleb (2007, 2016) confirmed decentralized systems as more resilient to shock. The decentralization operated by the blockchain seems to enable what 2001 Nobel laureate M. Spence defines the "flow of value" (how digital technologies transform global value chains through the dynamics of information flows). As will be shown, the problem of the dispersed nature of information is crucial to the circular economy, and the blockchain, via its technical features (anonymous, transparent, immutable, and distributed) and applications (e.g., smart contracts), seems to offer a legitimate solution.

2.2 The Circular Economy

The unsustainability of the current economic paradigm has been taken for granted (Rifkin, 2012); Non-sustainability is the biggest global challenge facing humanity at the beginning of the twenty-first century (Dapp, 2018). The publication of the club of Rome (1972) and the following Brutland report (1987) clearly stated this fact many years ago. The linearity of the productive system is among its identifiable causes. Its main weakness is the inability to extend a product's lifecycle, losing value and misusing material, energy, and labor (Lacy et al., 2016). New paradigms are needed to be applied on a large scale. The so-called circular economy (CE) is currently gaining attention as an alternative model of production and consumption, a growth strategy enabling the 'decoupling' of resource use from economic growth, thereby contributing to sustainable development (Reike et al., 2018). It represents the most recent attempt to conceptualize the integration of economic activity and environmental wellbeing in a sustainable way (Murray, 2015) to rethinking and redesign how economies work. The circular economy recognizes effective and efficient economic functioning at multiple levels – governments and individuals, globally and locally, and for both large- and small-scale businesses (Kouhizadeh et al., 2019).

Although Geissdoerfer et al. (2018) suggest that "Stahel might have introduced the concept in 1982 talking of a self-replenishing system that minimizes material and energy input as well as environmental deterioration without negative influences on growth and progress", the term was first used in the book "Economics of Natural Resources and the Environment" (D. Pearce and R. K. Turner, 1991). Then, the publication of "Cradle to Cradle: Remaking the Way We Make Things" (M. Braungart and W. McDonough, 2002) facilitated wider public discussion on the topic. Further pioneers such as Ernst U. von Weizsäcker et al., with "Factor Four: Doubling Wealth, Halving Resource Use" or Gunter Pauli and his "Blue Economy" (2010) contributed markedly to the debate. Currently "the circular economy is a generic term for an economy where growth is decoupled from scarce resource use" (Lacy et al., 2016). The term is so generic that, as highlighted by Kirchherr et al. (2017), it is possible to gather 114 definitions of a circular economy. In an attempt to find common ground among the different interpretations studied, the same authors presented the following definition:

"*A circular economy describes an economic system that is based on business models which replace the 'end-of-life' concept with reducing, alternatively reusing, recycling and recovering materials in production/distribution and consumption processes, thus operating at the micro-level (products, companies, consumers), meso level (eco-industrial parks) and macro-level (city, region, nation and beyond), with the aim of accomplishing sustainable development, which implies creating environmental quality, economic prosperity and social equity, to the benefit of current and future generations*."

Practitioners' definitions are much more concise, placing a greater focus on the relationship between materials and products. In fact, according to the Ellen MacArthur Foundation (2015), "We can define circular an economy that is restorative and regenerative by design and which aims to keep products, components, and materials at their highest utility and value at all times, distinguishing between technical and biological cycles." "Material use is of two types: biological (renewable) materials, designed for reuse and ultimate return to the biosphere, and technical (nonrenewable) materials, designed to move back and forth between production and consumption with minimal loss in quality or value" (Lacy et al., 2016). Moreover, "it is conceived as a continuous positive development cycle that preserves and enhances natural capital, optimizes resource yields,

and minimizes system risks by managing finite stocks and renewable flows. It works effectively at every scale" (Ellen MacArthur Foundation, 2016), being able to create a so-called *circular advantage*. This can be defined as the competitive edge gained by organizations adopting circular economy principles as a core element of their growth strategies (Lacy et al., 2016). Concisely, "its value drivers include extending the regeneration of natural capital and the useful life of finite resources, maximizing the utilization of assets and creating new use cycles for end-of-life assets" (Askoxylakis et al., 2017) thus resulting in a circular supply chain (Lacy and Rutqvist, 2015).

Nowadays, supply chain currently "depends on organizations' networks, since one single enterprise does not own the entire set of skills and resources required to deliver its value proposition (Taylor et al., 2001 cited in Geissdoerfer et al., 2018). These network configurations are variable according to specific attributes (such as dynamic behavior, level of trust between nodes, distribution of risks or benefits, geographical dispersion, etc.), characteristics of each organization representing the network node and also product type (Taylor et al., 2001 quoted in Geissdoerfer et al., 2018). The configuration can be linear or circular; each has its own way to be managed. Geissdoerfer et al. (2018) provide a definition of circular supply chain management (CSCM), viewed as "the tool to close, slow, intensify, narrow, and dematerialize material and energy loops to minimize resource input into and waste and emission leakage out of the system, to improve its operative effectiveness and efficiency and generate competitive advantages." This can lead to the development of new business models and economic interactions among market stakeholders, favored by the development of decentralized structures and integrated management for the supply chain thanks to the blockchain (Rubio et al., 2018). For example, Lacy et al. (2016) identified five new types: i) the above-mentioned *Circular Supplies* business model; ii) the *Recovery and Recycling* business model (also known as *Resource Recovery*); iii) the *Product Life Extension* business model; iv) the *Sharing Platform* business model; v) the *Product as a Service* business model. Each one of these business models has its own particular specificity that is reflected in the way the different systems are organized. Such specificity can also be observed in the blockchain too; the different levels of applications (accounting, contracting, and community) reflect different levels of integration with the different business models mentioned above, with particular concern with governance and functioning of the network (R. Casado-Vara et al., 2018).

Research is beginning to investigate use cases. An example case involves the Product Life-Extension business model, in which by using the blockchain companies can monitor real information on the life cycle of materials and products and determine initiatives to extend their life cycle (Kouhizadeh et al., 2019; Faber and Jonker, 2019). Similarly, the blockchain may be suitable for the implementation of the product as a service model (Vogel et al., 2019).

There are several initiatives currently underway to implement the circular economy. The main actors are legislative and governmental bodies, NGOs, and consultancy firms. The plurality of the implementers is reflected in the absence of common ground (Kalmykova et al., 2017). Among the primary challenges related to the circular economy, those related to business models can be mentioned, such as data ownership, data sharing, data integration, collaboration and competence requirements (Antikainen et al., 2018). Many of these can be addressed thanks to digitalization. In fact, it has been claimed that pairing digitalization with circular economy principles can transform the relationship between the economy and both materials and finite resources, unlocking additional value and generating positive outcomes (Ellen MacArthur Foundation, 2016). In practice, cloud computing, big data, and constant information innovations can lead to greater insight into a product or the price, availability, and performance of a service (Lacy et al., 2016). Synthetically,

digital solutions can enable circular business models through automated monitoring, control and optimization of resources and material flow by providing accurate information on the availability, location and condition of products (Antikainen et al., 2018). Information on the quantity and quality of products and their raw material contents must be collected and retained, resulting in the need for continuous dialogue in order to create and share information. This process can be improved thanks to information systems supported by blockchain technology that will affect circular economy performance at multiple levels (Kouhizadehet al., 2019) thanks to the so-called Internet of things (IoT). The sensory networks of the Internet of things (IoT) enable the measuring of real-life phenomena (Dapp, 2018). In his book, "The zero marginal cost society" (2014), Rifkin clearly expressed its potentialities. As is now known, in order to be fully operative, the IoT requires *intelligent assets* that must be governed in the case of the circular economy "by three underlying attributes enabling circularity: location, condition, and availability" (Askoxylakis et al., 2017). These intelligent assets could be placed on the blockchain thanks to its technological features. As suggested by Askoxylakis et al. (2017), blockchain-based mechanisms can effectively enable the transfer of asset ownership directly between parties participating in the circular economy while introducing trust, efficiency, and automation in asset exchange contracts (fig. 5). On the possible integration between blockchains and the IoT, Conoscenti et al. (2016) provided a systematic literature review, while an analysis of challenges and opportunities is provided by Reyna et al., 2018.

3. Discussion - How can the blockchain be suitable for the circular economy?

As highlighted above, the coordination of material and information flows within the circular economy is crucial. Information sharing is an urgent requirement in supply chains, especially with greater interest of industry 4.0 developments and digitization (Kouhizadeh et al., 2019). To this end, digitalization is considered one of the enablers of the circular economy due to its building of visibility and intelligence into products and assets (Antikainen et al., 2018). The interplay between the circular economy and intelligent asset value drivers is already proving fertile ground for innovation and value creation; "it is now people-people, people-things, and things-things."[8] In such a framework there is no space for trusted intermediaries. Blockchains are a low-cost market disruption to any business acting as a middleman. People will be able to connect, share, and transact directly with one another. The blockchain will enable the creation of decentralized networks that can operate using alternatives such as smart contracts and provide economic incentives to their participants via cryptocurrencies (Mougayar, 2016; BitcoinBanc, 2016).

In practice, the blockchain allows individuals to carry out their work and be compensated inside new circular and self-contained economies with their own currency and work units (Mougayar, 2016; BitcoinBanc, 2016). Since there is no intermediary operator, the value produced within these platforms can be more equally redistributed among those who have contributed to its creation (De Filippi, 2018). Moreover, according to the Mougayar (2016) these processes will open a new chapter in the nature of work and its organization, raising the opportunity for a more equal redistribution of the means of production, both digitally and physically, as a type of "platform cooperativism" (De Filippi, 2018). However, in an assessment of the real improvements offered by

[8] https://blockgeeks.com/guides/blockchain-applications/ - Consulted on February 8, 2020

the blockchain it is difficult to address potential impacts on income inequality with certainty (Novak, 2018).

The blockchain appeared on the stage as the foundation of the cryptocurrency Bitcoin, but its potential is far greater than this. It has the potential to transform traditional industry with its key characteristics: decentralization, persistency, anonymity, and auditability (Zeng et al., 2016). The potential benefits do not stop here. In his 1937 paper "The Nature of the Firm," the Nobel Prize winner N. Coase identified three types of costs in the economy: search, coordination, and contracting. The blockchain can reduce each of these by addressing two problems of traditional governance structures: (1) principal-agent dilemma, and (2) high transaction costs of coordination (Blockchain hub, 2017). The blockchain can achieve this through the application of software that can be implemented into it. Until now the most developed have been *smart contracts.* N. Szabo coined the phrase in 1994, defining a smart contract as "a computerized transaction protocol that executes the terms of a contract. The general objectives of smart contract design are to satisfy common contractual conditions (such as payment terms, liens, confidentiality, and even enforcement), minimize exceptions both malicious and accidental, and minimize the need for trusted intermediaries. Related economic goals include lowering fraud loss, arbitration and enforcement costs, and other transaction costs."[9] In other words, smart contracts contain a set of values and only unlock those values if the predefined conditions are met (Faber and Jonker, 2019). Either identified as *autonomous agents* (software that makes decisions and acts on them without human intervention) applied on a large-scale, these can give rise to:

Decentralized Autonomous Organization – DAOs, which can be seen "as the most complex form of a smart contract, where the bylaws of the decentralized organization are embedded into the code of the smart contract, using complex token governance rules" (Blockchain hub, 2017) that requires little or no traditional management or hierarchy to generate customer value and owner wealth.

Decentralized collaborative organizations – DCOs, which may represent a more cooperative form of crowdsourcing, sometimes referred to as "platform cooperativism" through which users qualify both as contributors and shareholders of the platforms to which they contribute (De Filippi, 2018).

Distributed application – Dapp, a set of smart contracts that stores data on a home-listings blockchain.

The implementation of smart contracts, which can be used for supply chain process management and even process reengineering (Kouhizadeh et al., 2019), and the broad diffusion of DAOs, DCOs and Dapps, can easily reshape the boundaries of a company, dropping Coase's search costs and coordination costs and giving the opportunity to enterprises to disaggregate into more effective networks. This process seems familiar to the particular process enhanced by the circular economy; it involves entire networks of production and a diffusion of responsibility throughout these networks is prevalent (Murray et al., 2015). This decentralization, which would result in a shift in the system from vertical and hierarchical to circular and horizontal, consequently poses several challenges that must be addressed, concerning regulatory, governance and technological.

[9] http://www.fon.hum.uva.nl/rob/Courses/InformationInSpeech/CDROM/Literature/LOTwinterschool2006/szabo.best.vwh.net/smart.contracts.html – Consulted on February 7, 2020

As suggested, the *Circular Supply-Chain* business model that could be implemented on the blockchain can allow companies to improve the value they offer customers, operate in future-proof mode and be more competitive overall (P. Lacy et al., 2016). Moreover, the development of such an integrated technological framework could enrich the biodiversity of the market. For example, Tapscott and Tapscott (2016) identified seven network enterprises models that will be possible to adopt: i) *the Peer Producers;* ii) *the Rights Creators;* iii) *Blockchain Cooperatives;* iv) *the Metering Economy;* v) *the Platform Builders;* vi) *Blockchain Makers;* vii) *the Enterprise Collaborators*. Each of these business models promises to reshape markets and the relationships between the actors involved, resulting in an increase in the "platform cooperativism" stated by De Filippi (2018).

The blockchain may replace the model of top-down hierarchical organizations with a system of distributed, bottom-up cooperation (De Filippi, 2018) – a fundamental aspect of the circular economy is the involvement of consumers in a sharing or servicing the economy (Kouhizadeh et al., 2019) – representing a technological instrument that can enable the creation of value and provide a solid and reliable infrastructure.

4. Conclusions

The decentralization initiated by the blockchain and its subsequent impact, must be studied in greater depth to find legitimate solutions to the challenges posed to the market's current functioning. As Arruñada (2018) suggests, law and regulatory agencies will have much of the responsibility in dealing with these new phenomena and they will inevitably be responsible for regulating them, assessing the limits that must not be overstepped. Blockchain implementation on a large-scale still faces several challenges before it can unlock its proclaimed potential. It is possible at this juncture to place these challenges into three categories: technical aspects (e.g., governance), the development of business models and correlated incentive mechanisms (e.g., scalability is a critical barrier originating from the immaturity of blockchain technology – Kouhizadeh et al., 2019), and legal aspects (e.g., applicable regulations).

This also holds true for the application of the circular economy on a large scale. The transition towards larger scale application will require the ability to manage disruptiveness and radical innovation in the industry and to overrun the barriers suggested by the literature: financial, structural, operational, attitudinal and technological (Ritzén and Sandström, 2017).

Hence, the availability of the right technology appears to be paramount for its implementation (Kirchherr et al., 2018), since the idea of the circular business model is that the ecosystem (such as the blockchain) and not any one company closes the loop (Antikainen et al., 2018). This shared particularity, combined with the technological features of the blockchain technology (e.g., transparency and traceability of the processes of the supply chain follow from the unique construction of the blockchain (Faber and Jonker, 2019), give rise to a suggestion that, on a theoretical level, it is possible to imagine the active cooperation and combined implementation of these two concepts to attain shared societal benefits. For example, we consider plausible the idea of the implementation of the circular economy through private blockchains or consortium models, in which public and private ledgers are integrated in order to ensure distributed governance, control, and benefits. This integration process will have to take into account the development of new business models, such as those identified by Talpscott and Talpscott (2016), which can possibly lead to a change in the structure and boundaries of the market, even resulting in the redistribution

of wealth and wellbeing (Novak, 2018). However, this is another claim that must be proven. The development and implementation of novel technology does not guarantee that it will be used and be successful. For example, the principal obstacle to the proliferation of blockchain technology is the cost involved in its application (Rubio et al., 2018).

Further research is required to gain a greater understanding of the underlying motivators and barriers that will lead to or discourage the adopting of blockchain technologies for supply chains (Francisco and Swanson, 2018). Most blockchain-based articles do not focus on potential use cases and motivation factors that favor the use of blockchain (Vogel et al., 2019). Moreover, this adoption will imply a change in the organizational culture of the supply chain and a more integrated vision in which there are no individual motivations but synergistic transactions in favor of the entire chain (Rubio et al., 2018). Solutions are currently under development. For example, Dapp (2018) proposes a new system which could motivate people to act more sustainably while remaining decentralized, self-organizing, multi-layered, and circular thanks to a multi-dimensional and multi-layered incentive (and feedback) system based on cryptocurrencies.

The real capacity for the unlocking of the potential benefits espoused by practitioners and enthusiasts will only become plausible via practical implementations and assessments of their impact, while bearing in mind that a circular economy requires broader and more inclusive supply chains, not only in industry but in communities, both individually and in terms of households. This dispersion and variety of actors causes difficulties in identifying, developing, and maintaining reliable circular economy sourcing (Kouhizadeh et al., 2019).

However, the real capacity for the unlocking of the potential benefits espoused by practitioners and enthusiasts will only become plausible via practical implementations and assessments of their impact. Multiple and single-use cases may serve this purpose. We need to bear in mind that a circular economy requires broader and more inclusive supply chains, not only in industry but also in communities (Kouhizadeh et al., 2019), which means considering all the sustainability dimensions of the entire process. Although several impact assessment tools are to be adopted, these will probably need to be adapted to adequately address the goals and issues that communities will establish for themselves.

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Consumer perspectives on refurbished products: A systematic literature review

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Abstract

A transition to a circular economy is believed to be able to harmonize economic growth with environmental protection. To achieve this, a shift is required not only on the production side, but also on the consumption side. However, consumers may be reluctant to abandon traditional consumption patterns. This paper focuses on consumer perspectives on refurbishment, which is one of the prominent strategies in the circular economy. Refurbishment prolongs products' lifetimes by bringing them to a good working condition, which helps to retain value in products for a longer time. In addition to selling refurbished products, the potential of refurbishment in the circular economy also seems to be in combination with access-based business models, within which products are refurbished between leasing cycles. The purpose of this paper is to bring together and analyze existing literature on consumer acceptance of refurbished products through a systematic literature review. The systematic literature review was guided by the following research question: What is known about consumer acceptance of refurbished products? Four databases were searched, and the final sample consists of 28 studies. The results are organized into five themes identified in the reviewed literature, namely drivers, barriers, other factors influencing consumer acceptance of refurbished products, differences between product categories, and comparison of refurbishment and other sustainable strategies. Finally, suggestions for future research are presented.

Keywords

Consumer acceptance, refurbishment, circular economy, systematic literature review

Introduction

A linear model of production and consumption, in which raw materials are used to produce goods, which are then sold, used, and discarded, has dominated the evolution of global economy (Ellen

MacArthur Foundation, 2015). However, growing challenges of this model are causing a shift towards seeing materials as assets to be preserved instead of their continuous consumption (Stahel, 2016). Harmonizing economic growth and environmental protection might be achieved through a transition to circular economy (Lieder & Rashid, 2016). Circular economy can be defined as: "*a regenerative system in which resource input and waste, emission, and energy leakage are minimised by slowing, closing, and narrowing material and energy loops. This can be achieved through long-lasting design, maintenance, repair, reuse, remanufacturing, refurbishing, and recycling*" (Geissdoerfer et al., 2017:p.766).

This article focuses on refurbishment, i.e. a process of returning a product to a good working condition, which can be done by replacing or repairing major components that are faulty or close to failure, and by making 'cosmetic' changes to update its appearance. In general, the warranty as well as the performance might be less compared to a new product (Ellen MacArthur Foundation, 2013). These products are also usually priced lower than new ones, Mugge, Jockin and Bocken (2017) suggest that the difference is approximately 30% of the price of a new product.

Refurbishment has potential environmental benefits since it aims at retaining value in products and materials and thus contributes to reduction and slowing down of flows of energy, materials and goods (Hunka, Linder & Habibi, 2021). Bressanelli, Saccani and Perona (2022) showed that the refurbishment of washing machines allows to achieve a reduction of about 25 kg CO_2 eq. per year per household, together with a lower average total cost of ownership compared to a linear model.

Refurbishment (together with remanufacturing, repair and direct reuse) was identified at the G7 meeting as one of the priorities to be tackled by the alliance (European Union, 2017). In 2018, the global market for refurbished consumer electronics was estimated to be 10 billion dollars (Rallo, 2018) and the demand is growing. For example, the demand for certain categories of high-tech products (connected watches and game consoles) in France increased by more than 200% between February 2021 and February 2022 (Statista, 2022). The potential of refurbishment does not lie only in selling refurbished products. It also seems to be a viable strategy in combination with access-based business models where the product is refurbished between leasing cycles (see, e.g., Sumter, Bakker & Balkenende, 2018).

Despite this growing popularity, consumers still perceive many barriers to refurbished products. In fact, there are some groups of consumers who would never purchase such products (Akkucuk, 2011; Esmaeilian et al., 2021; Mahmoodi and Heydari, 2021). As suggested by Camacho-Otero et al. (2018), consumer acceptance is a critical factor hindering the diffusion of circular business models since it requires important changes in consumption such as, in case of refurbishment, giving up newness. Based on a systematic literature review on circular economy, Lahane, Prajapati and Kant (2021) concluded that consumer behavior towards used products is still a not much explored area. The purpose of this paper is therefore to bring together and analyze existing literature on consumer acceptance of refurbished products. This paper addresses the following research question: *What is known about consumer acceptance of refurbished products?* The paper is structured as follows. First, the process of literature search and selection is described, then, the results are presented. The results are organized into five sections reflecting the themes identified during the review process. They are focused on the factors that influence the acceptance of refurbished products, differences between product categories, and a comparison of refurbishment and other sustainable strategies. The results are followed by discussion with suggestions for future research.

Methods

A literature search was conducted using four databases, namely Scopus, Web of Science, ProQuest and Ebsco. The search query is shown in Table 1. Studies eligible for inclusion were those (1) written in English language, (2) with a considerable focus on the consumer perspective on refurbished products, (3) reporting the results of a primary research. Papers focusing on refurbished buildings were not taken into account, which is also reflected in the search query. Grey literature such as master theses was also included. This decision was motivated by the fact that the literature on the subject is quite scarce and also by the fact that including grey literature in the systematic reviews is believed to better inform practice (Adams, Smart & Huff, 2017).

Table 1 – Search query

refurbish*	AND		consumer* OR user*	AND	attitude OR acceptance OR perception OR willingness OR adoption OR motivation* OR barrier* OR driver*	AND NOT	building*

The initial search produced 433 results, of which 107 were from Scopus, 71 from Web of Science, 19 from ProQuest and 236 from Ebsco. After removal of duplicates, and title and abstract scanning, 40 papers were selected. 4 of them were excluded due to inaccessibility, 8 were excluded based on fulltext reading and 2 were excluded because they were conference papers that were later extended to journal papers containing more information, and these journal papers were included. Two additional papers were identified through a backward search. In total, 28 studies were included in the review. A table containing all the reviewed studies and the information on the product categories they focused on can be found in the appendix.

Results

This section focuses first on drivers and barriers consumers perceive towards refurbished products. The following part is dedicated to the influencing factors that are not classified as drivers or barriers. These are divided into three sections; the first one deals with product appearance, the second one focuses on information, knowledge and awareness, and the last one contains other factors such as brand, seller, warranty and distribution. After the influencing factors, differences between various product categories are presented. Finally, the last part of the Results sections is devoted to comparison of refurbishment and other sustainable strategies.

Drivers

Both environmental and financial benefits are often cited as main drivers for purchasing refurbished products (Holmström & Böhlin, 2017; Koistila, 2020; Nasiri & Shokouhyar, 2021; Ratering, 2020; Sharifi & Shokouhyar 2021; van Weelden, Mugge & Bakker, 2016; Wallner, Magnier, & Mugge 2020). Furthermore, characteristics such as environmental concern (Wallner, Magnier & Mugge, 2021) and pro-environmental attitude (Harms & Linton, 2016) were also found to have an impact

on acceptance of these products. However, the majority of authors agree that the most important motivation to buy refurbished products are financial benefits (Chen, Wang & Jia, 2020; Mugge, Safari & Balkenende, 2017; Nasiri & Shokouhyar, 2021; Ratering, 2020; Snel, 2021; van Weelden, Mugge & Bakker, 2016). In line with this, Liu and Tsaur (2020) showed that government subsidies in interaction with attitude positively influence purchase intention. The importance of price reduction is highlighted by van Weelden, Mugge and Bakker (2016) stating that most of their interview participants would opt for a new rather than refurbished mobile phone if they did not consider money. To attract consumers and become the reason to choose refurbished, the price difference must be significant (Mugge, Safari & Balkenende, 2017; Ratering, 2020). Even those who say that they would not be influenced by price reduction might change their mind when the price is low enough (Snel, 2021). On the other hand, van Weelden, Mugge and Bakker (2016) point out that consumers might perceive low price as an indicator of poor quality of refurbished products, and that an optimal price balance should be found. In contrast with previously mentioned findings, based on the analysis of Twitter data, Sharifi and Shokouhyar (2021) concluded that environmental factors appear to be a more important motivator than financial ones. Mugge, Jockin and Bocken (2017) even found no effect of perceived financial benefits on purchase intention, while perceived environmental benefits were a significant predictor.

It seems that consumer groups do not attach equal importance to financial benefits. Although, in general, willingness to pay for refurbished products is lower than for new ones (Akkucuk, 2011; Harms & Linton, 2016), there is a fraction of consumers who would be willing to pay a premium price for refurbished (Akkucuk, 2011; Boyer et al., 2021). Duan and Aloysius (2019) found that in some situations, highly environmentally involved consumers perceive refurbished products to have superior quality and have a greater willingness to pay a premium than for new products. From the perspective of economic situation, Sharifi and Shokouhyar (2021) showed that while in developed countries, environmental motivations are slightly more important than financial motivations, the opposite applies to developing countries.

In addition to these two main drivers, van Weelden, Mugge, and Bakker (2016) identified several more – consumers might be attracted by some unique features refurbished products have and available new ones are missing, or, conversely, appreciate the absence of undesirable features new products are equipped with. In most studies, it appears that the benefits of refurbished products are considered in relation to new products. However, when comparing refurbished with second-hand, an additional benefit consumers perceive is (performance) quality (Holmström & Böhlin, 2017; Weelden, Mugge & Bakker, 2016).

Barriers

A major factor hindering the acceptance of refurbished products is perceived risk. While some authors report a negative impact of an overall perceived risk - whether on willingness to pay for refurbished (Harms & Linton, 2016) or on attitude, perceived value and purchase intention (Agostini et al., 2021), others focus separately on its components. Consumers worry about performance risk related to product's functional state or/and shorter lifetime (Holmström & Böhlin, 2017; Mugge et al., 2018; Mugge, Jockin, & Bocken, 2017; Koistila, 2020; Ratering, 2020; Snel, 2021; van Weelden, Mugge & Bakker, 2016). This might be reflected in the finding of Bressanelli, Perona and Saccani (2019) who showed that consumer acceptance of a refurbished washing machine decreases as the number of washing cycles per year increases which, according to the authors, might suggest that consumers who wash more often are afraid of breakdowns of the refurbished machine. However,

this relationship was not confirmed by Bressanelli, Saccani and Perona (2022). Another important risk is connected to fears about the product becoming obsolete faster than a new one, for instance, due to rapid technological progress (Holmström & Böhlin, 2017; Koistila, 2020; Mugge et al., 2018; Mugge, Safari & Balkenende, 2017; Ratering, 2020; van Weelden, Mugge & Bakker; 2016). Mugge et al. (2018) give an example of a concern that refurbished phones would not be able to handle future software updates. Some consumers perceive a financial risk, i.e., a fear that a refurbished device would entail service costs or that the money would not be well spent (Holmström & Böhlin, 2017; Koistila, 2020; van Weelden, Mugge & Bakker, 2016). Time risk represents the time consumer loses if a product breaks down (Holmström & Böhlin, 2017; van Weelden, Mugge, & Bakker, 2016).

Since refurbished products may have been previously owned by someone else, consumers might perceive that they are 'contaminated' by traces of the previous user (van Weelden, Mugge & Bakker, 2016; Wallner, Magnier & Mugge, 2021). This contamination can be related to hygiene (Mugge, Safari & Balkenende, 2017; Ratering, 2020; Snel, 2021). In this regard, Gülserliler, Blackburn, and Van Wassenhove (2021) found that respondents who showed preference for leasing a refurbished washing machine had a lower level of disgust than those who opted for leasing or buying new machines. In case of digital devices, certain consumers fear possible digital contamination, i.e., the data of the previous owner still in the memory or even viruses and Trojans (Mugge et al., 2018; Mugge, Safari & Balkenende, 2017; van Weelden, Mugge & Bakker, 2016). For personal products, such as wallets, consumers might feel unease about perceived traces of personality of the former owner (Mugge, Safari & Balkenende, 2017). Wallner, Magnier and Mugge (2021) came to a conclusion that perceived contamination risk has a stronger effect on purchase intention toward refurbished products than environmental awareness. That is why they suggest that more research should focus on strategies to reduce contamination, which they attempted in their subsequent study (Wallner, Magnier & Mugge, 2022). Based on a choice-based conjoint analysis considering refurbished headphones, they showed that out of six attributes, the two most important ones were related to contamination, namely, eliminating signs of aesthetic wear and tear, and replacing the ear-cushions. Interestingly, these attributes were even more important than price reduction and extended warranty.

Another important barrier identified in the literature is lack of awareness, which can mean that consumers are unaware that refurbished products exist and, therefore, do not even consider purchasing them (Holmström & Böhlin, 2017; Ratering, 2020; Snel, 2021; van Weelden, Mugge & Bakker, 2016). Unawareness can also be connected to the misunderstanding of what refurbishment means. Some consumers associate it with 'second-hand', which can lead to doubts about quality (Snel, 2021; van Weelden, Mugge & Bakker, 2016) and unawareness about warranty rights (Snel, 2021). In addition to lack of knowledge about refurbishment, Holmström and Böhlin (2017) also mention lack of knowledge about technology and resulting inability to compare specifications and therefore opting for new products as a safer option. Similarly, Van Weelden, Mugge and Bakker (2016) state that a low confidence in one's ability to judge the quality of a product increases the perceived risk. These authors also identified lack of availability as a barrier. As they explain, searching for refurbished products might be less convenient and different from habitual purchasing behavior which may prevent consumers from considering them. Holmström and Böhlin (2017), however, argue that their respondents did not consider lack of availability and visibility as an important barrier; they believe that it is rather the lack of awareness that hinders consumers from seeing the availability.

One of the reasons not to buy refurbished products identified by several authors lies in the fact that consumers would miss the thrill of newness (Holmström & Böhlin, 2017; Ratering, 2020; van Weelden, Mugge & Bakker, 2016). Other authors showed that the choice of refurbished is negatively influenced by the perceived importance between old and new (Chen, Wang & Jia, 2020) and consumer innovativeness (Mugge, Jockin & Bocken, 2017). Esmaeilian et al. (2021) found that the chance of purchasing a refurbished phone instead of a new one increases with older technology.

Other factors

Product appearance

There is a stream of literature focusing on product appearance. The presence of visual signs of wear and tear influences the acceptance of refurbished products (Mugge et al., 2018; Ratering, 2020; Snel, 2021; van Weelden, Mugge & Bakker, 2016; Wallner, Magnier & Mugge, 2022). Consumers tend to trust a product that does not look used (Ratering, 2020). As explained by Snel (2021), visible scratches might be associated with technological failure and create doubts about functionality. Mugge et al. (2018) report that their interview participants who were presented the phone with wear and tear showed more hesitation toward buying a refurbished smartphone than those who were shown an as-new phone. The importance of eliminating signs of aesthetic wear and tear is highlighted by Wallner, Magnier and Mugge (2022), who showed that in case of refurbished headphones, it was valued more than price or warranty. Snel (2021) proposes that the location of scratches is also important - scratches on the buttons or attachment can be associated with a reduced functionality. Acceptance can be hindered even more if the scratches are on the locations not consistent with the intended use, which raises concerns as to whether internal components have been broken.

In terms of product design, consumers seem to prefer robust designs (Ratering, 2020; Snel, 2021; Wallner, Magnier & Mugge, 2020) that do not contain many loose, fragile parts (Ratering, 2020; Wallner, Magnier & Mugge, 2020). Products that look repairable are also more desirable since consumers assume that they are more likely to be refurbished successfully (Wallner, Magnier & Mugge, 2020). Materials such as metal, wood, leather or glass are appreciated (Ratering, 2020; Wallner, Magnier & Mugge, 2020), whilst plastic might be perceived as unsustainable and cheap (Ratering, 2020) or less durable (Wallner, Magnier & Mugge, 2020). Wallner, Magnier and Mugge (2021) found that durability and attractiveness positively predict purchase intentions of refurbished headphones and blenders, however, the influence of these characteristics was not larger than in case of new products, which suggests that they might be universally desired features.

Wallner, Magnier and Mugge (2020) examined different design styles and came to conclusion that neo-retro design and simplistic design might improve consumers' evaluations of refurbished products. Both design styles were considered timeless. Moreover, a simplistic design was preferred because it was not connected to any particular historical time and reminded of the designs used by high-quality brands. Neo-retro design evoked feelings of nostalgia, was seen as less vulnerable to trends, looked solid and durable, and reminded of old products that were "made to last".

Information, knowledge, awareness

The tendency to buy refurbished products is positively influenced by the environmental awareness of consumers (Mahmoodi & Heydari, 2021). Although Liu and Tsaur (2020) did not find a significant direct effect of green awareness on purchase intention, they report that awareness positively

influences attitude which, in turn, impacts purchase intention. In addition, they showed that green awareness can be increased by green marketing. In contrast, Harms and Linton (2016) report no significant impact of general knowledge of environmental issues nor knowledge about recycling on willingness to pay for refurbished products. This incongruence might be partly caused by different operationalization of awareness or knowledge, or it is possible that awareness translates into attitude or purchase intention, but not into greater willingness to pay.

Another important type of awareness is knowledge about refurbishment. Familiarity and understanding of the procedures executed during refurbishment can result in greater trust in these products (Mugge, Safari & Balkenende, 2017). As shown by Mugge, Jockin and Bocken (2017), awareness of refurbishing has a positive significant impact on purchase intention and providing more information on this process can be a successful incentive to increase purchase intention. This is supported by Koistila (2020), suggesting that after clarifying the concept of refurbishment to her interview participants, some of them changed their minds and showed a greater willingness to purchase such products than at the beginning of the interview. On the other hand, Chen, Wang and Jia (2020) found that knowledge of refurbished products nor prior experience do not influence willingness to pay.

The need for information on refurbishing procedure as well as on product-specific issues such as its status and use history is also pointed out by van Weelden, Mugge and Bakker (2016). However, Mugge et al. (2018) argue that providing information about prior use might in some cases negatively influence the evaluation of refurbished products. Through an experiment, they showed that when there were no visual signs of wear and tear, participants evaluated refurbished mobile phones more negatively when they were provided verbal information about prior use. The authors believe that it is due to the incongruence between verbal and visual information, which makes participants more aware of prior use. When visual signs of wear and tear were present, verbal information did not have an impact on consumer evaluations. Duan and Aloysius (2019) showed that consumers' willingness to pay for refurbished products can also be influenced by information about the sustainable practices of the firm. Presenting the information about firm's sustainable investment generated a higher willingness to pay a premium for consumers with a higher level of environmental involvement. In contrast to pro-attitudinal information, counterattitudinal information (about reducing sustainable investment) did not have any effect.

Information can also be communicated through labels. To assure consumers about the quality of refurbished products, van Weelden, Mugge and Bakker (2016) suggest using an industry wide quality label. Harms and Linton (2016) focused on eco-certification and came to conclusion that while the willingness to pay for eco-certified refurbished products is still lower than for the new ones, it is higher compared to non-certified refurbished products, and it is positively related to pro-environmental attitude. They further propose that eco-labels might provide some information about quality even if it is not explicitly covered in eco-certification. After introducing eco-labels in their study, perceived risk lost part of its impact on willingness to pay. Boyer et al. (2021) investigated the impact of the Circular economy score, a hypothetical score indicating what proportion of a product is made of reused or refurbished parts. They suggest that consumers are willing to pay more for a slightly circular product than for a new one, however, it tends to disappear or even decrease at higher levels of circularity. When all other attributes were held constant, circular products seemed to be preferred by a greater number of consumers. Another type of label that appears in the literature is a ‘sparkling clean label’ that should indicate that the refurbished product was properly cleaned. However, consumers attributed relatively little importance to this

label compared to other strategies aiming at reducing contamination (Wallner, Magnier & Mugge, 2022).

Brand, seller, distribution, warranty

Some authors (van Weelden, Mugge & Bakker, 2016; Wallner, Magnier & Mugge, 2020) mention access to a certain brand for a lower price as a motivation to buy refurbished products. Moreover, brand image can help consumers evaluate the risks and benefits of these products (van Weelden, Mugge & Bakker, 2016). As proposed by Liu and Tsaur (2020), brand equity has a positive impact on purchase intention toward refurbished smartphones.

Confidence in refurbished products can also be supported by a good image of the seller and retail experience (van Weelden, Mugge & Bakker, 2016). To check whether a seller is reliable, consumers tend to look at reviews (Snel, 2021). Agostini et al. (2021) found that the importance paid to seller reputation is negatively connected to the perceived value of refurbished smartphones, which the authors explain by the current low level of seller reputation in the refurbished smartphone market. Another important factor when purchasing refurbished products is warranty (Boyer et al., 2021; Ratering, 2020; Sharifi and Shokouhyar, 2021; van Weelden, Mugge & Bakker, 2016). Warranty can contribute to trust in product's functional quality (Mugge et al.,2018) and to reducing concern (Mugge, Safari & Balkenende, 2017). Mahmoodi and Heydari (2021) report that 80% of their respondents would be more likely to purchase a refurbished product if a warranty was offered. Nevertheless, they also argue that money-back guarantee was a preferred option.

There are several other factors that are mentioned less frequently in the reviewed studies. Regarding distribution, van Weelden, Mugge and Bakker (2016) argue that the existence of a physical store can contribute to decreasing perceived risk connected to refurbished products. According to Agostini et al. (2021), the importance paid to distribution (in terms of existence of multiple channels) has a positive effect on perceived value and attitude and negatively impacts perceived risk. Positive attitude towards refurbished products can also be reinforced by a good previous experience with such products (Snel, 2021; van Weelden, Mugge & Bakker, 2016) and positive evaluations by other people (van Weelden, Mugge & Bakker, 2016). Mahmoodi and Heydari (2021) also point to the positive effect of perceived consumer effectiveness which reflects a positive feeling about refurbished products and the belief that using these products contributes to reducing pollution.

Differences between product categories

Mugge, Safari and Balkenende (2017) investigated consumer acceptance of 30 product categories and came to conclusion that the highest number of participants would accept a refurbished wardrobe, followed by products such as table, suitcase, office chair, drill, coffee maker, etc. Washing machine, laptop or smartphone were also among categories that would be accepted quite well. In contrast, refurbished electric toothbrush, kettle, computer mouse or sunglasses were judged as the least desirable categories. This is in line with the findings of Mahmoodi and Heydari (2021) who showed that consumers had the lowest willingness to buy refurbished personal products (including electric toothbrush and dinnerware). As they explain, this rejection is caused mainly by concerns about harmfulness of such products for consumers' health. In addition to hygienic concerns, personal products might be considered too personal (Mugge, Safari & Balkenende, 2017). According to Mugge, Safari and Balkenende (2017), consumers also have some reservations regarding food-related product categories. This is only partly supported by Ratering

(2020) who focused on home appliances and found that while products such as kettle, toaster and blender are indeed less acceptable, it does not apply to large appliances such as oven or fridge.

Essoussi and Linton (2010)[10] propose that willingness to pay for refurbished products is associated with the level of their functional risk. As their findings suggest, consumers are willing to pay a higher price for product categories with lower functional risk such as recycled paper or reused single use camera compared to refurbished cell phone, printer/fax or auto part. Similarly, Harms and Linton (2016) state that refurbished tires have the most reduced willingness to pay, which they explain by the fact that among product categories taken into account, the failure of this one would have the most serious consequences. The difficulty to check functional quality is mentioned by Mugge, Safari and Balkenende (2017) as a disadvantage of electronic products which might result in higher perceived risk compared to e.g. furniture where it can be relatively easily checked. However, Mahmoodi and Heydari (2021) report that technology products have the highest rate of acceptance (among household, personal and luxury products). Essoussi and Linton (2010) also suggest that products with higher levels of functional risk have a narrower switching range, which means that consumers switch between purchasing and not purchasing over a small price range. Nonetheless, the findings made by Akkucuk (2011) do not confirm this.

Product categories also differ in terms of attributes that are important to consumers. For instance, the greenness of products is not considered very important in case of personal products even for the consumers with a high level of environmental awareness. This group of consumers appreciates greenness more in household products, but it is still less important than quality (Mahmoodi & Heydari, 2021). Regarding appearance, Mugge, Safari and Balkenende (2017) argue that products that are visible to others or express identity should look new while utilitarian products would be accepted even with signs of wear and tear. Based on a conjoint analysis, Boyer et al. (2021) showed that appearance is a more important attribute for a mobile phone than for a vacuum cleaner. Chen, Wang and Jia (2020) compared MP4 as a hedonic product and cartridge as a functional product and found that importance paid to brand and importance paid to price only influence willingness to pay for refurbished MP4.

Refurbishment and other sustainable strategies

A few authors focused on comparing consumer perceptions of refurbishment and other sustainable strategies. Chen, Wang and Jia (2020) found that unlike remanufactured MP4 and cartridge, willingness to pay for refurbished ones is negatively influenced by importance paid to quality and in case of a MP4, also by importance paid to brand. This result might suggest that refurbished products entail more worries about quality. However, it should be noted that in this study, it was emphasized that the refurbished products were refurbished by a third party, which may have influenced the results. When comparing consumer acceptance of buying a refurbished washing machine and a pay-per-wash business model, in which users do not own the machine but only pay for the service, a refurbishment model seems acceptable for more consumers (Bressanelli, Perona & Saccani, 2019; Bressanelli, Saccani & Perona, 2022). Among consumers who would lease a washing machine, those who chose leasing new have a higher level of disgust and, interestingly,

[10] It should be noted that these authors do not investigate only refurbished products, some product categories in their study are recycled (paper), retreated (tire), refilled (toner), reused (single use camera) and they are all compared to each other.

a slightly higher pride of ownership than consumers who would lease a refurbished machine (Gülserliler, Blackburn & Van Wassenhove, 2021).

Agost and Vergara (2020) investigated consumer impressions of six wardrobes representing different sustainability design strategies, namely refurbishment, adaptability to new functions, durability, personalization, easy maintenance and flexible design. Consumers showed lower levels of product attachment and willingness to keep for the refurbished wardrobe than for all other design strategies. Moreover, refurbished wardrobe had lower evaluation in the aspects such as high quality, expensive-looking, trust in purchase. On the other hand, it scored higher in respect for the environment and sustainability. Borin, Lindsey-Mullikin and Krishnan (2013) attempted to compare purchase intentions for refurbished products, (new) green products and products from a company that engages in green processes. The authors came to conclusion that these strategies have an impact on purchase intentions, however, it is not important which one of them a company uses. They further propose that these green strategies are important mainly for pro-environmentally oriented customers. This group of customers had the highest purchase intentions towards refurbished products, although the difference from the other green strategies was not statistically significant.

Discussion

The purpose of this paper was to put together and analyze existing literature on consumer acceptance of refurbished products. There seems to be a consensus on two main motivations to purchase such products, namely environmental and financial benefit. The latter is believed to be the most important driver by many authors, however, there are situations where consumers would pay a premium for refurbished. Since it was shown that refurbished products do not always have to be viewed as inferior to new ones, further research should focus more on strategies how to increase perceived value of refurbished products. There appears to be some potential in labels, however, this is also an underexplored area in this context which is supported by the fact that out of four studies dealing with labels, each one focused on a different one (quality, eco, circular, clean). It might be worthwhile to assess the potential of a quality label suggested by van Weelden, Mugge and Bakker (2016), for instance, through a conjoint analysis.

The reviewed studies identified numerous potential barriers to acceptance of refurbished products. These comprise concerns about functional quality and obsolescence, financial risks, fear of hygienic, digital or personal contamination, lack of awareness and missing the thrill of newness. Many of the studies dealing with barriers were qualitative, further research could therefore attempt to quantify the impact of these barriers and assess their relative importance.

Several studies focused on product appearance. In this regard, visual wear and tear appears to hinder the acceptance of refurbished products. There were some inconsistencies in the reviewed studies on this subject. While Mugge, Safari and Balkenende (2017) argue that the ”as new“ look is mainly important for products that are seen, and that utilitarian products would be acceptable even with some signs of wear and tear, Snel (2021) explains that it may entail concerns about functional quality. More research is needed to quantitatively assess the impact of wear and tear on consumer preferences in utilitarian products, such as household appliances. There was also no clear consensus on the role of knowledge and information. Some authors reported a positive impact, some did not find any, and some even showed that providing certain information can be

detrimental to acceptance. Future research could look at the types of awareness that are worthwhile to be raised and the types of information that would be helpful in evaluating refurbished products.

In most studies, refurbished products are as if by default compared to new products. It would be interesting to enrich the stream of literature comparing refurbishment with other sustainable strategies as attempted by several authors cited in this review. More attention should also be paid to the acceptance of refurbishment in the context of access-based business models. Moreover, at present, many authors focus on refurbished smartphones, thus, there is a potential to deepen the knowledge concerning other product categories with different specifics.

This study has several limitations. Even though refurbishment is different from remanufacturing, some authors use the terms interchangeably (van Weelden, Mugge & Bakker, 2016) which might have led to the omission of some relevant studies. Furthermore, an extension of the search query could have led to a more comprehensive set of studies.

Conclusion

Refurbishment can lead to potential savings of material, energy, labour, and capital embedded in the product, as well as associated externalities such as greenhouse gas emissions, thus representing environmental and also economic benefits (Ellen MacArthur Foundation, 2013). However, to achieve these benefits, consumer acceptance is critical (Govindan & Hasanagic, 2018). The aim of this systematic literature review was to bring together and analyze existing knowledge on consumer acceptance of refurbished products. The final sample consisted of 28 studies. The results were organized into five categories reflecting the themes identified during the review, namely drivers, barriers, other influencing factors, differences between product categories, and a comparison of refurbishment and other sustainable strategies.

Consumers seem to be motivated mainly by financial and environmental benefits, while the former were identified as the strongest driver. By definition, refurbished products are products which have been returned to a good working condition (Ellen MacArthur Foundation, 2013), suggesting that they might not be ”as new“. In general, this is reflected in a lower willingness to pay for refurbished products. However, it was shown that some consumers do not consider refurbished products as inferior to new ones, and are even willing to pay a premium.

Regarding barriers, consumers might have concerns about functional quality, possible contamination, financial risk, obsolescence, and their acceptance is also hindered by the lack of awareness – not only lack of awareness about the existence of refurbished options, but also misunderstanding of refurbishment as such. In addition to motivations and barriers, other influencing factors comprise product appearance. In this regard, the reviewed studies focused mainly on signs of wear and tear and product design. Other factors revolve around information, knowledge and awareness, and factors such as brand image, seller reputation and warranty. Although most of the reviewed studies focused on a single product category, several authors dealt with multiple categories, which allowed to discuss the differences between them. Indeed the acceptance of refurbishment is product-specific to a certain extent. Finally, a few studies examined consumer perceptions of refurbishment in comparison to other sustainable strategies such as remanufacturing, leasing, durable design, personalization, etc.

Several avenues for future research were identified. These involve investigating the potential of labels to increase perceived value of refurbished products, assessing the impact of visual wear and tear in utilitarian products, focusing on product categories with different specifics than smartphones, and devoting more attention to consumer acceptance of refurbishment in the context of access-based business models.

By integrating the insights on consumer acceptance of refurbishment from academic literature, this paper could be beneficial for managers wishing to enhance consumer acceptance of refurbished products, whether in a ”traditional“ business model based on selling refurbished products, or as part of an access-based circular model. However, it should be noted the majority of the reviewed studies examined consumer acceptance in the context of the former. It is also hoped that this paper will provide value for researchers, by identifying avenues for future research within the topic.

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Appendix

Authors and product categories

Author	Product category	Author	Product category
Agostini et al., 2021	smartphone	Agost & Vergara, 2020	wardrobe
Nasiri & Shokouhyar, 2021	smartphone	Harms & Linton, 2016	single-use camera, cellphone, toner cartridge, printer, car tire
Sharifi & Shokouhyar, 2021	mobile phone		
Liu & Tsaur, 2020	smartphone	Essoussi & Linton, 2010	auto part, cellphone, printer/fax + re-treated tire, refilled cartridge, recycled paper
Mugge, Jockin & Bocken, 2017	smartphone		
Mugge et al., 2018	smartphone	Akkucuk, 2011	sanitary paper product, nonsanitary paper product, furniture, tire, autopart, cellphone, printer fax (not stated which products are refurbished and which recycled/retreated...but supposably the same as above)
van Weelden, Mugge & Bakker, 2016	mobile phone		
Holmström & Böhlin, 2017	smartphone		
Esmaeilian et al., 2021	Mobile phone		
Wallner, Magnier & Mugge, 2022	wireless headphones	Mahmoodi & Heydari, 2021	technology products (laptops, mobile phones), personal products (electric
Wallner, Magnier & Mugge, 2021	headphones, blender		

Gülserliler, Blackburn & Van Wassenhove, 2021	washing machine		toothbrush, dinnerware), household products (microwave oven, toaster), luxury products (branded watches)
Bressanelli, Perona & Saccani, 2019	washing machine	Ratering, 2020	general + fridge, washing machine, toaster, kettle, blender, hand blender, kitchen robot, coffee machine, over, dryer, iron, vacuum cleaner
Bressanelli, Saccani, Perona, 2022	washing machine		
Duan & Aloysius, 2019	computer		
Koistila, 2020	laptop, smartphone, tablet		
Borin, Lindsey-Mullikin & Krishnan, 2013	laser printer	Mugge, Safari & Balkenende, 2017	electric tootbrush, kettle, computer mouse, sunglasses, hanger, headphones, umbrella, vase, camera, cooking pot, wallet, iron, microwave, stereo, wrist watch, armchair, clock, laptop, smartphone, standing light, trashbin, washing machine, backpack, coffee maker, desk lamp, drill, office chair, suitcase, table, wardrobe
Snel, 2021	IPL hair removal		
Chen, Wang, & Jia, 2020	MP4, cartridge		
Wallner, Magnier & Mugge, 2020	coffee maker, headphones, radio		
Boyer et al., 2021	robot vacuum cleaner, mobile phone		

Paradoxical Tensions in Circular Startups

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Abstract

Circular startups face paradoxical tensions in their attempt to change the linear economic system into a circular one. This study examines 13 circular startups in a German incubation program. An inductive qualitative analysis reveals three types of tensions – conventional, sustainability and circular – and how circular startups manage them.
Circular startups experience paradoxical tensions in developing their business models and following the goal of transforming the economy into a circular one. In order to better understand the different tensions and how they are evoked, we apply a paradox theory lens to examine different types of paradoxical tensions in circular startups. For that, we followed a grounded theory approach and interviewed and observed 13 startups in a German incubation program over one year. This study finds three types of tensions that emerge through the circular startups' self-identity and goal orientation: conventional, sustainability and circular tensions. Conventional tensions can emerge in every startup, while sustainability and circular tensions are specific for startups with a focus on sustainability or the circular economy. Sustainability tensions emanate through the attempt of contributing to economic, environmental and social goals. Circular tensions are due to the specificity of circular startups trying to transform supply chains into value networks through systemic thinking. Apart from these types of tensions originating from within the circular startups, expectations and interests from stakeholders are posed upon the circular startups. Two exemplary stakeholders - jury members and the financing organization - are selected to showcase diverging expectations. Instead of aiming for alignment between the diverging interests and contradictory aspirations, we argue that experiencing paradoxical tensions as an early-stage startup prepares circular startups to manage tensions later on.

Keywords

Circular startups, paradox theory, paradoxical tension, incubation program

Introduction

Since recently, circular startups are a fast-growing alternative approach to directly address societal grand challenges. As a specific case of a hybrid business (Hahn et al., 2014), circular startups integrate circular strategies in their business model in order to limit resource use and expand product-life cycles (Henry et al., 2020). Further, they apply systems thinking to understand supply chains and transform them into value networks (Bocken et al., 2017; Geissdoerfer et al., 2017). As such, circular startups directly target the societal grand challenges of climate change mitigation (Howard-Grenville et al., 2014) and the management of non-renewable and renewable resources (George et al., 2018). However, due to the complex and contentious aim for systemic change comprising environmental targets and social inclusivity (Jaeger-Erben et al., 2021), circular startups inevitably experience *paradoxical tensions* in their daily operations as highlighted by De Angelis (2021) and Morales (2020). These tensions for example encompass the need of rearranging organizational structures towards more vertical ones (De Angelis, 2021) and creating new processes and knowledge for developing radical innovation (Ritzén & Sandström, 2017).

To better understand paradoxical tensions, paradox theory offers effective responses to paradoxical experiences that simultaneously engage seemingly opposing sides (Putnam et al., 2016; Schad et al., 2016; Soderstrom & Heinze, 2021; Schneider et al., 2021). Paradox theory puts great attention on the integrative and generative potential of competing demands (Smith & Lewis, 2011) which is useful in contexts in which startups aim at providing social, environmental and economic value simultaneously (Hahn et al., 2018). Further, paradox theory acknowledges the complexity that circular startups experience in pursuing higher levels of circularity (Henry et al., 2020) through more disruptive and radical innovations in product, process and business model innovation (Blomsma et al., 2019).

Hence, employing a paradoxical lens on circular startups enables us to take a more generative stance while remaining cognizant of the complex challenges inherent in circular approaches (cf. van Bommel, 2018; Smith & Lewis, 2011). Thus, we ask: *What types of paradoxical tensions emerge in circular startups?* and *How do circular startups balance and imbalance tensions in pursuing system change?*

To examine these questions, we conducted an in-depth empirical study following 13 circular startups participating in an impact incubation program in Germany. We collected qualitative data through 20 semi-structured interviews with the circular startups, six interviews with the program managers of the incubation program, several hours of participatory observation in meetings and workshops and documents such as filled business model canvases and pitch decks. During the observation, field notes were taken by the researchers that supplement the interview transcripts. Adhering to principles of grounded theory (Strauss & Corbin, 1998), all data was analyzed iteratively going back and forth between theory, previous research and initial findings. In this short paper, we present preliminary findings with a particular emphasis on the first research question.

Theoretical Background

Circular Startups

By reviewing the literature on the circular economy, Brown et al. (2019) find a shared understanding concerning the goals and principles dominating the circular economy literature that are "(1) replacing linear systems with intentionally designed regenerative and restorative circular systems, (2) decoupling economic growth from non-renewable material throughput and environmental degradation, (3) increasing system resilience and (4) maximizing value creation, capture and recovery across economic, social and ecological values" (Brown et al., 2019 after Masi et al., 2017). These goals and principles require rethinking the role of business and its activities including design and innovation processes (Geissdoerfer et al., 2017). Hence, new forms of cooperation leading to new stakeholder relationships and new forms of organizing supply chains and value networks are an inherent part of the circular economy (Tapaninaho & Heikkinen, 2022). Similar to sustainable startups, circular startups are confronted with several expectations as they are perceived "as new market entrants [that] can adopt CBMs from the start, take a holistic perspective at their business model and monetize design-to-last and maintenance efforts" (Henry et al., 2020, p. 3). Developing a successful circular business model, contributing to systemic change, building new value networks and ecosystems at the same time as applying systems thinking and innovating radically in experiments seems to be a rather challenging undertaking, especially when diverging stakeholder interests exist (De Angelis, 2021). Consequently, paradox theory supports a closer examination of existing tensions in circular startups as well as how they respond to them.

Paradox Theory

Paradoxical tensions in organizations can occur when "contradictory yet interrelated elements (...) exist simultaneously and persist over time" (Smith & Lewis, 2011, p. 382). In the case of startups aiming for a sustainable circular economy, these are often linked to the existence of several - sometimes conflicting - strategic goals, such as satisfying sustainability-oriented customers whilst fulfilling other shareholders' demands such as generating profits or providing products and services in the most sustainable design while maintaining a low price (van Bommel, 2018).

Smith and Lewis (2011) categorize organizational paradoxical tensions into four types: learning, performing, organizing and belonging. *Learning* relates to knowledge creation and use as well as the creation of more or less radical innovation related to a temporal perspective, navigating between incremental changes on the foundation of the old and destroying the preexisting through radical transformations. *Performing* tensions occur through divergent understandings of organizational success posed from different stakeholders such as sustainability impact and profitability. *Organizing* concerns the design of organizational structures and logics such as the culture practicing competition or cooperation or leadership types fostering flexibility or control. *Belonging* reflects questions of identity of individuals and the organization as a collective such as perceiving yourself as a changemaker or rather an entrepreneur.

The theoretical approach of paradoxes is used in research since several years to explain challenges in sustainable circular businesses as it enables scholars to extract more complex insights (cf. Hahn et al., 2014; Hahn, 2018; van Bommel, 2018; Van der Byl & Slawinski, 2015). Despite this general

advantage, previous research on paradoxical tensions in circular startups remains fairly scarce. Solely incumbent businesses have been analyzed with a paradoxical lens such as De Angelis (2021), who provides first conceptual ideas how different types of paradoxical tensions can occur in circular businesses developing and changing towards circular business models. Daddi et al. (2019) apply a multiple case study approach and find both defensive and proactive ways of circular businesses coping with tensions such as implementing new technologies, investing or certification. Morales (2020) examines nine cases of circular businesses of different size and age focusing on the tensions related to eco design and the use of secondary raw material.

Methodology

To establish an initial understanding of paradoxical tensions in circular startups, we apply a grounded theory design for collecting and analyzing qualitative data (Strauss & Corbin, 1998). Grounded theory is a common approach in analyzing paradoxical tensions and how organizations manage them (Fairhurst & Putnam, 2019) as well as in entrepreneurship research (Mäkelä & Turcan, 2007). Thus, our study approaches the objects of analysis in an open manner while reflecting on the categories of tensions by Smith and Lewis (2011), which is particularly suitable here due to the nascent stage of research on circular startups (Henry et al., 2020; De Angelis, 2021; Morales, 2020)

Sampling Strategy and Data Collection

For the purpose of this study, we examined two cohorts of circular startups participating in an incubation program. Each cohort participated for six months in the incubation program which has a focus on collaboration, circular economy and impact. Due to the COVID-19 situation, the program mostly took place digitally with single events on site. Startups were not allowed to have registered their business beforehand and are supposed to be at an early stage. The team members of the selected startups received a stipend over six months and were encouraged to participate in workshops, coaching, lectures and discussions concerning business model development, circular strategies and legal requirements for founding a business.

The researcher was introduced to the startups at the beginning of the program and the interviews and participatory observation were communicated as mandatory for the participants. In 20 semi-structured interviews ranging from 45-80 minutes with the 13 startup teams, six interviews with the program team and 25 hours of participatory observation, we gained in-depth insights in the startups' experiences. The interviews were recorded and transcribed verbatim while notes were taken during the observations in workshops, lectures, and feedback meetings. In addition to the interviews and rich observations, we collected documents such as pitch-decks and filled business model canvasses to enable data triangulation (Yin, 1994). All data was collected during 2021, starting with the selection process of the members including the decisive jury meeting up to the final pitches of the startups at the end of the program.

Data Analysis

Typically for grounded theory, initial steps of the analysis began while data collection still took place (Mäkelä & Turcan, 2007). At first, the transcripts and notes were analyzed through an iterative and

inductive manner while reflecting upon the types of paradoxical tensions in conventional businesses suggested by Smith & Lewis (2011) and incumbent circular businesses as researched by De Angelis (2021), Morales (2020) and Daddi et al. (2019). Starting with open coding of all data types, first categories are derived from the interviews and notes which was followed by axial and selective coding (Strauss & Corbin, 1998).

Preliminary Results

The results are divided into two aspects, namely the types of tensions stemming from their self-identity and goal orientation and the tensions evoked by stakeholder expectations. Due to the early stage of the analysis, we can share only preliminary results at this stage.

First, it appears that the startups faced general tensions that emerged most likely through their nascent stage in developing a functioning organization that are not specific for circular startups which we call 'conventional tensions'. Second, other tensions emerged due to the orientation towards economic, environmental and social goals that are typical for startups in the realm of sustainability that can be termed 'sustainability tensions'. Third, 'circular tensions' are due to the specificity of circular startups trying to transform supply chains into value networks through systemic thinking.

Types of Tensions

Conventional Tensions

These tensions can occur in every startup independently from their overarching goal. One example of a conventional tension that was communicated by more than one startup was the amount of working hours every team member spends on the development of their business model. The team members both complained about their working load not being equal to each other as well as not living up to societal expectations on startup working hours.

"We were taking up speed and I have the feeling that while I would be fine working on the weekends or working longer and being more productive during the time we work as well as working longer, I was anxious that the other two weren't as eager about it (...)."

In this case, the overarching goal of wellbeing and mental health of the team in contrast to the pressure of moving forward by working overtime were conflicting the team's cohesion. Both, the wellbeing and mental health as well as progressing in the development of their circular startup was perceived as being crucial for the overarching success, but still contradictory.

Another aspect was either the focus on strategic topics that are relevant in the long run or the development of the business model. The circular startups realized that it was not possible for them to concentrate on both aspects, as time and energy was a scarce resource in the incubation program and preferred the latter:

"For the startups, it was the most important to work on the startup itself, meaning the product and with the classes and coaching, we rather provided strategic and background knowledge (...)".

The preference of the circular startups clashed with the design and content of the incubation program as strategic aspects were an inherent part of the program.

Circular Tensions

Startups said that it is challenging to live up to their own expectations and external expectations of contributing to a transformation to a circular economy through their business models. Especially the core strategies leading towards a circular economy (e.g., reorganization of the linear economy and society towards circular ones, creating value networks, thinking in systems), contribute to circular tensions. In stating "the vision is not really about [our] product but it's more about the whole infrastructure", one founder realizes that their primary goal is more extensive than only providing a product. Instead, the startup wants to use their product as a tool to create impact on a more systemic level. Nevertheless, their business model is built upon the product and not the value created through system change which evokes a continuous reflection of what to prioritize. Without the product and their entrepreneurial activity, the circular startups lack the possibility to initiate system change while the focus on the product prevents the startups from fully being engaged in system change. The startups feel disjointed between their identity of being change agents or even activists and the necessity of fulfilling the role of an entrepreneur which leads to *belonging* tensions.

Another example is the radicality of the startups' innovation and business models which the entrepreneurs know are necessary but also more difficult to realize: "(..) we wanted to tackle something which is not easy. Because that is maybe a reason why not many people actually try to do something in the industry." In their attempt to provide a product with higher circularity, they exceed the common standards in the industry and are confronted with the necessity of new knowledge for radical innovation. As this knowledge is not available yet and the circular startups have to spend resources on experimentation, building new partnerships and researching alternatives, a *learning* tension between continuing with the old and entering the market fast and starting the new and being delayed in entering the market. This *learning* tension seems prevalent in circular startups that perceive themselves as change agents for system change. Apart from the self-expectations of the circular startups concerning their products' level of circularity, expectations from other stakeholders of the incubation program were posed upon the circular startups.

Complexity through Diverging Stakeholder Expectations

The circular startups faced several diverging interests and expectations brought forward by different stakeholders that were part of the incubation program leading to *performing* tensions. These diverging expectations constituted a complex context in which the circular startups operated. The types of stakeholders comprised external experts functioning as jury members, the program managers, the program itself, the organizations financing the program, external experts providing content and coaching, the other participating startups and the individual members of the startups. In order to give a first insight into diverging expectations, the jury members and the financing organization are showcased in the following.

Jury Members

The jury members and the program managers were the first contact that the circular startups had at the beginning of the incubation program. The incubation program started with a pitching session in which the jury members and program managers interrogated the circular startups concerning the business models. Afterwards, the jury deliberated which startups were invited to participate in the incubation program. As the jury members came from different positions, they either focused on the degree of circularity, the potential of their product or service to contribute to a system change, the suitability of the team to the program or on the startups' likelihood to succeed. Two members of the jury preferred startups that were net-positive in their impact and have a cradle-to-cradle approach in their material. For others, the primary goal of the program was to ensure that the startups are able to finance themselves after the incubation program which requires the startups focusing on financing instead of improving their product in terms of circularity or fulfilling overarching aims. Already the first interaction with the jury and the program managers made the disparity of priorities between the jury members visible for the circular startups.

Financing Organization

The financing organization was a public entity that sponsored the program with the motivation of encouraging circular startups to locate at the municipality. The primary goal of the financing organization was that the circular startups after having finished the incubation program enter the market and are legally funded: "the [financing organization] wants to tick it off and they only tick it off if there is a startup [in the market]." This primary goal was combined with legal requirements that had to be fulfilled by the circular startups such as participating regularly in the incubation program and signing off attendance lists. These legal requirements were perceived as time consuming by the startups and as a nuisance.

Discussion and Outlook

To the best knowledge of the authors, this is one of the first studies that investigates tensions in circular startups and one of the few studies that concentrates on circular startups in general apart from e.g., Henry et al. (2020). The present study was designed to examine paradoxical tensions in circular startups that are embedded in an incubation program. In interviewing and observing 13 circular startups and the stakeholders of the incubation program, the first results show that circular startups experience tensions of different kinds such as conventional, sustainability and circular tensions. The second major finding is that the interests of the program's stakeholders are diverging and contradictory which can lead to performing paradoxes in the circular startups. This finding that different stakeholders being involved in incubation programs for the circular economy have diverging interests is similar to previous findings from studies in the global south (Hull et al., 2021).

Additionally, in comparison to former studies on circular incubation programs, this study shows that not only the government, non-profit actors such as non-governmental organizations, trade associations, entrepreneurs, the banking sector, and academia are a contributing part for incubators in the circular economy (Hull et al., 2021) but also experts from the industry, program managers and the financing organizations influence the participating circular startups.

When considering the performing tensions with a bit of distance, the question of the tensions' implications come to mind. From a perspective of alignment, one would argue that the diverging

expectations from the stakeholders have to be adjusted so that the circular startups are able to fulfill all of them. From a perspective of paradoxical complexity, we would rather reason that the complexity already appearing in the incubation program enables the circular startups to practice their management of tensions early on. Diverging stakeholder expectations are especially observable for circular businesses in the market (Jakhar et al., 2019) and are not a distinct phenomenon of circular startups in the foundation phase. As this study is still in an early phase, the results can only be recognized as preliminary that will be deepened in the future. In concrete terms, this means that the categories of conventional, sustainability and circular tensions will be more distinct and clearer as well as the stakeholder expectations. Further, how the startups manage the tensions is not analyzed in the data set yet.

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Circular business models in the wind industry

Potential sustainability benefits and industrial challenges

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Abstract

The deployment of wind energy technologies is instrumental to support a sustainable energy transition. However, the manufacturing, operation and end-of-life management of wind turbines (WTs) entail the consumption of a significant amount of energy and material resources contributing to environmental impacts. Thus, much of the ongoing sustainability research on WTs have been concentrated on material innovation (e.g. substitution of rare earth elements in the generators) and technology innovation (e.g. new recycling technologies for blade composites) to increase resource security and efficiency. Nevertheless, there is a lack of research analysing the role circular business models (CBMs) can have in driving implementation of circular economy (CE) strategies for narrowing, slowing and closing resource loops in the wind industry. Accordingly, this paper summarises the key potential sustainability benefits related to 14 CBMs with application to the wind industry, including the main industrial challenges that should be overcome to facilitate the upscaling of sustainable CBMs and value chains. A description of how CBMs can be implemented to support the resource-efficient management of wind energy projects at different stages of development and operation is also provided with the aim of guiding CE-oriented decision-making processes.

Keywords

Business models, circular economy, circular value chain, renewable energy, wind turbines.

Introduction

Wind is a key renewable energy source (RES) to support a sustainable energy transition, accompanied with demand-side resource efficiency improvements driven by circular economy (CE) strategies (UNEP 2019).

However, wind energy is not exempt from resource and environmental impacts. For instance, a review of 79 life cycle assessment studies on RES performed by Amponsah et al. (2014), concludes that wind energy greenhouse gas (GHG) emissions can range between a minimum of 1.7 g CO_2 eq./kWh to up to 123.7 g CO_2 eq./kWh (+7,100%), where the materials used to manufacture the wind turbines (WTs) account for 50% to 80% of the environmental impacts (Amponsah et al. 2014, Jensen 2019).

A conventional WT can have around 25,000 components, weighing more than 3,400 tonnes; 680 tonnes corresponding to the weight of a single (4.2 MW) WT (Razdan and Garrett 2019). Over 90% of the materials used in a single WT, comprising a tower, a nacelle, and a rotor with three blades, corresponds to metals (e.g. steels, copper, aluminium). However, rare earth elements (REEs) (e.g. neodymium (Nd) and dysprosium (Dy)) and composites (glass and carbon fibre reinforced polymers) are required to manufacture the permanent magnets of direct drive synchronous generators and the WT blades, respectively.

REEs are critical materials with a very low recovery rate through current conventional recycling systems (Wind Europe 2020). Likewise, recycling the blades is inefficient and costly due to the technical complexity in separating the various materials in the composite construction (Jensen and Skelton 2018). Both aspects represent relevant challenges for the wind industry. Whereas REE supply might not be able to meet the ambitious wind power deployment scenarios due to geopolitical and environmental constraints (Li et al. 2020), large amounts of blade waste will be generated in the short to medium term due to wind farms decommissioning and repowering projects (Liu and Barlow 2017).

Accordingly, much of the material and technology environmental innovation taking place globally concentrates on finding solutions to reduce the dependence on REEs and facilitate effective composite recycling to increase the overall resource efficiency of wind energy technologies (e.g. European Commission 2022). However, little attention has been placed so far on the role and relevance of circular business models (CBMs) to facilitate the configuration of circular value chains toward narrowing, slowing and closing resource loops (Bocken et al. 2016, Velenturf 2021) from a more integrated and holistic approach than focusing only on material and technology innovation.

CBMs are oriented to narrowing, slowing, closing and regenerating resource loops to mitigate negative impacts (Konietko et al. 2020, EEA 2021), while generating higher socio-economic benefits compared to linear business models based on take-make-use-dispose (Rosa et al. 2019). However, despite the benefits of developing CBMs in the wind industry, research with a focus on CBMs is scarce and limited in scope, as the studies available do not provide an overview of the type of CBMs that can be implemented by the wind industry to deploy more sustainable wind energy systems (e.g. Velenturf et al. 2021, Lobregt et Al. 2021, Nichifor 2015).

CE strategy	CBM typologies			Business goal	Key requirements	Sustainability potential		
						Economic sustainability	**Environmental sustainability**	**Social sustainability**
Narrowing resource flows	Demand reduction services			Mitigating resource consumption by delivering service-based solutions	Digitalisation Data analytics Internet of things (IoT)	Increased profit from reliable asset outputs	Greater and consistent renewable energy Lower resource use due to fewer parts replacement	Increase in skilled component performance modelling careers
	Cleaner production			Reducing resource consumption, wastes and impacts through best available technologies	Advanced materials and manufacturing equipment	Substantial reduction in manufacturing costs	Substantial reduction in resource consumption for WT manufacturing	Training and skilling new workers in highly specialised and technical jobs
	Collaborative consumption	Community-owned wind park		Decentralisation, democratisation and decarbonisation of electricity generation through community engagement	Renewable energy certificates Energy cooperatives Local investment	Transparency in the shared economic benefits	Climate change mitigation through increased use of renewable energy	Investment returns in the local economy through the development of energy projects Recruitment of local staff
		Aggregator platform		Balancing energy production and consumption through flexibility services that ensure grid stability, while increasing consumers' awareness in energy sufficiency.	Software platforms Virtual energy storage systems Prosumers	More efficient use of technologies and physical storage systems		New job opportunities with consumers becoming active subjects in the energy market
	Wind farm hybridisation	PV-WT-Battery		Combination of photovoltaic panels, wind turbines and batteries in a single location to improve resource efficiency	WTs, PV panels, storage batteries Supporting infrastructure	System performance optimisation through efficient use of surplus energy to minimise power curtailment	Reduced use of fossil-based fuels, GHG emissions and reduced waste generation	New employment opportunities as the hybridisation of wind farms requires more labour and new skills
		Power-to-X	Power-to-Gas (PtG)	Convert renewable energy into gaseous energy carriers (e.g. hydrogen, methane) to substitute fossil-based gas fuels.	Electrolysers & storage tanks Air capture systems & combined cycle gas turbines	Same plus act as renewable energy storage system for use to decarbonise energy-intensive industrial processes.		
			Power-to-Liquid (PtL)	Convert renewable energy into liquid energy carriers (e.g. methanol, Fischer-Tropsch fuels) to substitute fossil-based liquid fuels.	Methanation plant Reverse water-gas shift plant & heat exchangers Storage tanks & distribution networks			
Slowing resource loops	Retrofitting (upgrading)			Improving assets´ efficiency, capacity and performance by fitting components upgrading solutions	Software and data analytics Technology adds on	Reduction in the LCOE Increase revenue generation through adds-on	Increase annual energy production Reduction in noise levels	Need for skilled engineers Positive corporate reputation (by rising environ. awareness)
	Reuse			Second-hand use (same application) of WT components that are in a good condition.	Software (trading platforms) Decommissioning tools & storage areas Redistribution logistics	Cost savings in purchasing and operating WTs Development of local markets for reused products	Notable reduction in waste generation and GHG emissions	Employment opportunities in second-hand markets

CE strategy	CBM typologies	Business goal	Key requirements	Sustainability potential		
				Economic sustainability	**Environmental sustainability**	**Social sustainability**
	Refurbishment	Partially restoring the WT operational capacity by repairing and replacing worn or damaged components	Workshops & tools Testing equipment High quality spares	Market diversification Reduced capital costs, payback times and LCOE	Substantial reduction in material use and GHG emissions per asset	As refurbishment activities are labour intensive, they can open new markets and job opportunities Serve educational purposes Meeting social needs in less developed RES markets
	Remanufacturing	Fully restoring the WT functionality, resulting in final WTs comparable, or even better, to brand-new units	Reverse logistics Remanufacturing plants and equipment Spare parts	Project cost improvement for secondary users due to reduced capital investment	Preserve the material value Save energy and avoid GHG emissions Improve energy output.	
	Repurposing	Reusing a product or its parts (after reprocessing) for different applications than the original	Specialised facilities Software tools Warehouses Redistribution logistics	Blade-based products can be very profitable Reduce the economic cost of some civil engineering projects Improvement in brand image and reputation.	Blade-based solutions have a reduced environmental footprint compared to standard solutions. Product lifetime can be extended greatly	Local jobs in communities close to wind farms. Education and training programmes for students and industry professionals through design studios and labs
Closing resource loops	Open loop recycling	Extending resource value through material recovery for use in the development of new components and products (downcycling)	Recycling facilities, technologies and tools Material storage units	Lower disposal rates New business opportunities More resilient supply chains by reduced demand on imports	Reduced pressure on virgin materials and imports. Improved environ. performance against landfilling	Potential to create new jobs in material recovery activities.
	Closed loop recycling	Implementation of reverse logistics and reprocessing systems for material recovery and use in the manufacture of WT components (upcycling).	Dismantling, collection & recycling equipment and facilities Reverse logistics	Optimised recovery routes for some materials can generate substantial economic benefits (e.g. REEs)	Significant GHG reductions by recovering some materials (e.g. REEs) Optimised reverse logistic routes can help to reduce the transportation GHG emissions	New highly specialised jobs Local community development through the installation of collection and recovery facilities

Table 1. Overview of circular business models with application to the wind industry. Acronyms: GHG – greenhouse gases, LCOE – levelised cost of electricity, OEM – original equipment manufacturer, PtG – power to gas, PtL – power to liquid, PV – photovoltaic panels, REE – rare earth elements, WT – wind turbine.

As far as the authors were aware at the time of writing this contribution, there is only one scientific paper available in the literature (Mendoza et al. 2022) that has addressed a comprehensive categorisation and characterisation of CBMs with application to the wind industry. Building upon Mendoza et al. (2022), this short paper concisely summarises and discusses the potential sustainability benefits and industrial trade-offs related to 14 CBMs applicable to the wind industry, including the provision of guidelines for future research.

Circular business models in the wind industry

Building upon the approaches proposed by Blomsma et al. (2019) and Pieroni et al. (2020) for the identification, categorisation and characterisation of CE strategies and CBMs, Mendoza et al. (2022) performed a systematic literature review of 125 journal papers and industrial reports leading to the definition of 14 CBMs with application to the wind industry. A CBM canvas was used to define the business offering, the value creation, delivery and capture mechanisms, the potential sustainability benefits and the industrial challenges and opportunities, by relying on the findings from the literature review. However, due to space limitations, only a summary of the main goal, key resource requirements and potential sustainability benefits of the 14 CBMs with application to the wind industry are presented in Table 1.

As shown in Table 1, digitalisation, reverse logistics, and specialised materials, equipment and facilities, are the most relevant requirements to implement CBMs in the wind industry, which must be managed by specialised technicians and engineers. Likewise, strategic partnerships between original equipment manufacturers (OEMs), materials and equipment suppliers, wind farm owners and operators, and waste managers is crucial to design, implement and manage CBMs over time, as each actor depends on the other and CBMs cannot be driven by a single company nor operate in silos. Finally, although wind park owners and operators are the main customer segments, local businesses and communities (from developed and developing countries), looking for the implementation of low-cost renewable energy production systems, also represent relevant customer segments for the deployment of resource-efficient and environmentally sustainable solutions. High energy and carbon intensive industries demanding clean energy (gas or liquid) carriers can also benefit from the hybridisation of wind farms (Table 1).

However, CBMs should be properly planned, designed and deployed in the value chain to ensure sustainability benefits (or net positive impacts) are achieved. This requires action to be taken in the following areas (Mendoza et al. 2022):

Development of servitisation and digitalisation capabilities
Build robust business cases, including value chain considerations within and beyond the wind industry, for an accurate balance of costs and benefits
Address technical constraints for the implementation of CE solutions
Develop suitable markets for secondary products and materials
Reduce the complexity of forward and reverse logistics
Rationalise supply and demand mismatches
Diversify industrial know-how and capabilities
Encourage policy development and incentives
Define and implement circular design and technology management criteria
Use robust sustainability assessment frameworks, tools and indicators

Main conclusions

As discussed by Mendoza et al. (2022), the dematerialization and servitization of wind farms should be considered from the early project planning stage to minimise overall resource consumption and negative impacts related to WTs and infrastructure manufacturing, installation and maintenance over time. As an absolute dematerialisation of wind farms is not a realistic solution nowadays, cleaner production techniques and closed-loop recycling systems should be pursue to complement the implementation of digital solutions to mitigate WTs life cycle resource consumption and environmental impacts.

Alternatively, collaborative consumption models can be deployed for a more efficient production and consumption of wind energy through the optimisation of the system operational performance, which can be further pursue through the hybridisation of wind farms by integrating multiple technologies for renewable energy generation in combination with energy storage systems. Once in operation, the lifespan of WTs can be extended through retrofitting CBMs.

When a wind farm reaches the end of its service life, dismantled WTs and components can be i) reused in other wind farms if they are in an appropriate condition, ii) refurbished and/or remanufactured for a second and/or multiple subsequent use cycles (e.g. towers, gearboxes and/or entire WTs), iii) repurposed for reuse in different industrial and/or urban applications (e.g. wind turbine blades), or iv) recycled to recover some materials (e.g. mostly metals and plastics).

Nevertheless, each wind energy project is unique and the decision to foster one or several CE strategies driven by CBMs is highly project-specific, as it depends on the site constraints, safety issues, technologies performance and reliability, and the whole economic balance. Accordingly, building robust CE business cases is essential to demonstrate the sustainability benefits of implementing CBMs in the wind industry. This requires active collaboration between OEMs, suppliers, wind park owners, asset managers, operation and maintenance service providers, off-takers, policymakers and researchers.

Indeed, a CE plan should be prepared from the early stage of project conceptualisation and design, and address the whole life cycle of wind farms, based on a shared vision on the best CE strategies with the goal of maximising sustainability benefits. In this process, it is essential to address and respond properly to the 10 challenges highlighted above.

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Circular Business Models and Theoretical Anchoring: Are We There?

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Extended Abstract*

The magnitude of the ecological, economic and social sustainability challenges of this historical juncture, including climate change and a broken economy resulting from the outbreak of COVID-19 pandemic, makes a strong case for the transition towards a more resource efficient and resilient circular economy (CE) (Desing *et al.,* 2020; Mohammed *et al.,* 2021). For one, within the context of our current climate emergency, by transforming the way in which we make and use products, particularly across five key areas (cement, aluminium, steel, plastics, and food), CE principles can eliminate 9.3 billion tonnes of CO_2 emissions in 2050 (EMF, 2019). What is more, circularity is a huge source of new profit pools. Several business leaders have started capitalising on circularity benefits via reduced costs, enhanced sales and mitigation of linear-related risks: it is estimated that a global economic opportunity worth $4.5 trillion can be unlocked by 2030 through the implementation of CE principles (WBCSD, 2021).

In parallel with the rising interest towards the CE in business and policy contexts, CE thinking has entered the scholarly literature contributing to the advent of a novel field of academic enquiry (Goyal *et al.,* 2021). Yet, understanding of CE remains multifaceted and in need of both consolidation, and a common theoretical background (Borrello *et al.,* 2020; Webster *et al.,* 2021). Hence, the rationale of this research paper is to contribute to the much needed conceptual and theoretical clarity in the CE field. To accomplish its goals, this article suggests a range of theories that can be used for the theoretical coupling of research on circular business models (CBMs). Theoretically grounded CBMs studies are scarce. In fact, Geissdoerfer *et al.* (2020) lament that

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"despite the importance of the circular business model notion, there is considerable lack of clarity about its theoretical conceptualisation" (p. 1).

To build such a theoretical repertoire, this article line of enquiry hinges upon the business models (BMs) literature. Since CBMs are one of the offshoots of the BM concept, it is appropriate to couple the theoretical foundations of CBMs with those underlying the mainstream BMs literature. BMs research is positioned within the strategic management literature (Ritter and Lettl, 2018). Consequently, this article makes links with the strategic management literature, and, particularly, with the natural-resource-based-view of the firm (Hart, 1995). Not only is this useful to establish consistency among the lines of enquiry characterising BMs and CBMs research but also a strategic management perspective fits with the competitiveness dimension of CBMs and is pertinent to advance current understanding of CE business strategies. Research on the micro level, and so on the organisational dimension of the CE and CBM innovation, is limited (Barreiro-Gen and Lozano, 2020; Hofmann and Jaeger-Erben, 2020; Khitous *et al.,* 2020).

Furthermore, this article draws on sustainability transitions and systems theories, which have received some application in corporate sustainability and CE studies (e.g., Sarasini and Linder, 2018; Tate *et al.,* 2019; Webster, 2013; Williams *et al.,* 2017). Transitions theories - with their multidimensional and multi-actor focus - are appropriate to investigate the complexities involved in systemic innovations, which are also crucial for the emergence and scaling up of CBMs. Coupling CBMs experimentation studies with transitions lenses is deemed appropriate in current research on CBMs (Bocken *et al.,* 2021). In fact, although CBMs innovation stems from individual/organisational agency, structure must be aligned so that CBMs can effectively emerge and reach significant scale. Additionally, CE thinking is informed by complexity and systems thinking (EMF & McKinsey, 2012, 2013; Fehrer & Wieland, 2020). This means that the theoretical coupling of CBMs cannot do without the establishment of a relationship with systems theory, which is rarely captured in current CBMs studies. This is much welcomed in the CE literature with Rovanto and Bask (2020) lamenting that the relationship between CE and CBMs "is still rather informal and ill-defined" (p. 5).

Concepts and theories evolve through three different stages: introduction and elaboration, evaluation and augmentation, and consolidation and accommodation (Reichers and Schneider, 1990). CE thinking has yet to move beyond stage one. It is hoped that this article line of enquiry is useful to stimulate academic debate as how to advance the theoretical foundations of CBMs research. Arguably, as correctly put by Bansal and Song (2017), "an academic field's development is aided by a consensual research" (p. 106).

Keywords

circular business models, systems thinking, strategic management, transitions theories.

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From cooperation to collaboration: value co-creation and preservation for circular bio-economy

Collaborative business models and business ecosystems in the bio-based and biodegradable plastics industry

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Extended abstract

Introduction

The social concerns about marine plastic pollution and the normative pressure on single-use have boosted the demand for bio-based and biodegradable plastics, which is expected to quintuple by 2024 (European Bioplastics, 2021). Because of their properties, these materials force a complete redesign of products, supply chains and value propositions with resulting innovation-oriented processes (Batista et al., 2018). Although value co-creation emerged as crucial when actors shared common interests (Jonker et al., 2020), innovation remains technical/technological and relegated to the business dimension. Conversely, socio-technical innovation is ensured when synergies are enlarged to non-industrial stakeholders (Antikainen et al., 2016). Specifically, collaboration over value networks plays a pivotal role in a circular economy where value is retained in further production and consumption cycles. Practically, organizations driven by a circularity paradigm adopt an anticipatory approach to look beyond a single organisation's borders and identify and prevent value losses circumstances (Ruggieri et al., 2016). To be circular, bio-based and biodegradable plastics should circulate in the biological cycle of the butterfly diagram designed by Ellen MacArthur Foundation (2019). It implies socio-technical conditions and infrastructures and the engagement of business and non-business actors, including consumers, recyclers, municipalities and policy-makers (Harangozó and Zilahy, 2015). This paper leverages cooperation theories to map, categorize, and characterize existing cooperation models in the bio-based and bio-degradable plastics industry to analyze the dynamics facilitating value co-creation on one side and value preservation on another.

To reach the scope, the present study is confined to the European context and considers inter-organizational cooperation, both horizontal and vertical, with multi-stakeholder engagement.

Coordination, cooperation and collaboration: antecedents and outcomes

The bio-based and biodegradable plastics industry necessitates the involvement of different stakeholders - from supply chains (agriculture, starch/sugar refinery, chemical/biotechnology industry, plastics manufacturing, plastics conversion, brand owners, retailers, consumers) to governments, communities, non-governmental organizations (NGOs) and public-research organizations (PROs). While some are based on R&D to foster the commercialization of innovative end-products, others work at multiple levels to set up the system by increasing consumers awareness, facilitating legislative harmonization and making the materials competitive with their fossil-based counterparts. Each action rests on specific attitudes and behaviours that enfold different collaboration, coordination, and cooperation forms. While cooperation can be intended as "*the process through which parties who see different aspects of a problem can constructively explore their differences and search for solutions that go beyond their own limited vision of what is possible"* (Gray, 1989), collaboration brings together nonconnected or competitive stakeholders to arrange more tightly organized interrelationship with collective decision-making (Hartman et al., 1999). In this regard, cooperation refers to those cases when parties share tacit information, the level of trust among them is low, and the parties are loosely coupled. Coordination refers to the instances where there is a coordination of activities among parties, when they follow semi-interdependent goals, and when they align their resources, but the power remains within the organization. The level of connection among parties is medium, with a work-based trust. While in the case of collaboration, parties have dense interdependent relations, accompanied by high confidence and sharing of tactical information. They share resources and power among them and have the same negotiated goal. In light of the stakeholder theory, this study investigates how circular bio-economy pragmatically fosters form of cooperation, collaboration, and coordination among multiple actors to guarantee the value retention of bio-based and biodegradable plastics.

Methods

Based on a comprehensive literature review, a research framework has been set up to analyze the type of actors and the level of engagement per each form of interaction. Hereinafter, we have the models from a resource dependency perspective and relational approach, considering existing strategic partnerships, associations, alliances, networks, joint-ventures, and consortia operating in the bio-based and biodegradable plastics industry. Per each category, we have first analyzed the composition and then investigated a. the level of connection, b. the level of trust and c. the type of information, resources and power shared to discuss which and how they contribute to co-create and/or preserve the value of bio-based and bio-degradable materials in a circular-bio-economy paradigm.

Results and Discussion

The study reveals that forms of collaboration prevail where business stakeholders are involved. Cooperation is common when business stakeholders interact with non-business actors. Specifically, materials producers consider the supply of renewable resources as one of the priorities in the transition process towards circularity (Potting et al., 2017). Bio-based and biodegradable plastics are generally perceived as eco-friendly materials able to address the urgent problem of marine

plastics pollution. However, cooperation models entirely focused on bio-based and biodegradable plastics are few compared to those working on conventional plastics (that have dominated the market for the last fifty years). Looking at the categories, alliances are generally EU-based and deal with the problems of raw materials supply and waste management. However, little attention is paid to production and consumption patterns. Driven by the need to strengthen market demand, share commercial data and make knowledge accessible to all the involved parties, associations are widespread, especially at the national level. Networks have similar approaches to associations, but the mission may differ widely since the goal is comprehensive, the number of stakeholders engaged high, and the outcomes less impactful. Consortia, mainly dealing with extended-producer responsibility (EPR) schemes, exist but remain linked to conventional plastic waste management. A robust interaction is rather evident in joint ventures, mainly based on the need to integrate different expertise, thus strengthening collaboration among raw materials producers, compounders, and converters. Finally, only a few strategic partnerships among end-product manufacturers and waste managers have been registered.

Conclusions

Our study makes contributions on both a theoretical and a managerial level. A theoretical lens explores the dynamics beyond stakeholder theory and circularity mission. At the managerial level, it explores and characterizes the forms of interactions that exist in the bio-based and biodegradable plastics industry. The results show that coordination and collaboration mechanisms do play a crucial role in the commercialization of innovative solutions. Still, new forms of cooperation are needed to foster a business ecosystem supporting the loop closing. Indeed, while value co-creation is an imperative, value preservation is still in the background. Collaborative business models, based on a user-centric perspective, with an approach to life cycle thinking, are necessary to achieve a full circular bio-economy in that industry.

Keywords

Circular economy, business models, cooperation, collaboration, bio-based plastics.

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Including New Business Models Thinking in The Humanitarian Sector

Transitioning From Reactive Humanitarian Responses to New Preemptive Development Solutions. The Case of Small Island Developing States in The South Pacific.

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Extended Abstract

The linear economic system of production and consumption is problematic under many points of view. It implies a non-stop exploitation of natural resources, it increases climate change, and it generates enormous amounts of waste and pollution, among other down-sides. The negative effects of this system can be even more evident in situations of vulnerability, where the development factor is ultimately overshadowed by the urgency of humanitarian interventions.

Some of the most vulnerable countries in the world are located in the South Pacific area, and climate change and the scarcity of resources are exacerbating their already existing vulnerabilities. For instance, it is anticipated that the effect of global warming on coral reefs will seriously impact earnings from fisheries and tourism, which are fundamental sources of income for the inhabitants of the area. Moreover, according to the Pacific Islands Forum and as mentioned in the 2050 Strategy for the Blue Pacific Continent (2021), natural disasters such as floods and droughts, increasingly frequent, cost South Pacific countries an average of 2%of their GPD each year, and unemployment and suicide rate are at their highest. Small Island Developing States (SIDS) in the South Pacific are especially threatened by this situation, since the source of their national income is strictly linked to a clean and preserved environment.

The region's geographical vastity and scatter represents an obstacle for economic development, since these small remote areas are located far away from the main consumer markets, and far from the major global trade routes. Moreover, a connectivity challenge exists within the region, among different islands and areas. This geographical isolation dissuades foreign investments, and it represent an obstacle for economic growth. For this reason, many communities depend on migration, allowances, and humanitarian assistance, which reduces their capacity building and their power to advocate for themselves and their communities. Therefore, it is vital to include peoples and lands in this area into the conversation about innovative NMBs, and encourage them to be first actors into its design.

From 2018 progress has been made in regard to the management of waste in the South Pacific area. For instance, the Samoa Recycling and Waste Management Association represented the first step towards a system of circular economy in the South Pacific Region. But progress is still necessary in this regard. According to the Director General of the Secretariat of the Pacific Regional Environment Program, for the South Pacific Islands to benefit from a circular economy, new innovative business models are required. For instance, new methods for the final return of materials to the soil, or innovative approaches for the industrial production system, as well as new tailored policies to incentivize the private sector. In this research we will investigate ways of realizing this.

Aim of the research

A shift towards a proactive, environmentally sustainable, and development-oriented approach could be beneficial for humanitarian emergency situations such as the one in the South Pacific SIDS. This research will investigate what can be learned from the application of a system of circular economy in the analyzed area and how this transition could increase resilience for present and future economic and environmental threats. Moreover, it will investigate the ways in which indigenous knowledge could inform and guide this radical shift towards a global circular economy.

Circular economy is based on recycling, repairing, remanufacturing, reusing and finally managing waste and pollution in a way that is beneficial and harmless for our environment. Shifting to a circular economy can have economic, social, and environmental benefits such as reducing the demand for natural resources, reducing waste and pollution, creating jobs, and promoting innovation. Therefore, recognizing the importance of new business models in humanitarian emergencies would highlight the importance of development-oriented projects and long-term solutions, valuing proactivity as opposed to the reactivity-based approach adopted so far in the humanitarian field.

Design / Research methods

The research will be based on three pillars:

A literature review of new business model theories, such as, but not limited to, circular economy, exploring practical examples in which they have already been applied to humanitarian situations, with a focus on the South Pacific area.
Interviews to several experts in this field will be included, at least a Senior Policy Officer at the Dutch Ministry of Foreign Affairs, and the lead of the All-India Disaster Mitigation Institute (AIDEMI) on Climate Change Adaptation and integration of development approaches and climate change in modern humanitarian responses. More experts (a Campaigner for the NGO Survival International) will be looked for.[11]
Finally, as the third pillar we will try to work out what it could mean for SIDS to apply the Circular Economy Model.

Based on these three pillars we will answer our main research question. How can the use of the concept of Circular Economy, being development-oriented, improve the humanitarian aid approach, traditionally reaction-oriented?

[11] The interview method will be based on Chapter IX of the manual “The Practice of Social Research” by Earl R. Babbie.

Value of the research

Greening the humanitarian system to adapt it to the impacts of climate end environmental crises is nowadays in the spotlight. Interest is constantly raising for the integration of environmental protection in humanitarian responses. For instance, in 2021 the IFRC drafted a Climate and Environment Charter for Humanitarian Organizations (2021) to improve the environmental sustainability of the humanitarian sector. Important elements mentioned in the Charter are cutting greenhouse emissions, contrasting biodiversity loss and environmental degradation, and addressing the damage caused by the impact of crises.

Exploring innovative business models could help the transition from a reactive to a proactive approach, fundamental to tackling modern humanitarian emergencies. In fact, in contrast with the past years, the amount of humanitarian crises happening simultaneously has constantly risen, and the majority of these are protracted in time and hence in need of updated long-term solutions designed with a developmental approach. The focus on the SIDS in the South Pacific is justified by the good example these islands provide of a humanitarian situation where already existing vulnerabilities are worsened by the climate emergency situation, and could benefit from the implementation of new environmentally friendly business models such as the circular economy.

This research will therefore look for point of junction between two opposite fields of work: on one side the Humanitarian Action, result-oriented and addressing the direct consequences of emergency situations, and on the other side development models, sustainable, addressing the roots of the crises worldwide and which aims to prevent instead of curing. Judging NBMs as an integral part of the development field, the aim of the research is to showcase how NMBs can be of support and make the humanitarian field more sustainable, creating shared value and addressing humanitarian issues in a holistic perspective.

Keywords

New business models, circular economy, humanitarian emergencies, development, environmental protection, sustainable.

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How do circular businesses scale up?

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Extended abstract

The circular economy is an alternative paradigm to a wasteful linear economy where products have limited product lifetimes and are prematurely disposed of (Geissdoerfer et al., 2017; Heshmati, 2017). A circular economy is "*restorative or regenerative by intention and design"* (Ellen Macarthur Foundation, 2013, p.7). Companies innovate towards circularity by narrowing, closing, slowing and regenerating resource loops (Bocken et al., 2016; Konietzko et al., 2020).

In recent years, both start-ups and incumbents have explored these circular strategies by innovating their products, services and business models (Bocken et al., 2021). Out of the two, many scholars see start-ups as more flexible and responsive to market changes (Henry et al., 2020; Rizos et al., 2016). Hence, they may be better positioned to adopt disruptive circular innovation practices, and act as accelerators towards a circular economy.

It is vital to understand the scaling process of circular business model initiatives to intensify the development towards circular business (Sandberg & Hultberg, 2021). However, there are only a handful of scale-up examples across different sectors. Moreover, circular scale-ups have not yet been analysed as a distinct category. At the same time, there is also a lack of theory to explain how circular start-ups or initiatives scale up. Recent studies exploring scaling in the circular economy are still novel with limited empirical data. Up to this point, fewer than ten research articles on this topic were identified (e.g., Guyader & Piscielli, 2019, Sandberg & Hultberg, 2021). These papers focus on specific sectors only that lacked empirical insight. For example, recent studies on the fashion industry found that traditional and non-traditional scaling strategies were applied (Hultberg & Pal, 2021; Pal et al., 2021; Sandberg & Hultberg, 2021).

According to Sandberg & Hultberg (2021), social enterprise literature can help understand the scaling logic beyond traditional economic growth based on an individual organisation's geographical expansion. They noted that circular businesses with a sustainability mindset should include different scaling logics to encompass other representations of scale, such as impact. Chembessi et al. (2021) contributed to this idea through their investigation into the impact of scaling on the broader socio-economic landscape. For example, a multilevel view on scaling that introduces "scaling up" and "scaling deep" to the traditional growth objectives of "scaling out'' can be a useful theoretical lens (Bauwens et al., 2020). According to Riddell & Moore (2015), "scaling

up" entails the impact at the institutional level, such as policy and laws, while "scaling deep" focuses more on the impact on culture. Furthermore, there is little research on the challenges and corresponding solutions of scaling in a circular business context. Some initial research suggested the challenges may be related to the transition from linear to circular (Khan et al., 2020) and competing value logic (Sandberg & Hultberg, 2021). This study seeks to contribute to the understanding of scaling for circular businesses by answering the following research questions:

How do circular businesses scale up?
1a. What factors drive and constraint companies scaling circular business models?
1b. What strategies do companies use to anticipate these factors?

What pathways do companies use to scale up circular business models?
Explorative qualitative approaches are selected for this research. To answer the proposed research questions, we devise a three-step approach. First, a literature review is conducted to define circular scale-ups and scan scaling approaches used by businesses. Both business management and interdisciplinary sustainability literature serve as the foundation to provide a more thorough understanding of circular scale-ups (Riddel & Moore, 2015, Stampfl et al., 2015, Tauscher & Abdelkafi, 2018). Second, a practice review of existing circular scale-ups is conducted to support and enrich the findings from the literature review. The practice review seeks to include cases spanning from various countries and sectors. The practice review includes examples from sectors such as food, mobility, electronics, furniture, fashion and consumer goods, where circular businesses have scaled up. Third, semi-structured interviews are conducted from select companies from the practice review to complement the existing findings and learn from businesses on the approaches to scale-up.

This study aims to contribute to the current circular innovation literature in three ways. First, based on multidisciplinary literature review, we define circular scale-ups. Second, based on the practice review and semi-structured interviews, we investigate the challenges companies face when scaling and various approaches they have used to overcome these challenges. Third, through our practice review, we contribute to the research topic empirically by providing examples from different sectors. For practitioners, this study can function as a roadmap to guide in their scaling efforts, aiming to achieve scale to accelerate the circular transformation.

Keywords

Circular Business Model; Scaling; Circular Business Model Innovation; Experimentation; Circular Economy; Sustainable Impact.

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Value chain mapping for regenerative business model design

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Extended abstract

1. Problem description

Due to the irresponsible use of natural resources and the ongoing deterioration of natural ecosystems that goes along with it, we are approaching the twilight of the linear economic system. Hence the need for transformation on a societal as well as organizational level is imminent. Focusing on the organizational and business level, the adaption of existing business models towards regenerative circular models is highly necessary – as most of the currently existing business models are linear and exhaustive (Goni et al., 2020). Currently, companies still lack the incentives as well as capabilities to look at their activities holistically and to balance them economically. To create the conditions for companies to become a transformative force for the better, management tools and instruments must either be adapted or developed and applied.

In the past Corporate Social Responsibility concepts (Ortiz et al., 2018) have been applied to linear business models, improving or mitigating social, environmental or economic impacts on stakeholders, yet significant contribution to the UN Global Goals (UN, 2017) remains a challenge for most businesses. At this stage, businesses preserve economic value principles and attempt to include environmental solutions. (Landrum, 2017)

A holistic perspective is needed to avoid lock-ins while at the same time mobilizing opportunities to accelerate and strengthen the transformation of companies towards sustainable development. If we want previous 'externalities' to be economically reflected and thus become 'internalities', the impacts of companies in ecological, social and economic aspects must therefore be analysed and reflected along the entire value chain. This includes not only the direct but also the indirect impacts in order to get to the bottom of barriers and opportunities for a transition to regenerative business models, involving both upstream and downstream processes.

Transforming and innovating a company's business model also means to create new and appropriate logics of creating value and to design a modified activity system within the company (Amit and Zott, 2010). As regenerative circular business models require a broader perspective than their linear counterparts, new and holistic approaches to the analysis of value chains are crucial. The traditional value chain model in use, mainly shaped by Michael Porter's contribution to value creation and value chain (Porter, 1985), focuses on company internal aspects and is still widely

applied in business practice. The authors argue that to align business with the Global Goals, a widened, more holistic perspective on their impacts, in line with a regenerative value chain approach needs to be applied. Thus, this holistic approach means that all stakeholders alongside with impacts from raw-material extraction and cultivation, logistics, company aspects, use and consumption to end-of-life, have to be considered, mapped and analysed to re-design and manage a regenerative value creation (Hahn and Tampe, 2020).

2. Research focus

This research paper focuses on analysing the barriers and limitations of the traditional value chain approach, which primarily focuses on the intra-company aspects of business operations, while not including the upstream and downstream impacts and risk analysis required to make a significant contribution to sustainable development in line with the United Nations Global Goals. It also explores the possibilities of broadening the perspective to a "regenerative business model" and "regenerative value creation" by considering business activities and impacts at each stage of the process (‘cradle to grave’).

3. Method

As the innovation of existing and the design of new regenerative business models and value chains is a relatively new topic, we have chosen to adapt an explorative approach to research this may need new tools or merely the expansion of the existing for sustainability management. We have chosen to apply an abductive multilevel approach for this research. An abductive approach first starts with an observation of a phenomena; second, a generalization of the findings of the observation, and third, an empirical evaluation of the generalization to gain further insights into the topic and to understand if the research process should be repeated (Tavory and Timmermans, 2014).

Therefore, and to the more precise, our research is design as follows:

- First, we carry out a qualitative survey to explore the understanding of regenerative elements in value chains from a practical perspective. In-depth interviews will be carried out with decisions makers within businesses to understand their view on this topic, motives and barriers to transform the current value creation mechanism within their business towards circular value creation.
- Second, the findings will be theorized and generalized, a generic model of a regenerative value chain will be developed from the findings.
- Third, the generalized model of circular value chain will be tested, using focus groups. {Note from the authors: at the NBM Conference 2022, findings from the first part of this threefolded research process will be presented}

4. Results and conclusion

At the NBM conference, the authors will present findings from the first research phase; the main understanding of regenerative value chains, motive and barriers that support / prevent such a transformation will be discussed. These findings will in consequence deliver the input for the second research phase, the design of a generic model of a regenerative value chain.

As potential results of this research project, we expect more detailed explanation of barriers and limitations of currently used value chain models for business transformation toward sustainability. We expect to gain insights supporting the conceptualization of a regenerative value chain model as well as managerial aspects and challenges of companies when adapting such a model, as for example required resources, incentives, knowledge and assistance needed in the creation of appropriate conditions.

Keywords

Regenerative value creation, regenerative business models, value chain, circular business model, sustainable business model

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Filling Competency Gaps through Collaboration for Circularity

Insights from a gap exploiter business model

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Extended abstract

Introduction

The transition to a circular economy (CE) necessitates businesses to participate in strategies such as reuse, repair, remanufacture, refurbishment, and resale to reduce the production and consumption of new products while retaining value from used goods. The facilitation of such circular strategies are often new tasks outside of the operations of traditional (linear) business models (Brown et al., 2019), and require certain capabilities and knowledge that companies may lack, particular those with established business models (Bernon et al., 2018; Reim et al., 2021). Business model innovation for circularity operates with uncertainty in a complex and dynamic environment (Santa-Maria et al., 2021) and face barriers such as a lack of organizational knowledge for circularity, financial, technical, market, and institutional barriers (Bianchini et al., 2019; Guldmann and Huulgaard, 2020).

Companies can address some of the complexities of business model innovation for circularity through the development of external collaborative partnerships and networks (Brown et al., 2018; Greco et al., 2020; Reim et al., 2021) in order to share resources across organizational boundaries (Hansen and Schmitt, 2021). The success of circular business models (CBMs) is perhaps dependent on collaboration since circularity requires specific actors, capabilities, resources, and knowledge (Brown et al., 2018) that take time to develop (Frishammar and Parida, 2019).

While it is understood that partnerships can aid in business model innovation for circularity (Brown et al., 2021), the dynamics of partnerships for CBMs need to be explored to identify the parameters and success factors that explain how collaboration works between partners (Brown et al., 2018). Different aspects of interorganizational relationships need to be examined to understand collaboration networks as well as the competences and capabilities that companies need to move towards circularity (Hofmann and Jaeger-Erben, 2020). Brown et al. (2021) suggest that future research should focus “within collaborative processes, practices, and dynamics as they happen” (p. 14), therefore justifying this research that investigates three different cases of collaboration for circularity at different scales and implementation processes of innovation. This research explores

collaboration dynamics from the perspective of Godsinlösen AB (GIAB), a gap exploiter business model that helps established firms implement circular strategies. The concept of a gap exploiter model can be understood as a 'reuse and redistribution' business model where it evaluates the value of used products, makes small repairs, and provides access by creating a market for them (Lüdeke-Freund et al., 2018).

This research aims to identify and categorize competences for circularity through exploration of a gap exploiter business model and its partners. Furthermore, it aims to understand and utilize collaboration mechanisms to help explain how partnerships can address the challenges of established companies seeking to implement circular strategies.

Methods

This research takes a case study approach and includes the perspective of various actors and organizations, as called for by Aarikka-Stenroos and Ritala (2017) to include multiple perspectives and interactions in business network studies. Semi-structured interviews, annual reports, press releases, and ethnographic observations were collected and analyzed following Gioia et al.'s (2013) methodological approach to coding.

GIAB was selected as the central unit of analysis due to its unique business model spanning several industries, and its role in working with various other companies to facilitate circular strategies. Its role of collaboration was investigated through the perspectives of three partnerships: a furniture company, an insurance company, and a white goods manufacturer. The companies have different circular ambitions partnership agreements with GIAB and were selected to obtain different perspectives of the innovation process and nature of relations.

Findings

GIAB offers a broad range of services around the facilitation of the reuse of products and creates value through its business areas and digital platform. GIAB's value proposition is presented as its competences in Figure 1, where a competence framework and collaboration mechanism framework are combined to describe how GIAB meets its partners' needs to implement and maintain circular initiatives.

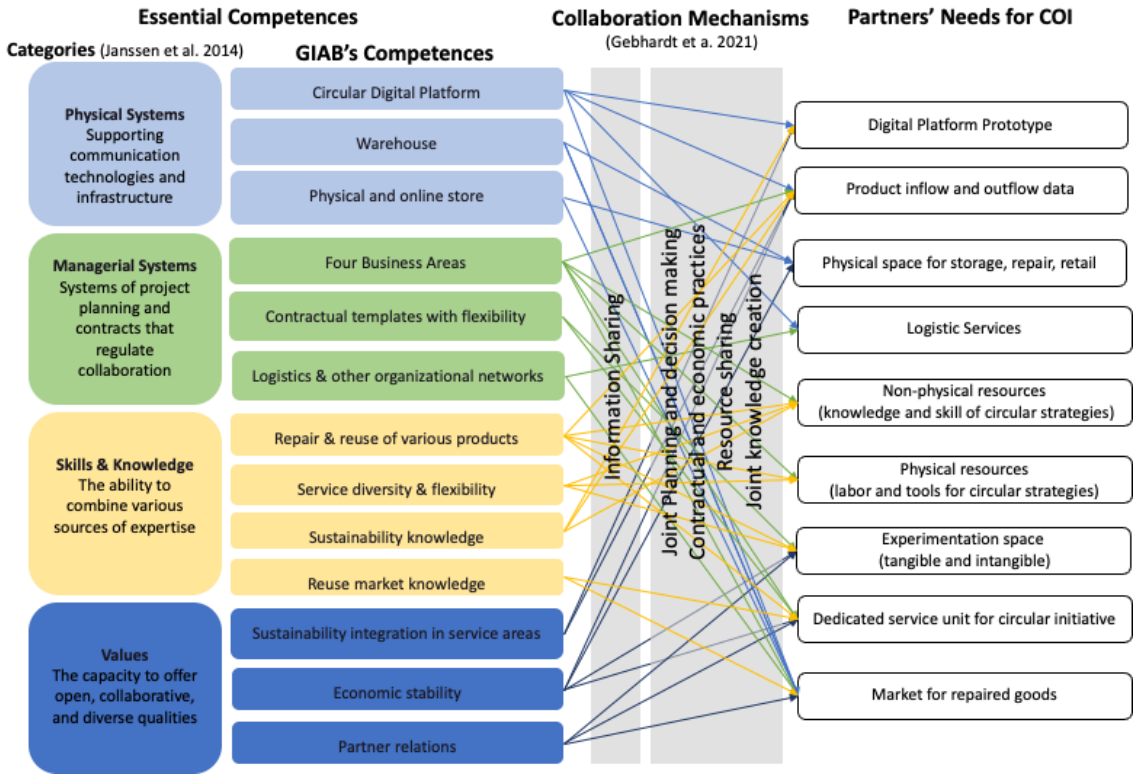

FIGURE 1. COMPETENCES AND COLLABORATION MECHANISMS TO MEET PARTNER NEEDS

GIAB's competences are categorized under physical systems, managerial systems, skills and knowledge, and values within an organization (Janssen et al., 2014):

Physical Systems: GIAB's digital platform acts as the main system for communication by providing product and component tracking, and sustainability data to partners of products that have been reused. GIAB also has two physical warehouses for storage, repair and refurbishment, and resale of partner goods.

Managerial Systems: GIAB's four business areas provide diverse services and its partnerships are managed through different contact types. GIAB maintains various networks of interaction with partner and logistic companies, research institutions, industry networks, social, and other organizations that work with large-scale reuse. GIAB's various contractual offerings for its business areas provide partners with flexibility in the relationship with concrete outcomes of profit-sharing, as well as access to GIAB's logistic networks.

Skills and knowledge: GIAB offers diversity and flexibility in its service abilities to clean, repair, and refurbish goods that range from durable to consumable goods. While GIAB separates expertise into four areas, it shares employee skills and knowledge throughout the organization. Information is connected through GIAB's digital platform that acts as a complement to the business areas as well as a foundation in providing product-specific data. GIAB's skills and knowledge is perhaps the most valuable and needed from the partners' perspective as it provides the foundation for the work needed to facilitate their circular initiatives.

Value: GIAB's values are integrated throughout its services as they provide economic value to its partners and itself, as well as sustainability data for partners to communicate to its consumers and stakeholders. GIAB works to build trust and personal connection with partners, for example by integrating partner customer service into its organization such as with the insurance company.

GIAB's competences are shared through various pathways of collaboration as shown in Figure 1. Information sharing is a critical enabler for circular systems and is the primary foundation for

collaboration (Bressanelli et al., 2018; Hussain and Malik, 2020; Gebhardt et al., 2021). GIAB provides information sharing in different ways, which is described through the four other mechanisms as defined by Gebhardt et al. (2021):

Joint planning and decision-making: GIAB's collaborative planning is implicit in its business areas since partners can decide along with GIAB the breadth and level of involvement of GIAB's services, i.e. cover the entire return management chain or engage in individual processes.
Contractual and economic practices: GIAB offers various flexibilities of contractual agreements for revenue sharing, as well as the duration of the collaboration. For example, GIAB invoices the insurance companies depending on the repair cost for each item with an insurance claim, while it offers a 50/50 contract model minus repair costs for e-commerce companies.
Resource sharing: GIAB shares resources in its physical space of repair and storage, as well as tools and such used for cleaning and repair, and general operational processes.
Joint knowledge creation: In working together with its partners by providing the digital platform to track products and processes, GIAB also learns about product flow and market patterns.
The configuration of GIAB's competences across the different systems acts as a foundation for the capabilities needed to create circular solutions, as shown in Figure 2. By combining categories of GIAB's competences, this research presents a model for circular capabilities. The capabilities needed for CBMs can be categorized as solution configuration capability, orchestration capability, and digitalization capability using conceptual definitions by Reim et al. (2021).

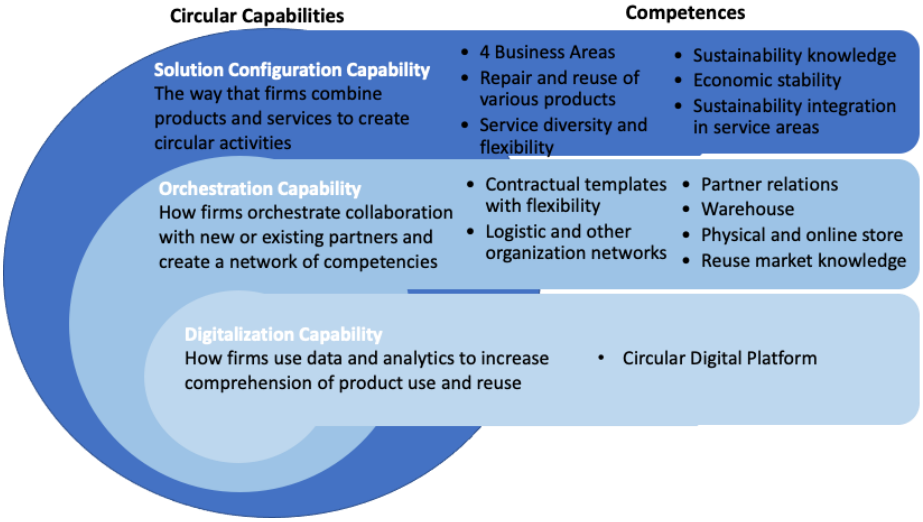

FIGURE 2. COMPETENCE CONFIGURATION FOR CBM CAPABILITIES

Conclusion

This research provides perspective beyond the organizational boundaries of individual firms and towards connected systems through collaboration for a circular economy. It examines the implementation of practical circular initiatives in established business models through a partner perspective and draws upon resource-based theory to connect business model innovation for circularity with collaboration to fill competency gaps and fulfill the need for circular capabilities. This research acknowledges the case-specific attributes of the companies analyzed, but through the development and combination of previous frameworks in literature, provides a tangible and generalizable understanding of firms' circularity needs and partnership dynamics.

Keywords

Business model innovation for circularity, Collaboration, Gap exploiter business model, Circular capabilities, Competences for circularity

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From countries to corporations: an analysis at different levels to achieve sustainability in circular economy

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Extended abstract

The sustainable business model could improve the risk mitigation and firm resilience, improve diversification and "value co-creation opportunities" (Geissdoerfer et al, 2018, p.402). A business model is a conceptual framework with three "major components" "the value proposition, the value creation and delivery system, and value capture" (Richardson, 2008. p.138). Sustainable business model have to consider values beyond economic aspects to take into account a broad range of stakeholders (Bocken et al 2013). Circular business models have additional characteristics respects to sustainable business models in fact they "are not only creating sustainable value, employing pro-active multi-stakeholder management, and have a long-term perspective, but also close, slow, intensify, dematerialise, and narrow resource loops" (Geissdoerfer et al, 2018, p.403). As Geissdoerfer et al, (2018) point out these additional characteristics could not be in the sustainable range. An activity based system is considered a good theoretical foundation to analyze the sustainable business models (Hernández-Chea et al 2021). Activity that often are associated with cost savings are the increase of material efficiency, the creation of value from waste, the use of renewable energies (Hernández-Chea et al 2021).

An aspect that again need more investigation regards the differencies and similarities among the circular business models and the different industries (Ferasso et al 2020). This could help to better understand the relationships between circularity strategies and different industry sectors. Other aspect that deserve attention is the relationship between circular economy and sustainability performances (Ferasso et al 2020).

Through index decomposition analysis is possible to analyze the context at industry level and its link with corporate level (Lonca et al 2019). The flexibility of this methodology can be useful to consider the role played by some aspects such as information technology or resilience. It is interesting to evaluate the weight of industry in fostering circular business models. A quantitative comparison among industrial sectors, inside each industry and in relation to single corporation can provide a better insight about the correct pathway in sustainability direction. Following real option theory (Trigeorgis & Reuer, 2017) are taken into account the substitutability or complementary effects of different options, competition versus cooperation.

The collaboration and partnerships in business are enablers of circular economy business model however it is interesting to investigate how regional factor such as geography and demography can affect them (Hina et al 2022).

The methodology adopted can investigate on such factors by decomposition analysis. The study at industry sector level can facilitate the overview to evidence the complementarities and possible criticalities to the circular economy process.

To understand the contribution that circular economy can give to sustainability have to be considered the possibility of rebound effect due to increase in production. Following Lonca et al (2019) pollution emissions can be decomposed in material recirculation, product material efficiency and circular business model to calculate the contribution of these aspects on the overall result. Conducting the analysis in different countries it is possible to take in consideration the geographic and demographics variables. In a longitudinal perspective is evaluated the evolution of the variables and their possible effect on the circular business model.

The empirical examination about the role of institutional pressure in the link between digitalisation and circular economy (Chauhan et al, 2022) can help to know how corporations can achieve economic and environmental benefit with digitalisation.

The role of information technology can enhance the value creation, value delivery and value capture. Information technology can increase efficiency and improve performance (Ibarraa et al, 2018). The analysis at industry sector level underline the usefulness of partnerships among corporations in different industries. To foster the sustainability of circular economy it is necessary a shift in business model that can capture the value created and delivered with environmental sustainable products and services. So it could be possible compensate the eventual rebound effect due to an increase in efficiency with an improvement in product quality services. Cooperation framework among different corporations can improve the value context of circular business model. In this case the value capture is more related with new revenues streams rather than with cost saving dynamics. Institutional pressure have an important role in enhancing information technologies that are useful for circular economy.

Keywords

Circular economy, sustainability, business model

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Developing a Sustainable Business Model to make the Textile Industry Circular through Wastewater Treatment

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Extended abstract

Introduction

Water crisis is one of the most important global risks influencing humanity, putting increasing pressure on our global resources and the climate. Sustainable Development Goals stress the importance of increasing water-use efficiency across all sectors. Industry constitutes a significant water polluter since a large amount of its wastewater does not receive treatment prior to its disposal in the environment. In particular, textile industries are one of the largest generators of wastewater as a large amount of water is used in dyeing, rinsing, conditioning and finishing processes (Singh et al., 2019). One of the greatest sources of wastewater is brine effluent, a hypersaline concentrate created during the water treatment in the industries (Jones et al., 2019). Brine concentrate is linked with numerous negative environmental impacts such as the pollution of groundwater or the alteration of water's properties (Ariono, Purwasasmita & Wenten, 2016; Panagopoulos, Haralambous & Loizidou, 2019).

In an effort to tackle the challenges that brine discharges impose, both in terms of management and costs, the textile industry should shift to solutions that promote sustainability as has been highlighted by researchers, practitioners and policy agents (Desore & Narula, 2018; Lee, 2017; Luján-Ornelas et al., 2020; Roy, Sen & Pal, 2020). The Circular Economy (CE) is a promising approach to transform the current linear model of production and consumption that place a substantial burden on earth and its environmental ability (Walmsley et al., 2019).

Generally, the textile industry has a very linear business model that is highly competitive (EEA, 2019; Ly, 2021). However, the implementation of Circular Business models could shift the non-sustainable 'take-make-waste-paradigm' to sustainable business model innovation that concentrates on

creating value for a broader range of stakeholders and takes into consideration the benefits from societal and environmental perspectives (Bocken, 2015).

Purpose of Research

The aim of this study is to explore and develop a Circular Business Model for the treatment of brine wastewater generated by the textile sector. In this way, this report can showcase the benefits of applying circular economy techniques not only in terms of environmental value but also economic and social.

This work revolved around the ZERO BRINE (zerobrine.eu) project which aims at facilitating the implementation of the Circular Economy Package and the SPIRE Roadmap in various process industries by developing the necessary concepts, technological solutions and business models to redesign the value and supply chains of minerals. The project involves four large scale demonstrations in the Netherlands, Spain, Turkey and Poland, while this work presents findings related to the demonstration in Turkey that relates to textile wastewater treatment. The concept of circular economy and Zero Liquid Discharge options were investigated for a textile industry. In this manner, treatment and recovery of the concentrated salt solution (brine) which can be reused in the dyeing baths of the textile plant and/or utilized as feed for salt production was achieved.

Methods

This study was designed as an exploratory case study research (Yin, 2009) by focusing on one textile case in Turkey. Case study research is recommended as a research methodology when the research problem is complex and needs to be understood within its context (Eisenhardt & Graebner, 2007). This study applied also action research, as the researchers involved were engaged in a process to co-design with the problem-owners (“Zorluteks” textile industry) and the technology providers (“The Scientific and Technological Research Council of Turkey”(TÜBİTAK), Marmara Research Center) that enabled the collection of rich information both from the technical demonstration of the proposed innovative technical solutions. A first recording of the textile enterprises’’ distribution and concentration in Turkey is provided in Figure 1.

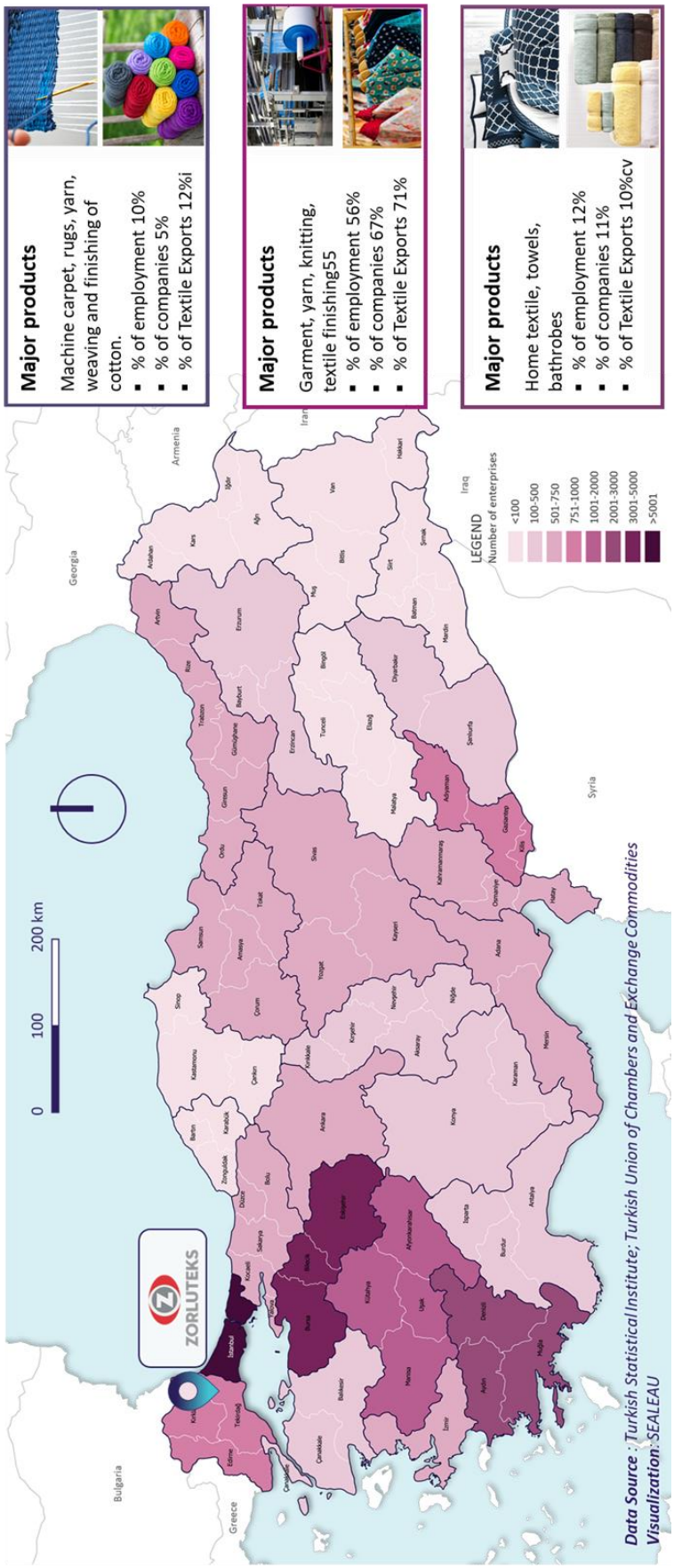
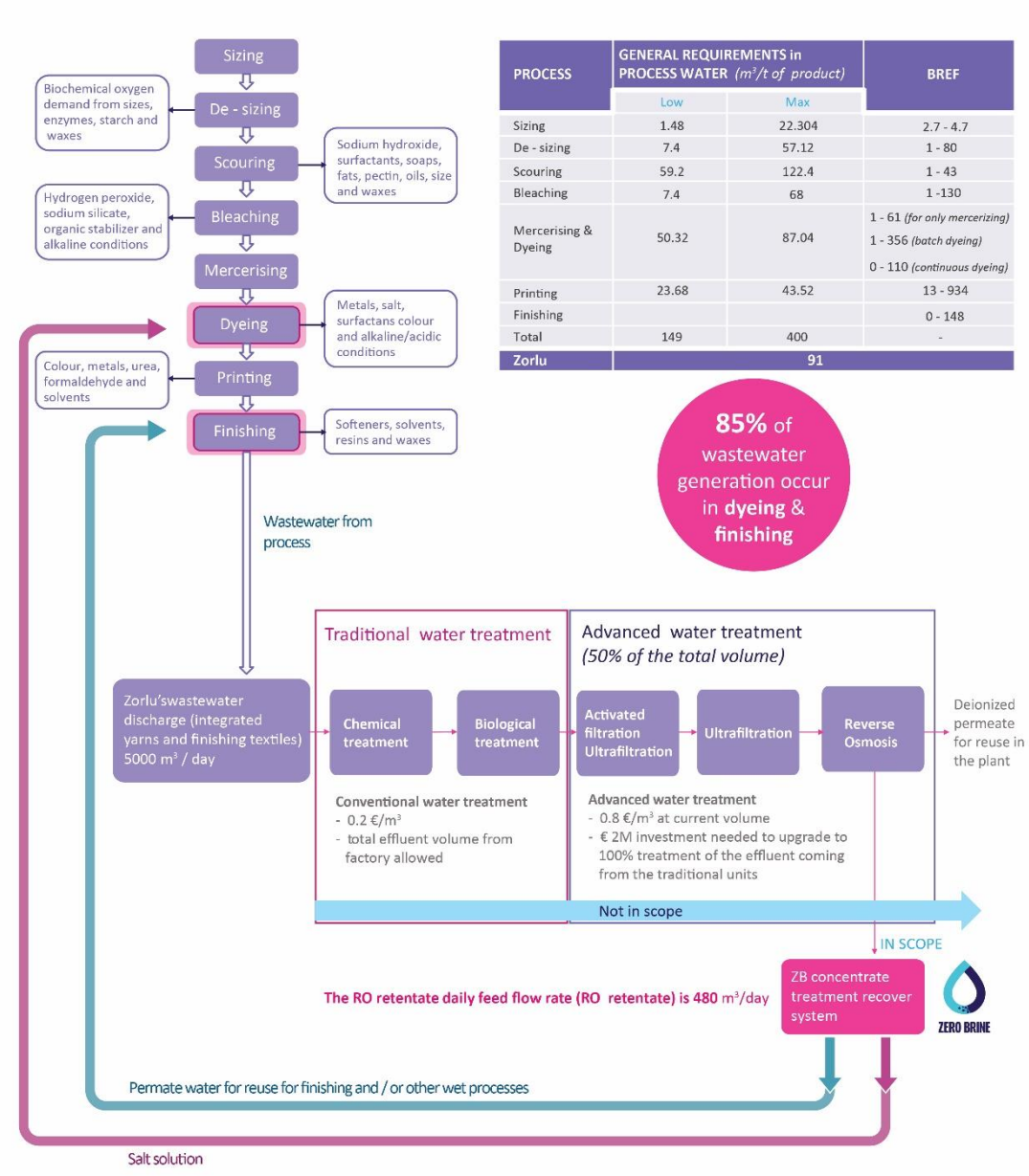


FIGURE 1: TEXTILE ENTERPRISES GEOGRAPHICAL DISTRIBUTION AND CONCENTRATION IN TURKEY



PROCESS	GENERAL REQUIREMENTS in PROCESS WATER (m³/t of product)		BREF
	Low	Max	
Sizing	1.48	22.304	2.7 - 4.7
De - sizing	7.4	57.12	1 - 80
Scouring	59.2	122.4	1 - 43
Bleaching	7.4	68	1 -130
Mercerising & Dyeing	50.32	87.04	1 - 61 *(for only mercerizing)* 1 - 356 *(batch dyeing)* 0 - 110 *(continuous dyeing)*
Printing	23.68	43.52	13 - 934
Finishing			0 - 148
Total	149	400	-
Zorlu	91		

FIGURE 2: CONCEPTUAL OVERVIEW OF THE TEXTILE WASTEWATER TREATMENT

Preliminary Results and Discussion

The value proposition to the textile sector could be formulated as follows: "Increasing resource recovery yields through advanced wastewater treatment methods in the textile sector". As already highlighted by many researchers, sustainable business model literature takes into consideration, not only the economic but also ecological and social value arising from the exchange process with the stakeholders (Bocken, 2015; Masud et al., 2019; Joyce & Paquin, 2016; Lüdeke-Freund et al., 2020). Therefore, the sustainable business model in this report follows the triple bottom line as three key elements are included in this value proposition; *profit*, *people* and *planet*.

Profit

By applying the ZERO BRINE processes, the company could capture a new Circular Economy value of up to 0.43 €/m³ of brine treated (see Figure 3). However, the costs of implementing the ZERO

BRINE system are higher than the revenues. One reason behind that could be the low water prices, depending on the region, and low salt costs in Turkey. With the increasing water scarcity, positive achievements could be seen with the increase in the value of water.

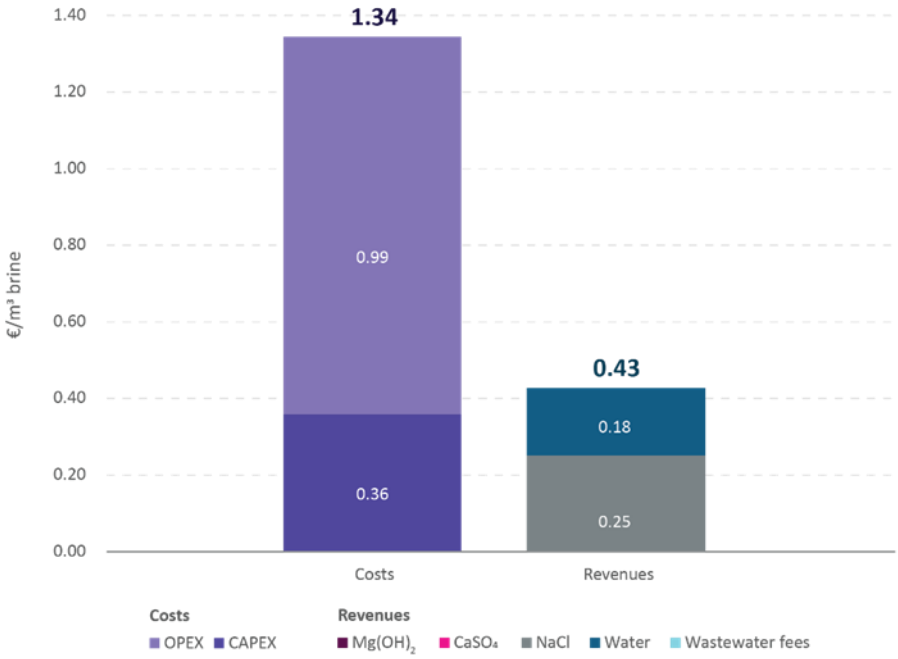


FIGURE 3: COSTS AND REVENUES PER M^3 OF WASTEWATER TREATED FOR THE TEXTILE CASE STUDY (FULL-SCALE IMPLEMENTATION)

The main driver for the textile companies to apply these circular economy techniques is the improvement in the visibility of the enterprise due to increased concerns for environmental issues, and also the relevant growth in export potential with good market value. Textile industries have expressed interest in full-scale implementation of the proposed system.

Planet

The textile industry is responsible for various environmental impacts, mainly due to wastewater discharges that contain various chemicals, dyes, salts and other auxiliary materials from unit processes. Furthermore, the textile industry is a highly water-intensive sector. Water consumption ranges between 60 to 120 L/kg for cotton products and 110-650 L/kg for wool. Extensive water use is required for processes such as dyeing, rinsing, conditioning and finishing operations (see Figure 2) (European Commission, 2019). Another important issue is salt usage in the textile industry. Salt is consumed for dyeing cotton or linen fabrics and acts as a raw and auxiliary material. For this reason, the wastewater generated as a result of the processes carried out contains high levels of salt and these flows can be described as brine. Brine can cause significant environmental problems if discharged to the receiving bodies due to its high concentrations of pollutants such as salt, organic matter and toxic chemicals. In this line, it has been stated that the ZERO BRINE system allows a NaCl recovery rate of 66% for dyeing processes and clean water recovery up to 77%. Furthermore, the organic load to be discharged might be reduced by 90% (Partal et al., 2022).

The LCA studies of textile brine treatment system have been studied within the ZERO BRINE project. The findings indicated that the best comparative performance of the ZB system is observed for

resource depletion due to the recovery of salt and water. On the other hand, when compared to a reference system, electricity consumption was found the major contributor to the impacts. On contrary, sodium chloride recovery provided most of the benefit in terms of greenhouse gas emissions (Harris et al., 2021).

People

Furthermore, the creation of new job alternatives for technical personnel in both textile and other relevant enterprises for various sectors including environmental fields (wastewater treatment and reuse companies) is of crucial importance. Finally, yet importantly, the saline wastewater streams generated by the industry are reduced, decreasing the environmental impact of brine, and minerals and water are recovered. Furthermore, in the basins where wastewater is discharged, sustainable agricultural activities can be ensured by preventing problems such as salinization. Thus, the salinization problem that the people of the region will encounter in agricultural activities can be prevented.

Subsequently, we define the creation of value that is structured around three key elements; the key stakeholders, the key activities and the key resources & capabilities. For the textile case study, the key stakeholders are:

Technology and knowledge suppliers: In this case, all the technologies applied were provided by The Scientific and Technological Research Council of Turkey (TÜBİTAK), Marmara Research Center.

Textile industries: The textile companies in Turkey are more than 52,000 and 160,000 in Europe. More particularly, in Turkey, there are approximately 3000 textile finishing enterprises that are active and most of them use salts in the dyeing process. Therefore, dyeing process effluent can also be characterized as a brine stream and ZERO BRINE technology can be used at the source of the stream by a cleaner production approach.

Water Users: The consumers of the water recovered

Chamber of Industries: Constitute important stakeholders to disseminate and inform their members about the project results.

Organized Industrial Zones operating relevant to textile: It closely follows the water and material recovery practices that are in line with the Green Deal.

Associations: Turkish Textile Associations are important actors in the textile sector in Turkey and among these, some of them also have connections with the European Apparel and Textile Confederation (EURATEX).

European Commission: Even though Turkey is not immediately affected by the EU policies, it follows the updates such as the EU Green Deal. Furthermore, EC is an important stakeholder in the application of the ZERO BRINE project in EU textile companies.

The key activities are the brine treatment and the water and salt solution recovery that are going to be used internally in the industry. However, there is also the possibility of external valorization. The key resources and capabilities of the applied technologies (in this case Ozone Oxidation, Nanofiltration, Reverse Osmosis and Ion Exchange) and the knowledge around the system. After the creation of value, it is important to deliver the value to the customers and to identify the right channels to do it. The targeted customer segments are textile industries that may be willing to purchase the system and the industrial water market for the recovered water. It is aimed to have

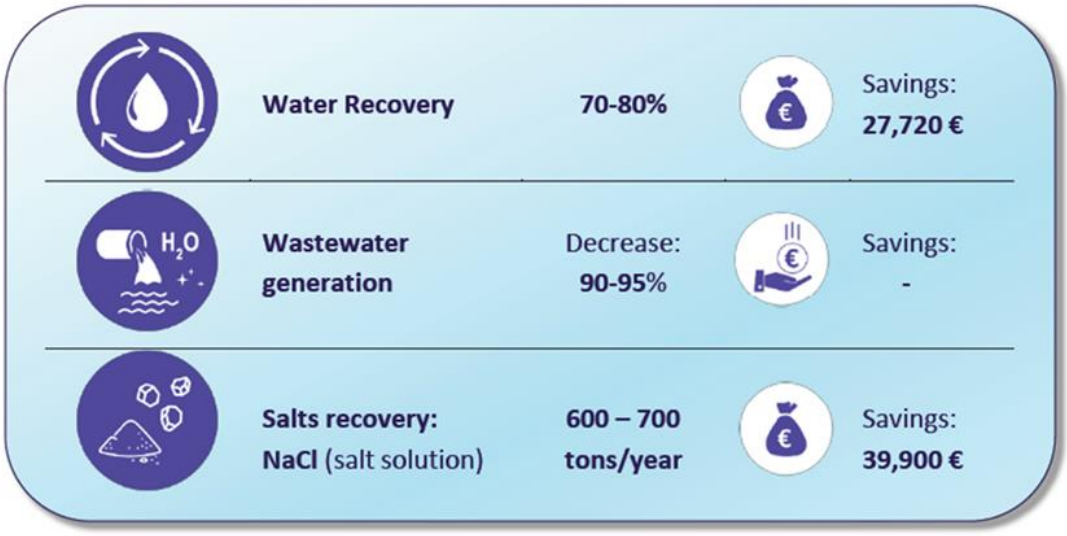
close relationships with the customers of the system, meaning to form Communities of Practice to co-create, improve and tailor the solution to the needs of each customer. Furthermore, personal assistance will be provided to each customer to support the operation and maintenance of the system. Last, the main channels to reach the ZERO BRINE project are through personal communication with the interested parties and the relevant textile associations, they could act as a channel to disseminate and inform its members about the project results.

Lastly, concerning the value capture, this report applies the Life Cycle Costing (LCC) technique by taking into consideration two components in line with (Swarr et al., 2011):

Costs linked to its development or use, (e.g. CAPEX, OPEX etc.)
Costs imputed to environmental externalities linked to the product, service or works during its life cycle (e.g. cost of emissions of greenhouse gases and other climate change mitigation costs).
For the conventional LCC, two elements were taken into consideration; the cost structure and the revenues streams. For the financial analysis, we calculated the total Capital Expenditure (CAPEX) and the total Operating Expenditure (OPEX) (see Table 1). The CAPEX include the costs for Ozone Oxidation, Nanofiltration, Reverse Osmosis, Ion Exchange and Cleaning-in-place units. For the OPEX, maintenance and electricity and chemicals consumption were considered. Regarding the revenues, the savings for the recovered water and the salt solution were calculated. It was assumed a feed stream of 20 m^3/h with 5.2 g/L of Total Dissolved Solids (TDS). The preliminary results are presented in Table 1.

TABLE 1: CAPEX, OPEX & SAVINGS FOR THE ZERO BRINE APPLICATION

	CAPEX (€)	**OPEX (€/year)**
Ozone Oxidation	159,371	45,796
Nanofiltration 1	113,209	35,507
Nanofiltration 2	68,209	12,915
Reverse Osmosis	108,209	41,756
Ion Exchange	28,035	15,114
CIP	7,215	4,989
Total	**484,249**	**156,078**



Acknowledgement

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Keywords

Textile Wastewater, Sustainable Business Modelling, Circular Economy, Wastewater Treatment

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The chance for a circular business ecosystem in the wastewater treatment industry in southern Portugal

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Extended abstract

In the field of management, business models are defined as "the rationale of how an organization creates, delivers, and captures economic, social, and other forms of value" (Osterwalder et al., 2005; Osterwalder & Pigneur, 2010). Foss & Saebi (2018), emphasize the business model architecture, as a mapping of the functional relations among the firm's value creation, delivery and appropriation mechanisms and the underlying activities.

A circular business model needs to add the principles of the Circular Economy to the offering. Therefore, forms of value aligned to circularity and sustainability must be at the core of the value proposition. The benefits of circular economy solutions may seem very small, when considered only from the point of view of a single company, or even an industry, in charge of their implementation. A single company/industry perspective can, in many cases, inhibit the adoption of innovations with undoubted economic and environmental benefits.

While the business model perspective typically focuses on how a company does business (Konietzko et al., 2020), defining the entire business model around a focal organisation, there are other perspectives that broaden the focus, taking into consideration the contributions of all agents involved in the value proposition.

In a business ecosystem, different companies and agents collaborate to develop new value propositions in such a way that none of the participating organisations could generate that value proposition independently. They compete and cooperate at the same time, evolving together, to support new products and meet customer needs (Moore, 1993). The Business Ecosystem approach opens new perspectives from which to understand changes in the management of innovation, structural adaptations of organizations and the evolution of the nature of inter-firm interactions (Parisot et. al., 2013).

Circular economy solutions often require traditional linkages among key partners, and other stakeholders, to be strengthen. Following, Konietzko et al. (2020), we argue that a business model perspective is too narrow to achieve higher levels of circularity.

The aim of this paper is to show the relevance of linkages among different agents and how they are built into a new cooperative and innovative process. We show how different organizations may cooperate to implement a new circular economy solution in the field of water mining. The paper is focused on a case study which is being developed within the H2020 project Water Mining. The case shows how the application of the Nereda® technology to the wastewater treatment process in southern Portugal supports the transformation of wastewater sludge into a new valuable product, which is called *kaumera*. Kaumera is a novel bio-based resource obtained from the granular anaerobic sludge resulting from the wastewater treatment process, with, potentially, multiple market applications.

We adopt the business ecosystem approach to better reflect how wastewater plant operators, technology providers, public institutions, and other relevant stakeholders, may engage into new stronger relationships that allow for the deployment of circularity innovations. As a result, the outcome of the wastewater treatment process is improved from an environmental perspective, while increasing economic returns.

The research is based on a qualitative methodology. The analysis follows a step-by-step process, which combines desk research and semi-structured interviews. The first step consisted in the analysis of the business model, based on the discussion of the main business model components, e.g., value proposition, value creation and delivery, and value capture. The second step consisted in identifying and analysing the relevant partners in the business ecosystem. This was conducted through semi-structured interviews with the identified partners. Finally, the circularity of the value created within / by the business ecosystem was based on a multicriteria approach.

Business ecosystems help to describe how increased value outcomes may be distributed not only among wastewater treatment partners, but also with customers, public institutions, and society at large, who benefit from the environmental improvements of the wastewater treatment process. Circularity is gained through the reduction of the amount of sludge that needs to be managed, the recovery of valuable materials, the reduction of energy consumption, and the enhanced efficiency of wastewater treatment facilities. Business ecosystems also allow for the consideration of non-market values, usually ignored in traditional business models, that represent an important share of the benefits society may gain from circular economy solutions.

Findings may be relevant to stimulate the participation of potential members in circular business ecosystems, particularly in those fields where the benefits are widely distributed among companies and society in general. Our results can also help policymakers to better understand the total benefits derived from circular economy innovations and thus facilitate their implementation and the achievement of circularity objectives.

Keywords

Circular business ecosystems, circular economy, business models, water mining, wastewater treatment.

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Elements of circularity in business models

How companies integrate circular economy principles into their business models to enable circularity transitions

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Abstract

The transition from a linear economy to a circular economy requires new ways of organizing business. Businesses models help to achieve systemic transitions. In this study, we explore how companies aiming to contribute to a circularity transition incorporate circular economy principles into their business models. We conducted a single case study of the Dutch building sector. We found that what is often called a circular economy business model, is not necessarily a fully circular business model – but a 'regular' business model that contains a combination of different 'elements of circularity'. These elements of circularity are: Product composition, use of product, revenue model/ownership, 'circular' production processes, end-of life treatment, and enabling services. Few businesses implement truly circular business models. Rather, companies add one or several 'elements of circularity' to their business model.

Closing the loop: A transaction cost perspective on product-oriented PSS

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Abstract

Academia discusses Product-Service Systems (PSS) as a business model to operationalize the circular economy. While use-oriented and result-oriented PSS are deemed to contribute most significantly to sustainability, in practice the most implemented type is product-oriented PSS. Hence, the question arises of how to leverage this potential for sustainability. One business model element of product-oriented PSS contributing to a circular economy is take-back: Products are collected to recover the product or material value. To do so, the consumer is decisive because in product-oriented PSS, the ownership of the product is transferred to the consumer. There is generally no formal contract or agreement for the consumer to return the product. Hence, for the consumer to take action, benefits must outweigh the costs. This paper adopts a transaction cost perspective on take-back to analyze consumers' costs for product return. The qualitative approach to answer the research question includes 14 interviews with experts from companies, start-ups, and organizations that run a take-back scheme and two consumer workshops. Based on the findings, I advance the current framework on transaction costs for product return. In doing so, this paper contributes to the theorization of transactions within a circular economy, especially product-oriented PSS, while also uncovering design elements for practitioners to create or improve take-back Schemes.

Track 2.1 - Data-driven Business Models for Sustainability and Digital Transformation in Emerging Fields

Track chairs: *Maya Hoveskog, Magnus Holmén (Halmstad University) and Lauri Paavola, (Aalto University)*

This track aims to explore how data-driven business models contribute to digital transformation and shape the overall ecosystem value propositions for sustainability. It intends to empirically analyze and conceptualize the emergence of the overall ecosystem value propositions for sustainability as well as the structure of such areas.

The track is focusing on, but not limited to, the interplay between products and service vs. data-driven business models for sustainability and ecosystem; data acquisition strategy and new business models; the role of digital platforms for sustainable business model innovation; methods for developing sustainable, data-driven business models and ecosystems.

Finally, the track is looking for cases of application of emerging technologies such as, for example, machine learning, artificial intelligence to business models for sustainability and ecosystem.

Business Model for Sustainability to Tackle an Energy Transition Initiative: Motivations and Antecedents

The case of a global manufacturing company

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Abstract

Energy transition is one of the most significant transformation that companies will face over the next decades. It addresses the UN Sustainable Goal #13 on Climate action as it aims to achieve decarbonization targets. Whereas literature dresses a list of motivations and antecedents for a company to address this, the impact of such transformation on the company's business models remains underexplored and the business case remains to demonstrate.

Building on literature on business models, business model innovation and business models for sustainability, this paper first dresses the theoretical list of antecedents and motivations that lead companies' managers to define and implement an energy transition strategy. Adopting an in-depth investigation approach, it then checks this list on a real case. The case of a global manufacturing company that recently announced an investment plan toward energy transition to accelerate global decarbonization, is in-depth investigated. It reveals the emergence of new antecedents such as (1) digitalization, (2) advancement of specific technologies, (3) the company's own culture.

Beyond contributing to understand the strategic motivations and antecedents of a traditional company to accelerate changes in the business model toward sustainability, this paper contributes to the literature on Business Models for Sustainability.

Keywords

Business Model, Business Model for Sustainability, Digitalization, Energy Transition, Sustainable Technology.

Introduction

Business Model (BM) and Business Model Innovation (BMI) have recently drawn the attention of several research communities, including business, strategy, technology management, and sustainability (Foss & Saebi, 2018).

Throughout the last decades, BM has gained popularity from both academics and practitioners (Zott, Amit & Massa, 2011). Literature on BM has expanded dramatically during the previous two decades (Foss & Saebi 2017). As Zott, Amit and Massa (2011) argued, the role of scholars, regarding BM, is to develop and highlight the key distinctive factors to conceptualize the phenomenon from other relevant concepts by rigorous theoretical "building blocks" that can describe the mechanism of the theory from antecedents and consequences. Specifically, how to increase the level of theoretical readiness around business model in relationship to sustainability framework it rises from critical assessment of BM theories. Most recently, a call by Snihur and Bocken (2022) in their essay *"A call for action: The impact of business model innovation on business ecosystems, society and planet"*, empathize the need of investigation on sustainable business model innovation, in order to better grasp factors that can create a long-term value for companies aiming at adding social and environmental scopes to the economic scope of their BM.

Massa, Tucci and Afuah (2017) while describing possible future directions for BM, empathize the need of formal modelling BM for sustainability (BMfS) considering a set of dynamics (e.g. key factors). In 2016, Schaltegger, Hansen and Lüdeke-Freund (2016) argue that the nature of the BMfS can also appear from organizations there are observed as capable to create new value by maintaining a "green" orientation. In this case, authors also call for modelling of such BM either for individuals or organizations, by adding theoretical constructs to the system dynamics.

New emerging theories regarding BMfS will emerge from well-established business model and business model innovation theories as a sub-field or as a stand-alone theory (Lüdeke-Freund & Dembek, 2017). Therefore, academics have started to investigate the link between BMfS with current available theories (Schaltegger, Hansen & Lüdeke-Freund, 2016). As argued by Schaltegger, Hansen and Lüdeke-Freund (2016) the BMfS exists also to share value across multiple stakeholders that they might be different from the traditional assumption of BM (Massa, Tucci & Afuah, 2017).

Most recently, Pereira, Niesten and Pinkse (2022) pointed out that how companies pursue strategic goals and the management motivations to engage with BMfS in the area of sustainable energy generation are still not fully explored.

In order to debate about the antecedents and motivations for companies moving their business model to BMfS, this research first reviews theoretical foundations then investigates a case study. A global company operating in power management and energy transition is chosen. This company is currently implementing its energy transition strategy. Such an investigation will show evidence of challenges to traditional BM (Massa, Tucci & Afuah, 2017) while moving forward sustainable initiatives. Senior managers of a global company addressing the UN Sustainable Goal #13 with defining and implementing an energy transition strategy are interviewed and analyzed to reveal motivations and antecedents of such a strategy.

By doing so, we expect to contribute to the literature around alternative forms of BM and BMI that in this specific case focuses on sustainable energy initiative including BMfS. Hence, the paper aims to explore the drivers and antecedents in the domain of business model for sustainability within an emerging strategic initiative of a global company. In particular, the role of digitalization and emerging of sustainable technology in the energy management is debated including their position

as a factor. The result comes from an empirical study of a division of a global manufacturing organization that operated in the Europe, the Middle East and Africa (EMEA) region and based in Switzerland. Where in this case, the implementation of the strategy it is still developing as the energy transition is a phenomenon currently occurring.

Therefore, part 2 presents the theoretical background and explains the link between BMfS and energy transition. Part 3 describes the research method to address the research question. This section also states the reasons to select the case study of a global manufacturing company. Part 4 presents data collection, data analysis and results including the approach to interviews and how the data are processed. The discussion of results and the relative details are argued in part 5. Finally, last section presents the conclusions of the work and possible future developments.

Business model for sustainability – insights from the literature

The conventional idea of the business model is based on the concept to deliver and maintain value for customers, as well as on process optimization (Massa, Tucci & Afuah, 2017; Zott, Amit & Massa, 2011). BMfS might be observed as a reconfiguration of BM toward sustainability. In this case the concept of sustainability refers to the merge of environmental topics inside a company strategy, operation, and business model to be able to maintain economical footprint while contributing to environment via a sustainable development (Massa, Tucci & Afuah, 2017). Previously, in 2016, Schaltegger, Lüdeke-Freund and Hansen (2016) claimed that BMfS could also appear as a co-evolution of large and small companies toward transformation of their business model.

As described by Massa, Tucci and Afuah (2017), the definition of BMfS provided by Schaltegger et al. (2016) implies that organizations have a responsibility to develop innovative solutions that transform their environmental challenges into market opportunities. Hence, by looking at the triple bottom line, a business can generate value for multiple stakeholders whilst being an engine of societal progress. Thus, BMfS implies innovations reduce the negative impact on the environment and/or society by having organizations that can deliver economic value or change their value proposition. This is achieved by adopting BMI or innovation strategies toward sustainability (Bocken et al., 2014). Therefore, these innovations can impact at the strategic level such as: value proposition, supply chain, customer interface, and financial model, or alternatively they might be technological, organizational, and / or social innovations (Boons & Lüdeke-Freund, 2013).

Also, the profit-oriented business models are a significant constraint impeding sustainability progress for many organizations (Upward & Jones, 2016). BMfS expands the scope of BM due to the possibility of creating other types of value such as social and environmental, and to deliver this to a more extensive stakeholder group (Freudenreich, Lüdeke-Freund & Schaltegger, 2019). Stubbs and Cocklin (2008) also debated this shift, which showed that the success level of a BMfS is linked to a multitude of shareholders. This expansion of shareholders includes local communities, suppliers, partners, employees, as well as customers.

Regarding BMfS or often called sustainable BM, it might be seen as integrated into the traditional theories of the business model and corporate sustainability, even if elements consider this theory as a stand-alone or sub-fields of BM and corporate sustainability (Lüdeke-Freund & Dembek, 2017). In this context, the most appropriate approach is to consider BMfS integrated into traditional

theories where they partially overlap with BM and BMI through framework, tools, canvases, resources and factors behind established fields (Lüdeke-Freund & Dembek, 2017).

Link between BMfS and Energy Transition

Bohnsack, Ciulli and Kolk (2021, p. 828) stated that the current stage of energy transition is characterized by coexisting of both new business and previous business models, whereby energy transition is 'the shift from fossil-fuel-based electricity generation to renewables and more sustainable sources'. Pereira, Niesten and Pinkse (2022) further studied how energy transition is driving changes in the business model of utilities that operate in the area of sustainable energy generation. Therefore, current transformation in the energy industry has mobilized the academic community. It results in multiple studies investigating the modifications in the business model toward more sustainable energy innovation and retention looking at different type of activity and organization such as utilities (Pereira, Niesten & Pinkse, 2022), European electricity firms (Bohnsack, Ciulli & Kolk, 2021), electric vehicle (EV) manufacturers (Bohnsack & Pinkse, 2017; Bohnsack, Pinkse & Kolk, 2014), urban districts (Gauthier & Gilomen, 2016), or solar photovoltaic generation (Vernay et al., 2019).

All these studies provide an overview of how companies are converting their business models to embrace sustainable energy generation and how those models reflect the value creation, delivery and capture moving (Pereira, Niesten & Pinkse, 2022) from traditional definition of business model to a new theory that focus on business model for sustainability (Bocken et al., 2014; Boons & Lüdeke-Freund, 2013; Schaltegger et al., 2016).

In this article we want to investigate the following research question:

Research question: What are antecedents for recent energy transition initiative of manufacturing companies that are moving their business model?

Therefore, to answer the research question, this research adopts an in-depth investigation method based on case study.

Research method and business context

Research Method

The research data is based on qualitative data and interviews. The data capture from interviews are primary data collected directly from senior management of company in the case study. Indeed, the semi-structure interviews have allowed to create a map between input and output factors (Gray, 2004) that are linked back to the gaps coming from the literature. Moreover, semi-structure questionnaire adopted during the interviews provides certain level of flexibility to explore a phenomenon from different angles and eventually to let emerge new factors (Gray, 2004); i.e. factors not cited in the theoretical list.

Indeed, the nature of qualitative research tends to be more explorative and to leave open-end consideration instead that pre-codes questions and response (Jackson, Easterby-Smith & Thorpe, 2015). One remarkable characteristic of qualitative approach is to emerge from different type of source to gather data either observations or interviews (Gray, 2004).

Case Selection

The current vision of the European Commission is that the buildings have a great potential to contribute on the 2030 and 2050 decarbonization objectives as they are responsible for the 40 % of the energy consumed and they contribute to 36 % of greenhouse gas emissions (European Commission, 2021). Most recently in December 2021, the European Commission have recasted the directive related to the energy performace of buildings where they reinforced the message that the goal is to reduce the energy consumption of the buildings while making them more energy efficient and less dependant from fossil source of energy.

In this context, a division of a global manufacturing company that operates at Europe, the Middle East and Africa (EMEA) level which provides offering in the energy efficiency of buildings including energy storage, microgrids, EV charging station and related software for energy management, is a relevant setting. The company can deliver high quality product and services in the space of power management to its customer globally with an annual revenue above 17 billons dollars. This company is ideally to observe transformation toward sustainable solution and digitalization as the announced during 2021 investor meeting.

In 2021, the global leadership team, during the annual investor conference, announced the company strategy toward energy transition for their electrical sector. This was the result of global strategy where each region decides to focus on one or more business segment. Before to define a global strategy for energy transition, the company was previously engaged in other sustainable initiatives. Indeed, over the last decade, the company started with energy storage focus both on residential, commercial & industrial and microgrid segments, where they partner with a major EV car manufacturer to provide first and second life lithium batteries and power management. Their offering is based on both new and used batteries coming from EV to be adopted also for stationary energy storage applications. After, the company decided also to invest in energy management system to expand the product offering together with software as a service. Most recently in 2021, the company acquired an EV charging stations and software charging point operator manufacturer. This allows to bundle together previous offering with EV charging station in order to provide more value to final customers

After having collected secondary data about the company (information is public available including comparison with peers, industry reports and business targets) and its official communication towards energy transition, the authors contacted senior leaders to participate to the study and to provide future update of evolution of the strategy deployment. Traditionally the division is based in Switzerland and supervises the whole business activities at EMEA level. This includes the design, the manufacturing, and the sales of power quality products, and energy storage solutions for their B2B clients. Some software solutions, mainly to facilitate user experience and energy management, are also provided to final customers.

Data and Analysis

Data collection

Secondary data were collected on the official website of the company, including investors conference, white papers and landing pages, as described in Table 2.

Primary data were collected through individual interviews conducted via online communication platform. Main senior leaders have been interviewed. In order to cover all geographical areas and directions such as general management, marketing, strategy, and sales, three individuals have been identified. All people interviewed were part of the global team for the definition of energy transition strategy inside the company. Each interview lasted between 45 and 60 minutes and was run during November and December 2021. They have been recorded, transcribed, and analyzed as displayed in Table 1.

The semi-structured interview questionnaire is presented in Appendix A.

TABLE 1: OVERVIEW OF THE INTERVIEWS CONDUCTED.

Role of the person	Responsibility	Type, date of contact
General Manager for electrical vehicle charging infrastructures, energy storage and microgrid	Responsible for the whole offering and business in the EMEA region	Web interview, 17 November 2021
Segment leader, Commercial & Industrial Building, EMEA	Leading the commercial and industrial building segment and involved in the energy transition strategy for buildings and electrical vehicle charging infrastructure	Web interview, 24 November 2021
General Manager and Sales leader for Italy	Responsible for the whole sales and market in Italy	Web interview, 23 December 2021

TABLE 2: OVERVIEW ABOUT SECONDARY DATA.

Date	Topic	Type of data
March 2021	2021 Annual Investor Conference – Electrical sector	Investor conference report out
January 2022	Understand how EV charging works in commercial buildings	White paper
2021	Energy Transition	Landing page

Data analysis

The data have been coded using a theoretical framework inspired by Foss and Saebi (2017). This framework was selected because it provides a set of in, out and moderator factors that it can be

appropriate to describe causality effects while bringing agility to describe the dynamics of a phenomenon that will evolve over the following years link the energy transition.

Hence, the data have been processed via a traditional axial coding (Gray, 2004) in order to categorize the factors, to provide context within the phenomena is occurring and to link them to future consequences. Indeed, axial coding is suitable for further interpretation of the phenomena as a causality interaction between several parameters (Gray, 2004). Therefore, the main idea was to use the questionnaire to stimulate the classical elements of the business model theories that they emerge from the literature review and to link them with other aspects (Jackson, Easterby-Smith & Thorpe, 2015). Those aspects include current claims in the literature regarding BMfS, stakeholders and performance factors.

Results

The energy transition initiative of the case study represents the result of previous activities toward sustainability that the company was already pursuing prior the announcement in 2021. This initiative is based on three main pillars for decarbonization, democratization and digitalization of the grid. Decarbonization is linked with the idea that carbon neutrality is required by 2050 and aligned with UN Sustainable Goal #13 on Climate action. Democratization and digitalization relate to the products and services that the company would like to offer to reduce the carbon footprint. Generally, during the interviews three main factors emerge as antecedents and motivators.

Figure 1 shows the map of the relationship between factors and how they are positioned. Of course, this map is an illustration of the current conditions of the organization analyzed. The key factors emerging from the research have a specific current orientation that is given by the management cognition of the subject.

Next section will discuss each of the findings from the case study.

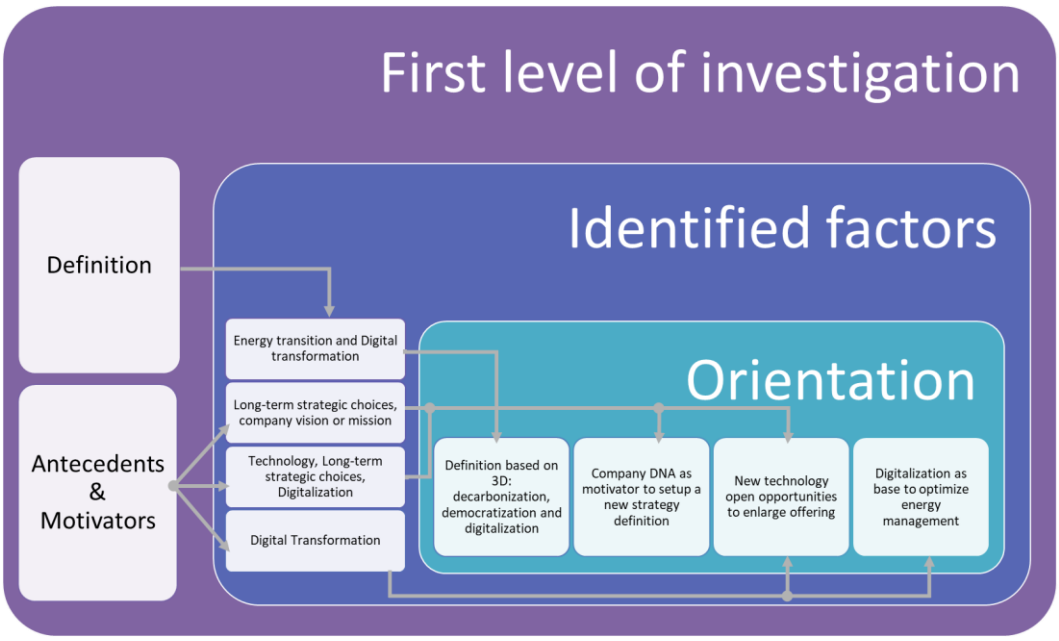

FIGURE 1: ILLUSTRATION OF THE RELATIOSHIP BETWEEN FACTORS AND THEIR ORIENTATION.

Discussion

In this section, we highlight the motivation and business model antecedents for energy transition that we are able to capture in this case study. We make the link with former literature.

Digitalization becomes an antecedent for the energy transition strategy

BMI is often described as taking advantage of new digital technologies (Foss & Saebi, 2017) by creating new value, developing a digital platform, and new business models (Amit & Zott, 2001). Digitalization is considered as an essential part of the value proposition, and is perceived as viable for BMI, particularly for those dynamic elements of the BM (Gauthier, Bastianutti & Haggège, 2018; Rachinger et al., 2019). Most recently, Pereira, Niesten and Pinkse (2022) have found out that digitalization allows smart energy management. Indeed, Pereira, Niesten and Pinkse (2022) demonstrates that once the utilities modernize their network by adding digital solution, communication, and software service then they might focus on more digitalized and decarbonized energy generation. This will allow to reconfigure their traditional business model toward sustainability.

Indeed, as debated by Vernay et al. (2020), the use of digital technologies in the energy sector represents a novelty and firms who operate in this sector. Therefore, digitalization is considering an antecedent because without it a full energy transition will be difficult to achieve. Indeed, digitalization is part of the definition of energy transition given by the company. Where, “digitalization has become one fundamental pilar of energy transition strategy of the company which is based on three components: decarbonization, democratization and digitalization” said the second interviewed.

Furthermore, digital transformation refers to a strategic transformation of an organization via digitalization (Caputo et al., 2021). Hence, digital transformation becomes a broad topic that can generate several outcomes. These outcomes include changes in the organizational setup such as new business models or intelligent and connected products/services. These also include changes in economics such as the improvement of firm and industry performances via process optimization or spill-over modifications such as the new customer-centric and connected market (Hanelt et al., 2020). For the specific case, digital transformation is considered as an enabler for digital services. For example, the maintenance and the operation at EV charging points or at grid level by collecting data and making meaningful for other companies. Digital transformation, as the general manager said, “is seen to leverage smart communication and connectivity between multiple assets such EV charging station, HVAC, PV inverter, energy management system and battery storage to maximize the energy self-consumption or to take autonomous decision to change how users consume or produce the energy”. This it might also affect internal process, buying/selling journey, and employees and customer experience.

Consequently, digitalization as argued by Sebastian et al. (2017) is considered as a way to provide a better user experience and as an enable of possible new product and services by reformulating the value proposition and creation. The novelty is represented where digitalization is positioned as a factor. Indeed, differently from utilities that prioritize digitalization to reinforce a centralization of the energy system (Pereira et al., 2022) in this case digitalization is considered as an enabler to trigger decentralization of energy. In this case digital transformation is helping management to

visualize new business models that can generate new organization structure to add value to the final customers (Volberda et al., 2021).

New technology open opportunities to embrace energy transition

Bohnsack, Ciulli and Kolk (2021) recently demonstrated new technologies such as, storage or demand response have increased the reliability of renewable energy installations in order to provide energy over a specific timeframe. Digital technologies have further boosted this antecedent by enabling direct communication with customers to: share electricity consumption; incentivize electricity-saving behavior; or optimize energy self-consumption (Bohnsack, Ciulli & Kolk, 2021). So far, technology becomes a key enabler to move toward new business models. Indeed, the volatility and intermittency of renewable energy will impact the grid stability. Hence, the grid to operate will require more flexibility to manage different problems and loads including demand response at both grid and site level (Pereira, Niesten & Pinkse, 2022). Furthermore, from the interviews emerge that the growth of new technology such energy storage and EVs could represent an opportunity but also a challenge for sustainable energy management. Indeed, from one side those emerging technologies could add capacity by extra resources that are available to help the grid when it needed while on the other side grid operators such utilities and distribution system operators will require to balance between the supply and the demand of the energy (Helms, Loock & Bohnsack, 2016). Indeed, some of the segments involved in the energy transition will change their traditional way to operate. This is for example the case of the buildings that in the future will be also able to produce energy and to support the grid wherever it is demanded. The same rule could apply to EV or any other battery available that eventually might provide extra capacity to help the grid when other resources are not available.

Meanwhile, as argued by Helms, Loock and Bohnsack (2016), companies in the energy sector create new business model to satisfy the need of time-base flexibility. This aspect, as emerge over the interviews, will become more relevant with EVs where high demand of energy and power might create congestion points that the grid operators will need to manage. This implies, as the segment leader stated, that in the "future the flow of the energy will be more and more complex, impacting the whole traditional way to distribute energy that is moving from centralized to decentralize approach". Still there are some open points especially in the regulation such as for example vehicle-to-grid, to handle the energy flow from EV battery to grid, where it is not fully standardized. Those could add extra complexity in the development and prioritization.

Company DNA plays a key role on motivation toward a new strategy definition

Bock et al. (2012) demonstrated that the company culture and the strategic flexibility of an organization can affect the innovation of the business model phase. They also argue that culture is a key driver in the business model innovation. BMI appears as a tool for transforming and reviewing the BM (Demil & Lecocq, 2010), and is key to firm performance (Zott, Amit & Massa, 2011). It might also be a "permanent revolution" as the continuous choices each firm makes have consequences on the BM (Casadesus-Masanell & Ricart, 2010, pp. 198-200). Therefore, as Demil and Lecocq (2010) argue, managers must constantly review their portfolio of competencies and resources to modify the organization or alter those BM elements to best exploit the corporate potential. This implies that every firm makes choices with consequences on its functioning, even if there is no viable long-term strategic plan or a satisfactory BM (Casadesus-Masanell & Ricart, 2010). In the

specific case study, the company DNA has been the key driver in the strategy definition for energy transition. Across all interviews we realized that behind the implicit motivation to increase financial performances, current transition in energy sector is creating demand for sustainable approaches to satisfy multiple stakeholders including investors, customers, shareholders, employees, and markets where the company plays.

Conclusion

This article explores what are the initial motivations and antecedents for a global power management company embracing sustainable activities to tackle energy transition. We have recorded that digitalization is becoming a central part of its strategy because it can enable additional value for customers and generally it can change the customer relationship (Parida, Sjödin & Reim, 2019; Boons & Lüdeke-Freund, 2013) that are fundamental for the success of the energy transition strategy of the company.

Other factors have been also identified such company's DNA and technology that are considered as main drivers to trigger innovation in the business model. Nevertheless, lack of clearance in some policy or standard, like for example in the case of vehicle-to-grid to regulate the energy flow from EV to grid, it is creating difficulty in the company prioritizations, investment plans and in the shaping of firm's business model.

Finally, the paper contributes to the literature on new business models related to the sustainable energy transition by examining a specific case of a division of a global company. These can help to inform practice in other organizations and industries for managers and researchers interested in the potential of new business models in such contexts.

Moreover, there are several unresolved topics with regard to the impact on business model for companies engaging in the energy transition. With regard to the future positioning of the factors considering the management cognition and the initial and boundary conditions, it remain unexplored.

Future analysis might consider the map of other set of factors as well as moderators and outcomes to study how the company is adjusting its business model toward sustainable energy management and how this might challenge the traditional view of business model by delivering benefits to multiple stakeholders. Possible future exploration might look at the adjustment of the skillset and management cognition along the evolution and dynamics of the new business models. Those topics refer to the exploration of the how and the intensity that new organizational structure and activity reconfiguration will impact the performance of BMfS.

We conclude that the rising of business initiatives about sustainability and in this case around sustainable energy management, it could further booster literature on business model for sustainability and contingent theories.

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Appendix A - Interview questionnaire

Initial questions

1.1 Could you introduce yourself? Roles, background, etc.…

1.2 How do you define energy transition within your company?

Antecedents and Motivators

2.1 What is the division motivations to engage in the energy transition?

2.2 Could you list main drives (external or internal) for adopting an energy transition initiative?

Internal/Long term strategic choice.
Internal/Digital transformation of the company.
External/Technology.

Do digitalization and/or digital transformation of your division help to the energy transition initiative? Please describe.

Early-Phase Business Model Design: A Structured Approach for a Digital Discovery Platform

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Abstract

The present paper aims to validate commonly used business analysis methods to obtain input for an early phase business model regarding feasibility, desirability, and viability. The research applies a case study approach, exploring the early-phase development of an economically sustainable business model for an open science discovery platform.

Keywords

Business Model Innovation, Business Model Design, Platform Business Model, Open Science, Multi-Stakeholder

Introduction

Although much research has been conducted on business model innovation (Osterwalder, 2010; Gassmann, 2013) and business model design (Zott & Amit, 2010), there are only a few proposals for a structured business model design process, and, to the best of the author's knowledge, none that specifically address the early phase development of multi-stakeholder data platform. The main research objective of this paper is to select and validate commonly used business analysis methods to provide insights into an initial Business Model (BM) in terms of feasibility, desirability, and viability.

The central use case of this research is an EU project that aims at designing and developing a European discovery platform dedicated to Social Science and Humanities (SSH) resources[12]. The project consortium follows the approach promoted by the European Commission (EC) that publicly-funded research should lead to the exploitation of results, which goes one step further than the

[12] H2020 Project TRIPLE (Transforming Research through Innovative Practices for Linked Interdisciplinary Exploration) https://project.gotriple.eu/

mere production and dissemination of new scientific knowledge (EC, 2013). One of the project's main objectives is to create a valuable and viable BM for the digital multi-stakeholder platform that is economically sustainable beyond the project end.

In general, the project activities are guided by Alan Cooper's interaction design principle: "A successful digital product needs to be desirable, viable and feasible." (Cooper et al., 2007). In the project's exploitation considerations, these principles are also applied in developing a suitable platform BM. The BM design process for such a digital multi-stakeholder platform is very challenging due to certain constraints such as i) restrictions concerning the function and feature set due to the specifications in the grant agreement, ii) uncertainty about whether the (multi-sided) platform offering is in line with stakeholder needs and iii) diverse interests of multi-disciplinary projects partners concerning the commitment to maintain the platform after the project ends. A structured approach at that early stage of the project aims to support the development of an economically sustainable BM after the project ends. Specifically, we seek to answer the following research question:

RQ: How do commonly used business analysis methods support the development of an early phase business model regarding feasibility, desirability, and viability?

Background

Open science (OS) has received increasing attention in recent years, as scientific knowledge is a crucial resource for increasing economic and social growth (Fell, 2019). OS's aim is to make science and data findable and openly accessible. In recent years, the EU has strongly promoted and funded the development of open access and science structures. In consideration of the increasing demand for OS resources and the growing number of OS platforms, it is relevant to strategically design an economically sustainable business model for such platforms.

By Business Model (BM), we understand a description or model representing a firm's logic to create, provide and capture value from and for its stakeholders (Bouwman et al. 2008). According to Osterwalder et al. (2005), a business model is a "blueprint" for running a business. To structure the results in an initial BM for the OS discovery platform, we use the BM Canvas (BMC) framework from Osterwalder & Pigneur (2010).

Since the OS discovery platform, which is currently under development, will act as a central mediator for various stakeholders (e.g. users, data repositories, research institutes, publishers, libraries), a multi-sided and multi-stakeholder BM needs to be considered. The interest in multi-sided platforms has increased with the rise of digital platforms such as Uber, Airbnb or Booking.com (Hein et al., 2020). They create value, acting as intermediaries by connecting users and facilitating interaction between them (Sanchez-Cartas and Leon, 2019).

For the early design of a BM, Bland and Osterwalder (2020) propose a model for testing business ideas. As depicted in Figure 1, the crucial factors for designing and testing a successful BM are Feasibility, Desirability, and Viability. The validation of these criteria is crucial for creating an economically sustainable business model. The BMC building blocks that need to be considered for BM feasibility are key activities, partners, and resources. To validate desirability, it is necessary to check whether the right customer segments are addressed and whether the services and products

meet the customer's needs. Concerning viability, the relevant BMC building blocks are revenue streams and cost structure.

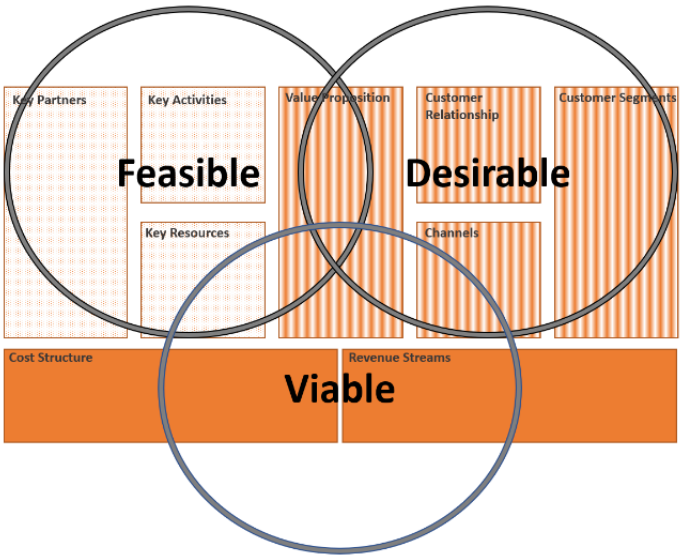

Figure 1: Combination of Cooper et al. (2007) interaction design principle with the BMC building blocks, according to Bland & Osterwalder (2020).

Method

To answer the research question, we applied the case study approach by Yin (2014). As central use case acts an EU project which aims to develop a digital Open Science discovery platform for Social Science and Humanities research. A consortium of 19 partners develops a full multilingual and multicultural discovery solution implementing innovative features and functions to support research (i.e., visualisation, annotation, trust building system, crowdfunding, social network and recommender system).

We have used a mix of commonly known and widely used business analysis methods, namely, competitor analyses, expert interviews, joint exploitation survey and stakeholder analysis. The methods have been selected under the initial assumption that their complementary use will provide sufficient insights into the desirability, feasibility and viability of an early-stage BM. We collected data through expert interviews, online surveys, and secondary research. The interviews and compiled desk research results were analyzed using qualitative content analysis (Mayring, 2001) and the online survey was analyzed descriptively. In the following section, we briefly describe the four selected business analysis methods.

Competitor analysis

To gain a deep insight into the current offers, we carried out an extensive web-based Competitor analysis (Bergen & Peteraf, 2002). A list of competitor platforms that offer similar services and share target markets was created in collaboration with the project members. Thus, we identified forty-seven platforms as potential challengers. To represent the competitive environment of the platform in the best possible way concerning different platform types, geographical origins, and popularity, we selected 26 platforms for the analysis. To better understand the competitive

environment of the future discovery platform, information about the 26 platforms was retrieved from their websites and documented in a template. We analyzed gathered information using qualitative content analysis, focusing on offered platform features and functions, organizational insights, strengths and weaknesses, and insights into usability and user experience.

Expert interviews

To complement the insights gained from the competitor analysis, we collected qualitative data through an interview study with general OS experts and executives from existing OS platforms. The project partners carried out the recruitment of the interview partners. All in all, nine interviews - three with OS experts and six with executives of OS services - were conducted personally (face to face or video calls) and lasted on average 30 minutes. We evaluated interviews through qualitative content analysis. The expected results provided valuable feedback for the planned range of the platform's functions and features (value proposition) on the one hand and input for the stakeholder needs on the other.

Joint exploitation survey

The general objective of the joint exploitation survey was to get early information on the project partners' willingness to maintain the platform after the project ends. We conducted an online survey to get an insight into the partners' exploitation plans, current interests, and opinions. The survey results from 19 project partners were documented and evaluated descriptively. As the partners are necessary for the platform's maintenance, an early assessment of their readiness was essential. The gained insights provided indications of the feasibility and viability of the business model.

Stakeholder analysis

Stakeholder analysis is a technique that identifies those actors, groups or individuals who have an influential interest in a project and business model (Ackermann & Eden, 2011). It is usually carried out in the run-up to or early phase of a project. Relevant "stakeholders" (or stakeholder groups) are systematically surveyed, briefly described and their significance and influence on the course and outcome of a project are assessed. Based on this, the involvement of the relevant stakeholders before, during and after a project phase can be planned at an early stage and any necessary action can be derived. The results of the analyses aim to contribute to the initial BM concerning desirability.

Analysis

The four business analyses methods previously described were carried out between December 2019 and September 2020, during the course of the project activities. A dedicated work package on ”Innovation, Exploitation, and Sustainability” implemented the necessary activities.

Competitor analysis insights

The analysis results can be summarized as follows: The primary competitors have an established presence in the market, and the brands are well known. However, no successful platform specifically targeting the SSH community could be identified. Looking at the products and services provided by the competitors, we recognize that the planned feature-set for the OS discovery platform (e.g., a visualization tool, annotation tool, trust-building system, recommender system, and crowdfunding service) represents unique features. These features will distinguish the platform from the competition. Attention needs to be paid to several agile platforms that constantly release innovative (e.g., AI-powered) features.

Expert interviews insights

The analysis of the interviews with OS experts indicates that despite the many platforms and services available, there are still market niches and underrepresented user groups. Important advice was to first look at the customer's problems and needs and then design appropriate solutions. The answers regarding frequent use can be summarised as follows: offer a highly useful and easy-to-use service. Regarding cost factors for the build-up and operation of an OS service, both interview groups mentioned personnel costs as the most relevant ones. A very broad picture emerged regarding the possible revenue sources. Besides any kind of funding, there are numerous other possible revenue sources such as in-kind contributions, membership fees, sponsorship and donations, all of which should be examined further. In addition, we obtained many helpful recommendations, ranging from needed skills and finance methods to success factors for service development.

Joint exploitation survey insights

The survey results showed a high willingness of the project partners to contribute to different kinds of maintenance activities after the project ends. This contribution - mainly in-kind - amounts to a current rough estimate of about 40,000 Euros per year. Many partners are also willing to participate in various roles in a future operating organization for the future platform. Most of the partners (i.e., 18 out of 19) are willing to maintain the platform after the end of the project.

Stakeholder analysis insights

From the stakeholder analysis we obtained information on the roles and needs of stakeholders and indications of their interest and power relations. From this data, identified a variety of relevant stakeholder groups that require different management strategies. At this stage of the project, we need to focus on our main potential user groups and actively involve them in the co-design processes. In a next step, we should identify which service offerings (i.e., the bundle of features and functions) best fits each user group. We need to conduct further research on communication and engagement for all other identified stakeholders.

Results

The complement of the outcomes of the four analysis methods provided valuable insights to inform the feasibility, desirability, and viability aspects of the early phase business model ideas of the

project's OS discovery platform. Figure 2 shows the contribution of the different analysis methods concerning Cooper's interaction design principles (Cooper et al., 2007), which are subsequently transformed into concrete input for each BMC building block of the platform BM (see Figure 3).

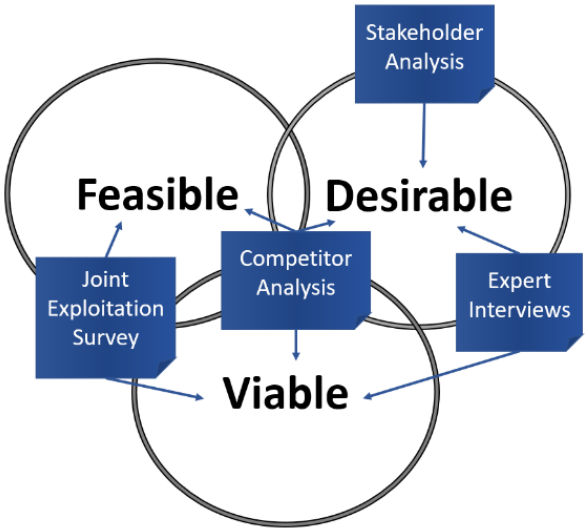

Figure 2: Contribution of the selected business analysis methods to inform the three BM sucess factors, following Cooper at al., 2007

Based on the results of the analyses, we created an initial business model for the project's OS discovery platform. The analysis results allowed us to index well-founded and empirically supported parameters regarding feasibility, desirability and viability. Concerning feasibility, key partners, key activities and key resources were identified based on the joint exploitation survey and the competitor analysis. Specific value propositions, customer relationships, customer segments and channels were identified as parameters for desirability based on the competitor analysy, the stakeholder analysis and the expert interviews. Viability was assessed by comparing cost structures and revenue streams identified through the joint exploitation survey supported by the competitor analysis and the expert interviews.

The competitor analysis revealed a market need for the specified platform, since no existing platform is specifically targeting the SSH community at present. The planned feature-set for the OS discovery platform (i.e., a visualisation tool, annotation tool, trust-building system, recommender system and crowdfunding service) represents unique features that distinguish the platform from the competition. The outcome of the expert interviews supports the desirability of the platform too. From the stakeholder analysis, essential data regarding desirability could be gathered, such as identifying relevant stakeholders, insights into their needs and different requirements to be considered in stakeholder management strategy.

The Competitor Analysis provided insights into possible organisation forms and governance implications in terms of feasibility. The results of the joint exploitation survey indicated that the consortium partners have a high willingness to contribute to different kinds of maintenance activities after the end of the project, a critical aspect of the project´s feasibility. In addition, many partners indicated that they are prepared to participate in various roles in a future operating organisation of the platform.

The competitor analysis provided insights for viability by highlighting important financial implications such as cost factors and possible revenue streams. The results of the expert interviews

also underlined this information. The results of the joint exploitation survey also showed essential information regarding viability.

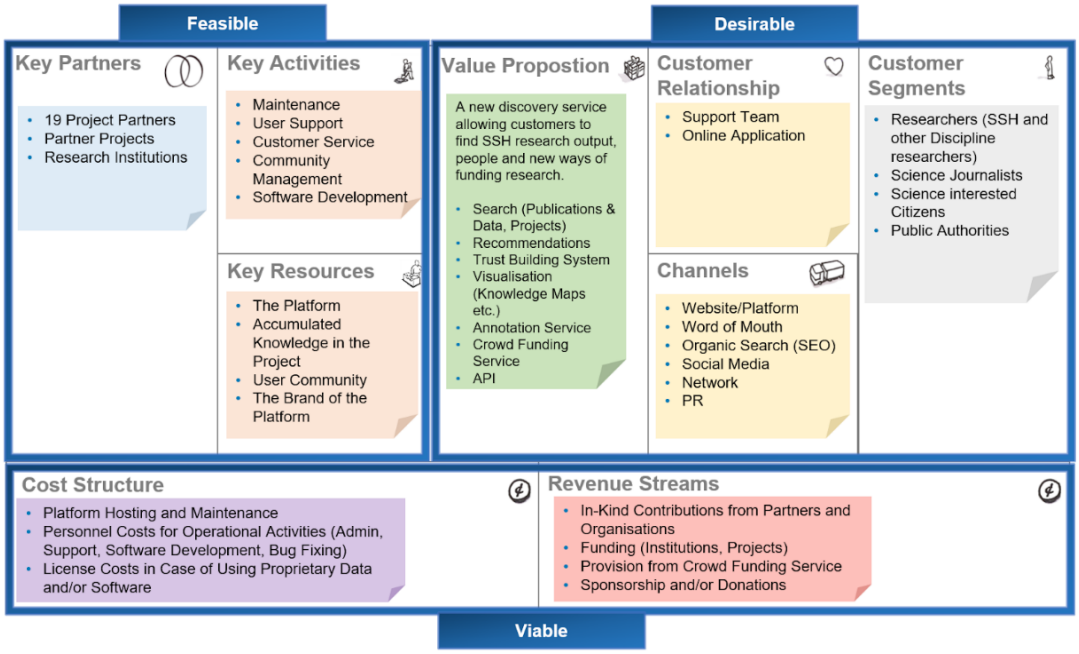

Figure 3: Resulting early phase business model design for the Open Science Discovery Platform, following the BMC structure(Osterwalder & Pigneur, 2010)

Conclusion

The present study explores how commonly known business analysis methods support the design process of an early phase BM. We described how the results of four selected business analysis methods provide valuable insights into the viability, desirability, and feasibility of the alternative BM configurations of a multi-stakeholder OS discovery platform. Our primary research objective was to validate that the combination of existing business analysis methods could support the design of an economically sustainable BM. As outlined in Figure 2, in our studied case, the applied business analysis methods (i.e., competitor analyses, expert interviews, joint exploitation survey and stakeholder analysis) contributed in different and complementary ways to validate the three success principles of a BM. The resulting evidence-based initial BM design provides a solid basis for further BM developments, to be developed in parallel with the technical implementation of the project´s platform. The approach proposed in this study, and the resulting BM design, can serve to inform future research on OS discovery platforms.

Limitations and future research

Overall, the range of possible methods is not limited to the four applied business analysis methods. Other methods that could be examined for suitability are, for example, SWOT analysis, PESTLE analysis or Personas. Since the developed approach has only been carried out once, our research implies certain limitations. Furthermore, we have explored the usefulness of the methods for the specific case of a multi-sided OS discovery platform in the context of a multi-stakeholder project, which limits the external generalizability of the outcomes to other settings. Evaluations in different project settings are thus recommended.

Based on the results and contributions of this study, we see a broad range of opportunities for further research. Further research projects could address other methods and different chronological sequence of the methods. In the next iteration another research stream could explore additional methods to design and test BM for multi-stakeholder platforms.

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Challenges of Data-driven Service Development in Manufacturing Industries – a Review

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Abstract

This literature review aims to identify the existing challenges of data-driven service development in manufacturing industries, and a general approach to manage the challenges. The three primary categories are technological, ecosystem- and business model-related. Those are identified and categorized through the lens of data-driven service taxonomy framework. Digital twin was identified as one overarching approach with the potential to solve some of the identified challenges. Future research can focus on exploring the different level of importance of the existing challenges.

Keywords

Data-driven service, Manufacturing, Challenge, Business model, Ecosystem, Digital twin

Introduction

The increasing growth of data and utilization of digital technologies have changed the business landscape dramatically (Engelbrecht et al., 2016; Hilbig et al., 2018) by opening the potential for providing new services (Coreynen et al., 2017; Kohtamäki et al., 2019; Bosch & Olsson, 2021). Servitization can create benefits for the companies such as competitive advantage, higher margins and new revenue streams (Küssel et al., 2000), e.g., by learning from customers when analyzing customers' data (Laine et al., 2010).

The combined use of big data, algorithms and servitization have influenced the way companies can create and offer data-driven services (DDS) (Kaiser et al., 2021). While service-based businesses can capitalize on data to provide services, manufacturers seem to encounter many challenges for developing DDS (Westergren, 2011; Azkan et al., 2020). Challenges include the increase of revenue (Marr, 2105, p.217) and service market share, or improve their product market domain by utilization of DDSs in the production process (Kaiser et al., 2021). While literature has discussed the

benefits that manufacturers can gain by developing DDS (Herterich et al., 2016), the challenges that they experience are still poorly understood (Schuh & Kolz, 2017; Klein et al., 2018).

As an attempt to better understand DDS challenges, Klein et al. (2018), identified and investigated non-technical challenges of smart services in capital good industries. Their research categorized those challenges into four classes: internal resources and capabilities, customer and information, value proposition and customer need, and adaptability.

Altmann and Linder (2019) illustrated challenges of data-driven servitization for remote monitoring of the product. It showed a tension between technical development of manufacturers' products for remote monitoring of product health and usage, and the commercialization business logic of manufactures. Although these findings added value to identifying the DDS challenges, the focus of the study was on one type of value proposition (i.e., remote monitoring).

Despite the work that has been done in the area as discussed above, more research is needed. Therefore, this literature review aims to identify and classify the main types of challenges that manufacturers might experience when developing DDS with the help of an existing framework. In addition, this paper investigates whether there are any generally relevant approaches to solve or mitigate these challenges.

In the next section, a brief explanation of the method will be provided. The third section will be illustrated the preliminary results of the study, followed by a short explanation about digital twin as a solution and finally, concluding remarks.

Method

Scopus and ScienceDirect databases were used for retrieving the articles included in this review. The selected keywords comprise "data-driven service," manufacturing, challenges, barriers, and concerns. Two types of keyword strings were used in both databases to identify articles as follows: (*"Data driven service" AND "manufacturing"*) and (*"data driven servic*" AND "manufactur*" AND ("challenge" OR "barrier" OR "concern"*)).

The eligibility criteria used were English language, full text, peer-reviewed journal, and conference articles. In total, 224 articles were retrieved in October 2021, among which 68 were duplicates. Therefore, 156 articles were selected and complied in Rayyan online platform to be skimmed in the following steps.

In the first step, the keywords and abstract of the articles were skimmed, and those that could not show relevance to DDS challenges were excluded. Afterward, a light reading of the article was performed to assure that the article has been written in the context of manufacturing industries so the challenges can be ascribed to manufacturing companies. Articles not meeting this inclusion criteria were excluded. In the end, 46 articles aligned with the research aim and comprised the main database for this literature review. After selecting the required articles, the coding process of the initial challenges started where the potential data was compiled in Excel tables. Coding and data analysis took place between mid-October to the end of December 2022.

The initial categories for identifying the challenges in developing DDS were based on scrutinizing the effect of being data-driven for manufacturing companies. After the emergence of the initial themes as technological, ecosystem and business model, a framework by Azkan et al. (2020) was used for the in-depth analysis of the challenges in each category (see table 1). This framework,

based on service-dominant logic as defined by Vargo and Lusch (2004), explains how DDS in manufacturing can be seen through the lens of business model (BM), represented through three elements of value creation, value delivery, and value capture (Teece, 2010). Each BM element embodies several dimensions which depict how DDS within the manufacturing industry can be characterized. Table 1 provides a brief explanation of each dimension.

Business Model elements	Dimensions	Description
Value proposition	Main value	Value proposition which is offered to the customers including four characteristics of condition monitoring, decision support, quality control and predictive operation
	Main outcome	Outcome of the value proposition that potentially benefits manufacturers for efficiency gains, improved quality, new insight and new offerings
Value creation	Analytics type	Four types of analytics result in DDS out of data comprising descriptive, diagnostics, predictive and prescriptive
	Data sources	Including internal data sources includes asself-generated data and external data sources such as customer-provided data, acquired data, and free available data
	Data types	Divided into four types of process, product, environmental or any other type of data that can be considered
	Aggregation level	Describing the aggregation of hardware and software components of DDS
Value delivery	Service delivery	Describing how a service is provided for the customer including software, download and web-interface
	Service flow	Referring to the rate of service provision as manually, predefined time, event-driven and stream
	Platform type	Describing ways, a service is delivered to the customer such as analytics platform, data marketplace and SaaS-platform
Value capture	Pricing model	Referring to the pricing schemes comprising subscription-based, transaction-based and indirect
	Payment mode	It can be embedded in product, stand-alone service and data

Table 1: *Description of Taxonomy for data-driven services in manufacturing industries*

Note. Adopted from Azkan et al. (2020). In the original taxonomy framework, value proposition considered as a part of value creation element. Here these two elements are separated.

Value proposition is the value that a company offers to the customers (Chesbrough and Rosenbloom, 2002) including two dimensions of main value such as analysis of the machinery vibrations for condition monitoring and main outcome, such as improved quality of products by data-driven quality control.

Value creation encompasses the resources, activities, and components (Fruhwirth et al., 2020) of DDS and consists of first, analytics type such as providing the statistical data in the form of reports, data visualization or dashboards in descriptive analytics (Steenbergen et al., 2019). Second, data

source such as self-generated data via machines' sensors or acquired data purchased in the data marketplace. Third, data type, e.g., natural environment data such as water, air, pollution named as environmental data. And fourth, the aggregation level is understood as the stage where the companies require the integration of DDS components, including hardware, software, and data sources with various data content together (Püschel et al., 2016). This integration can occur at the operational level (technological-related challenges) or at the ecosystem level (ecosystem-related challenges) (Püschel et al., 2016).

Value delivery is about the provision of the value for the customers and explain the interaction between customers and providers (Barrett et al. 2015). This dimension consists of service delivery e.g., by providing particular software, service flow e.g., providing the service on demand (manually) and platform type e.g., data marketplace as a multisided platform where an intermediary connects buyers and sellers of data (Koutroumpis et al., 2017).

Value capture explains how a company can monetize its created value (Schüritz et al., 2017). This dimension includes pricing model such as pay per use in transaction-based payments and payment method e.g., embedded in product when the service is provided as an additional offer to product (Azkan et al., 2020).

Preliminary results

Three primary categories of existing challenges for developing DDSs in manufacturing were identified: Technological-related, ecosystem-related and business model-related. The most frequently mentioned challenges in each of those three categories are explained below.

Technological-related Challenges

Technological challenges constitute most of the challenges. Using the framework by Azkan et al. (2020), these challenges influence different parts of BM. However, the main outcome dimension, aggregation, and platform type comprised the most frequently mentioned challenges. Those were found by mapping the number of challenges, rather that categorization by importance. Below a short summary of the most frequent challenges is presented.

Main outcome

In the main outcome, the first type of challenge is related to sustainability concerns when designing services (Landolfi et al., 2019; Pirola et al., 2020; Nick et al., 2021). For instance, providing environmental impact assessment over the product lifecycle is one of the challenges manufacturers face when transforming towards a low-carbon, resource efficient and sustainable economy (Landolfi et al., 2019). The second challenge type is validating the value proposition (Usitalo et al., 2021) by data-driven simulations (Tomiyama et al., 2019) before providing the service in the market launch phase (Kampker et al., 2018). The potential benefit of services is usually realized after customers using the services, manufacturers face uncertainties whether to invest in servitization or not (Donoghue et al., 2019).

Aggregation level

Aggregation level refers to the integrity of DDS components to create a value (Püschel et al., 2016). For example, the integration of the technological components, including data (Tountopoulos et al.,

2018) and digital enablers (e.g., AI, IoT) in a platform to create connected and autonomous machines over the service and product lifecycle (Bu et al., 2021) is considered a major challenge. Additionally, integration of algorithms with operational and planning tools (Senna et al., 2020) and the integration of sensors data with service activities (Kammler et al., 2020) are examples of aggregation challenges.

Ecosystem-related Challenges

The ecosystem challenges were scrutinized in relation to the companies' BM. Data source and aggregation were the most frequently stated ecosystem challenges for DDS development.

Data source

One of the challenges in DDS ecosystems is data sharing among the ecosystem actors (Kaiser et al., 2021), mainly caused by ethical considerations and regulations. This challenge can influence the data source dimension of BMs. For example, in many cases, customers are concerned about the manipulation of data by the companies for service development (Zambetti et al., 2020). Convincing end users to share the condition data with manufacturers to enable an automated resupply process is a challenge with which manufacturers need to deal (Petrik et al., 2020).

Aggregation level

Similarly, to the technological-related challenges, connectedness and integration of the actors involved in the DDS development to provide an agreed value proposition (Schulz et al., 2021) was a considerable concern.

Unwillingness to or withdrawal of sharing the resources result in lack of ecosystem resource integration (Schulz et al., 2021), lack of interoperability of the systems among all the ecosystem actors (Suppatvech et al., 2019), and lack of proper technical architecture of cyber product systems (Herterich et al., 2015) are other aggregation ecosystem-related challenges. For instance, in the context of mobility, Schulz et al. (2021) explained how lack of collaboration between private and public sector resulted in lack of public transport ticket provision via mobile application provider (Moovel Group). This made customers use an additional application which led to value co-destruction in their ecosystem.

Business model-related Challenges

Business model challenges were mainly ascribed to service flow and platform types.

Service flow

Providing DDSs has changed how manufacturers interact with customers (Zambetti et al., 2020), which has been challenging for the companies with B2B interactions. For example, individualization of the digital products for the industrial customers requires companies to integrate their customers into the innovation process, implying customers might spend a considerable time and simultaneously take the risk of loss in knowledge advantages or unvoluntary knowledge transfer to elaborate their problem for the companies (Permin et al., 2021). In such environment, customers are not receptive towards DDS as they underestimate the intangible value of the services due to ineffective interaction between manufactures and customers (Klein et al., 2018; Boldosova et al.,

2020). Thus, companies should seek ways to improve customers' attitude, behavior toward DDS providers (Boldosova et al., 2020) to improve the adoption of such services.

Platform types

Various types of challenges are associated with the platform. However, they might not necessarily be created by the business platform. DDS platform challenges include regulatory uncertainties in digital platforms when it comes to collaboration among different companies (Landolfi et al., 2019), radical revenue and cost structure changes (Zambetti et al., 2020), and negative customer feedback in the platform, which reduces the adoption rate of a DDS.

Challenges in developing DDS in manufacturing mainly relate to the technological, ecosystem and business model considerations. However, it does not mean that the challenges are limited to these three primary categories as sometimes other challenges such as organizational culture and structure have been stressed in the literature (e.g., Zambetti et al., 2020; Mohammad et al., 2021).

Digital Twins to Mitigate High Failure Rate

A very much emphasized and discussed aspect of DDS is in creating and exploiting digital twins (DT) over the service and product lifecycle (e.g., Donoghue et al., 2019; Watanabe et al., 2020; Mohammad et al., 2021; Bu et al., 2021). DT is defined as "the virtual and computerized counterpart of a physical system that can be used to simulate it for various purposes" (Negri et al., 2017, p. 940). The presence of DT in the DDS literature is rooted in smart product-service system publications (Watanabe et al., 2020) where cyber physical systems (CPS) are one of the corresponding concepts to the required interactions between products and digital components (Zheng et al., 2018). Considering two spaces as physical and cyber space, Zheng et al. (2018) introduced digital twin as the ideal form of CPS to simulate the real space accurately for manufacturing industries.

Although the reviewed articles in this study provided various solutions for the DDS concerns, DTs play a significant role in those solutions (e.g., Tomiyama et al., 2019; Pirola et al., 2020; Watanabe et al., 2020). For instance, Tomiyama et al. (2019) considered DT as a missing part of product lifecycle since the DT has the potential of being integrated with product lifecycle management (PLM) and enterprise resource planning (ERP) platforms to prolong the use of PLM and ERP over the entire product lifecycle.

Regarding the identified challenges in this research, one of the main contributions of DT is found in the main outcome dimension of technological challenges where manufacturers are uncertain about the potential benefit of their value proposition prior to launch (e.g., Donoghue et al., 2019; Tomiyama et al., 2019). Having a virtual system that enables simulation of the services with their potential benefits before market launch reduces the probability of failure in such services (Tomiyama et al., 2019). This is particularly important since DDS, more than traditional services or products, face risk of failure within the first year after the market launch (Kampker et al., 2018).

Another benefit of DTdevelopment relates to data type in technological challenges as DTs can eliminate the technical limitations for the availability of the data and simultaneously facilitate the monitoring of the continuous flow of data based on the dynamics of the DDS application context (Watanabe et al., 2020).

Despite the potential benefits of DTs for developing DDS in manufacturing, there are several numbers of difficulties in implementation of such technology that turn the DT into a challenging solution and a promising research area for the future studies (Pirola et al., 2020; Bu et al., 2021).

One of the inherent challenges of DTs' development can be reflected in the BM's aggregation dimension, where the connectedness of different data sources and data analytics for different collaborative companies seem crucial (Watanabe et al., 2020). Besides, the integration of legacy equipment into a 4.0 environment (Zambetti et al., 2020) obliges companies to investigate the feasibility of developing DTs which keeps the topics around digital twins debatable.

Conclusion

This research sought to map the challenges for DDS development for manufacturers. In total, three main challenges categories emerged as technological, ecosystem and business model. In the technological-related, the main outcome and aggregation dimensions are the most frequent challenges. Ecosystem as the second challenges category can influence data source and aggregation dimensions. Most of the challenges in the data source are due to ethical and regulatory issues that hinder companies from having flawless data sharing conditions. And in business model, service flow and platform types comprise the considerable number of challenges.

One of the possible solutions to some of the challenges of DDS development, offering several benefits for the manufacturing companies is digital twins.

The practical contribution of this research to the manufacturing companies striving to develop DDS is to provide an overview of the most frequent challenges which might occur as well as one potential solution - digital twins, which needs more investigation in the future studies.

While this study focused on mapping the frequency of existing challenges related to DDS development, experienced by manufacturers, with help of DDS taxonomy framework by Azkan et al. (2020), no prioritization in terms of their importance was done. Therefore, it might be the case that the least frequent challenges not presented in this paper influence the developing DDS more than what was articulated above. Therefore, future research shall focus on exploring the different level of importance of the existing challenges.

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Paradoxical tensions on circular economy and digitalization

Case textiles

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Abstract

Textiles are deeply woven into our day-to-day life but create substantial environmental impacts. Digitalization could support a shift toward circular economy but raises paradoxical tensions such as controversies between goals and potential of specific digital technologies to drive sustainability. To empirically address the topic, we used the disaggregative Delphi method.

Keywords

circular economy, digitalization, sustainability, textiles, paradoxical tension

Introduction

Digitalization could support a shift toward textiles' circular economy, but its utilization is not without controversies and complex interdependencies in textile value chains that cross over continents, industries, and actors with varying interests. Digital technologies can extend the lifespan of textiles, empower reverse supply chains, and save resources. At the same time, applying these technologies reveals competing demands and conflicting yet interrelated economic, environmental, and social concerns (Grigore *et al.*, 2020; Ibn-Mohammed *et al.*, 2021), so called paradoxical tensions defined as "contradictory yet interrelated elements that exist simultaneously and persist over time" (Smith and Lewis, 2011).

In the academic research, the paradox approach has been successfully applied in the context of circular economy (van Bommel, 2018; Daddi *et al.*, 2019; Aminoff and Sundqvist-Andberg, 2021; Chizaryfard, Trucco and Nuur, 2021). Although recent years have witnessed a growing interest on the digitalization related to circular economy (see, for example, Lopes de Sousa Jabbour *et al.*, 2018; Nascimento *et al.*, 2019; Rajput and Singh, 2019), most studies consider digitalization purely as an opportunity for advancing circular economy. We want to contribute to the discussion on the

paradoxical tensions of digital paradigms in sustainability transition, specifically in the circular economy, with the following research question: *What paradoxical tensions emerge when digitalization is utilized for implementing circular economy?*

Conceptual background

Decision makers operate in complex and dynamic business environments with competing demands and conflicting yet interrelated economic, environmental, and social concerns (Smith and Lewis, 2011; Hahn *et al.*, 2014). Considering paradoxical tensions can be specifically valuable in managing wicked problems with complex and interconnected nature (Schad and Bansal, 2018), as is often the case with sustainability transition.

The most noted paradoxical tension in corporate sustainability, also in the context of circular economy, is the one with competing sustainability goals and related trade-offs (Lazell, Magrizos and Carrigan, 2018; Reike, Vermeulen and Witjes, 2018; Daddi *et al.*, 2019; Sehnem *et al.*, 2019; Morales, 2020; Fehrer and Wieland, 2021). In addition, a move towards circular economy challenges incumbent business models and is likely to create competition between linear and circular economies, even within the business models of a company (Birkel and Müller, 2021; Chizaryfard, Trucco and Nuur, 2021). Tensions also arise between normative values and ethics in society, such as desire for sustainability, and dynamic of consumers' behaviour, such as unsustainable consumption (Wannags and Gold, 2020; Chizaryfard, Trucco and Nuur, 2021). Unclear and inconsistent definitions, objectives, and expectations for circular economy can cause further tensions (Aminoff, Valkokari and Kettunen, 2016; Kouhizadeh, Zhu and Sarkis, 2019; Sehnem *et al.*, 2019; Friant, Vermeulen and Salomone, 2020). Also the tension between long- and short-term perspectives is well recognized (Matos *et al.*, 2020; Zehendner *et al.*, 2021).

The above-mentioned tensions are reflected also when digitalization is used to advance development toward circular economy. In addition, digitalization as such presents a paradoxical tension for sustainability (Grigore *et al.*, 2020), in the context of circular economy alike, as, despite of its potential benefits, it comes with associated highly intensive resource and energy use and related costs (Kouhizadeh, Zhu and Sarkis, 2019; Ibn-Mohammed *et al.*, 2021). The potential added value of digitalization can be contrasted by the risk of business models diminishing, losing competitive position, and threatening data privacy (Birkel and Müller, 2021). Using digitalization to implement circular economy is likely to create economic value for some actors but at the same time destruct it from others (Schroeder *et al.*, 2018; Kouhizadeh, Zhu and Sarkis, 2019; Morales, 2020).

Method

To address the research question, we used the disaggregative, or non-consensual, Delphi method (Tapio, 2003; Steinert, 2009; Nowack, Endrikat and Guenther, 2011). It builds on expert views on the probable and preferred future (Linstone and Turoff, 1975; Rowe and Wright, 2001) and provides a systematic way to assess alternative future developments making the related arguments visible (Bell and Mau, 1971; Gausemeier, Fink and Schlake, 1998; Nowack, Endrikat and Guenther, 2011; Rubin, 2013). By doing this the method provides rich material for identifying paradoxical tensions in the emerging and complex phenomena such as rapidly evolving circular economy and digitalization. The Delphi process is described in Fig. 1.

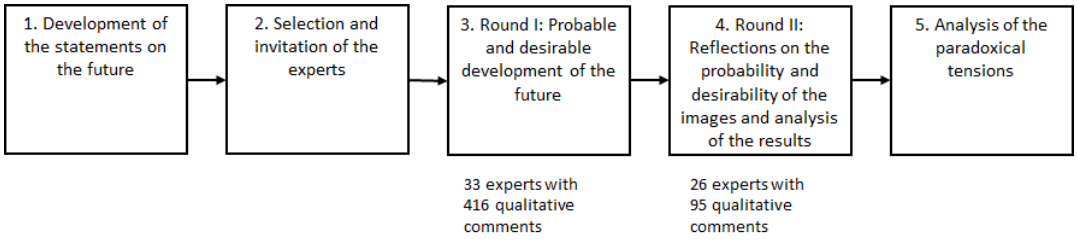

Fig. 1. The disaggregative Delphi process followed in the study.

The first round included 33 and the second round 26 expert responses. Out of the 26 experts on the second round, 6 represented industry entities and 10 research institutions, 10 experts were involved with both industry and research, and 1 expert was a public authority. There were 14 female and 12 male experts, and about half of the experts were 30–44 years old or younger.

On the first Delphi round, the experts were asked to assess the probable and the desirable development with regard to 17 hypothetical statements about the future (year 2035), such as on the use of digital identities, embedded intelligence, and blockchain as well as traceability of textiles and availability of open life-cycle data. In addition, they were asked to provide reasoning for their answers. These arguments provided by the experts form the core material for the analysis of this paper.

All in all, the qualitative material supplied was rich and extensive, reflecting the commitment of the experts and their interest in the topic. The first-round Delphi work yielded, in all, 416 comments (in total 32 862 words) with reasoning for the replies or answering the open questions, complemented with further 95 comments (3 794 words) submitted on Round 2.

To identify potential paradoxical tensions, the experts' qualitative comments were systematically reviewed. This entailed assessing the key content of the comments, such as the themes, arguments, and assumptions. Based on this assessment a variety of influencing factors, both driving and retarding the development, were identified for each of the hypothetical statements. Next, a short description of the preliminary identified controversies, and their opposing poles, was created for each of the statements. These descriptions were then scrutinized against the criteria of paradoxical tensions to ensure that they include clear contradictory, interrelated, and simultaneous demands. In addition, it was ensured that they have a clear link to both circular economy and digitalization. This resulted in a limited number of further defined paradoxical tensions. Their description was further elaborated and extended by quotations from the experts.

Results and discussion

The paradoxical tensions identified on the interface of circular economy and digitalization cover four themes, namely specific digital technologies, data sharing in textile value networks, circular business models that utilize data, and changing business and consumer mindset (Table 1).

Table 1. The paradoxical tensions in circular economy and digitalization

Paradoxical tension	**Arguments supporting the role of digitalization in circular economy**	**Arguments criticizing the digital opportunities**
DIGITAL TECHNOLOGIES		

Embedded intelligence can add understanding but hamper textiles recycling	Embedded intelligence adds understanding on customers and their use of textiles as well as enable product-service business models *"[The potential value of embedded intelligence lies] in seeking generalisable understanding, not tracking individual items en masse"*	Embedded intelligence hampers textiles' recycling and increases lifecycle costs *"I do not see embedded IoT as a solution - it is a slippery slope to creating a recovery nightmare."*
Distributed-ledger technology can trace lifecycles but uses energy	Distributed-ledger technology helps to trace textiles and their materials throughout their lifecycle *"…creating a data thread across the supply chain are the first steps to knowing where materials are coming from, what processes they undergo and the sustainability impacts of these. This needs a data infrastructure… Blockchain is a good solution for this."*	Distributed-ledger technology has extensive energy demand and causes environmental impacts *"It's not like this technology is just based in "the cloud" - the environmental footprint of these technologies are massive."*
DATA SHARING IN TEXTILE VALUE NETWORKDS		
Open lifecycle data can support companies' sustainability story but risk competitiveness	Open sharing of textiles' lifecycle data supports the credibility of textile companies and their sustainability story *"…those with a good story would embrace this opportunity for instance in product passports or other such means… We already see examples of companies who want to differentiate on the market with their sourcing story (cellulosic man-made fibres from European sourcing, recycled synthetic fibres from plastic debris in the sea etc) and we see that consumers start responding to that."*	Open data sharing reveals disguised data and challenges existing practices in the textile industry *"It has taken ages for brands to relieve their supplier lists and this is still in childshoes. When it comes to raw materials there is limited traceability and transparency. I doubt if the global value chains are ready to this level of transparency."*
Consumers can benefit from sharing data but find it too intimate	Consumers will gain social benefits by sharing data on the use of textiles *"If it brings consumers social (it's socially attractive eg it's fun and/or it's a game) and/or economic benefits, or picks on their other interests (e.g. interest, willingness or commitment to protect environment or climate), they may be happy to share their data."*	Data on the use of textiles is too intimate or invaluable to be shared *"This kind of data is quite individual and intimate so I think consumers are not so ready to share this kind of data (and to be monitored all the time)."*
Joint practices with data can profit all but contradict with specific interests	Common data standards are needed to ensure interoperability of circular-economy related data on textiles	A huge variation in the interests and readiness of different textile actors make global standards impossible

	"We should not create more monopolistic platforms - but systems that enable data-sharing and interoperability between stakeholders."	*"It will take a lot of time to develop, pilot and implement these. It requires changes in so many levels in the system and change is slow to happen. Textile ecosystem and value chains are extremely fragmented, sectors like collection, sorting and recycling (mainly downcycling) have been operating in silos for decades."*
CIRCULAR BUSINESS MODELS IN TEXTILE BUSINESS		
New ownership models can reinforce responsibility but also weaken it	New ownership models encourage reduced material consumption and closed loops as companies have increased interest for textiles' lifecycle optimization *"We are going to have many different models of consuming textiles: rental, subscription, sharing, swapping, purchasing, re-making what you own, etc. I don't see any of these models standing out particularly, we are going to see an increase in all of them but purchasing."*	By not owning the textiles consumers detach from the textiles and take less care *"I think these models makes sense for selected product groups and segments, but am uncertain whether they will ever "hit" the mainstream and big masses..."*
Personalization can support attachment but not necessarily reduce consumption	Personalization supports attachment to textiles and extends their lifetime reducing the consumption of textiles *"Textiles that are customized will have greater emotional durability, and thus lower cost/use.*	Personalized textiles are not necessarily used any longer and are hard to resell causing extra waste *"a focus on sufficiency and longer-lasting design and an acceptance from customers to own and have emotional connection to their products"*
CHANGING BUSINESS AND CONSUMER MINDSET		
Companies are under pressure for change but are locked in business as usual	External and internal pressure to transform towards circular economy and increased transparency drive textile companies to change *"Large brands and retailers [are] setting very ambitious targets by 2030 and beyond… Circularity and climate impact are on boardroom and NGO agendas"*	Textile companies are locked into existing practices and lack the capabilities for transformation *"Changes, that need investments, work, or brings even slight inconvenience shall not proceed if the mindset of the whole chain is not for it."*
Consumers value sustainability but are highly price sensitive	Consumers increasingly value sustainability *"My optimistic side hopes that we for consumers will have seen a slight movement towards fewer and better clothes. However, my pessimistic side is afraid that this will only be in very selected segments and countries."*	Consumers are highly price sensitive in their consumption choices *"Many consumers globally are also price sensitive by necessity, don't know about circularity, and have more immediate pressing issued to deal with."*

Some of the tensions are characteristic for circular economy as such but are reflected, and possibly amplified, on the interface of circular economy and digitalization. Others emerge specifically when digitalization is utilized for circular economy implementation.

The sources of the identified paradoxical tensions vary. Some of them arise from whether the total impact of utilizing digital technologies is environmentally positive (such as in the case of embedded intelligence and distributed-ledger technology). Others arise from whether data-driven business models encourage circular economy behaviour and practices (personalized textiles, new ownership models). In addition, tensions arise from whether practices utilizing digitalization that are likely to benefit circular economy, support business interests (open life-cycle data, data standards, companies' mindset). Last, tensions arise from whether practices that are likely to benefit circular economy, bring customers social benefits (users sharing data, consumers' mindset).

Conclusions

The findings from the study have several implications for theory. First, digital technologies have an evident environmental cost. Secondly, the environmental benefits of circular business models, that utilize digitalization, are not self-evident but depend on how these models change consumption and production practices in real-life. Third, transparency, reinforced by the increasing amount of data and ways to share it, both supports and challenges business interests. Fourth, environmental sustainability is only one dimension in the decision-making of both by consumers and businesses.

The identified paradoxical tensions emphasize several actions businesses leaders should take to address the tensions. First, both the positive and negative impacts, in short-term and long-term, of utilizing digitalization in implementing circular economy should be addressed covering both economic, environmental, and social impacts. Second, in the fast-evolving field of circular economy and digitalization collaborative exploration of opportunities and new ways of working are needed and the current practices will inevitably be challenged. Third, the business needs consumers and users on board to ensure that digitalization actually supports the objectives of circular economy.

Future research areas include further assessing the paradoxical tensions in circular economy in general and specifically related to digitalization as well as the management strategies for coping with the paradoxes. Empirical studies, specifically, would be valuable in understanding how to ensure the sustainability of the development and how to exploit digitalization for its benefit.

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Adopting business models for sustainability and digitalization. A process study of microlevel dynamics in an incumbent firm

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Extended abstract

Abstract

Incumbent firms face growing pressure to transform their business towards sustainability. However, business models for sustainability (BMfS) and circularity are grounded in fundamentally different institutional logic which, for incumbents, creates tensions with existing business models, structures and routines. How organizations manage tensions from conflicting logics is explored comprehensively in research on hybrid organizations and sustainable entrepreneurship – however, focusing on ventures already founded with sustainability-oriented/hybrid missions. It is unclear if and how such logic hybridization processes unfold in incumbents and what role digitalization plays. This research aims to explore and explain microfoundations of how involved actors (struggle to) make sense of BMfS in incumbents and how this is underpinned by broader shifts towards hybrid organizational logics. This longitudinal case study takes a process view (Langley, 2007, 1999), following a large manufacturer's Swedish division where a team works towards implementing a BMfS grounded in circularity and digitalization while facing doubt and inertia. Triangulating interviews, observations and documents, we track internal processes as they unfold in real-time to study how actors experience and rationalize the BMfS and navigate emerging tensions. Preliminary findings suggest that BMfS trigger diverging interpretations from different logics and therefore cause tensions. Overcoming these benefits from external impulses (e.g. customer or management communication that legitimizes new logic element), finding third-party common denominators (e.g. emphasize BMfS' digitalization element) and continuous exposure. Upon completion, this research will provide a process model of how microlevel dynamics shape BMfS adoption, while opening for future research on hybridity intersecting with sustainable entrepreneurship literature.

Introduction

Companies face growing institutional pressure to transform their business to address grand challenges (George *et al.*, 2016), such as climate change, by integrating sustainability into their business model. This can, however, be challenging as business models for sustainability (BMfS) and circularity reflect a "fundamentally new logic of doing business" (Schaltegger, Lüdeke-Freund & Hansen, 2016:p.270) and "change in the basic logic of value creation" (Rauter, Jonker & Baumgartner, 2017:p.146), for instance based on retaining ownership and product-as-a-service offerings. For large established firms, this creates tensions with existing business, structure and routines which are grounded in commercial institutional logic (Laasch, 2018; Fehrer & Wieland, 2020). Moreover, when new BMfS entail digital elements, it remains unclear how digitalization facilitates or complicates BMfs uptake in incumbent – compared to entrepreneurial (Gregori & Holzmann, 2020) – contexts. Studies in the service and servitization literature have provided crucial insights into corporate shifts to service-based business models (Baines *et al.*, 2020) and the corresponding transformation (Kurtmollaiev *et al.*, 2018). Yet, the focus here is often on providing superior customer value and competitiveness (Gebauer *et al.*, 2017), i.e. the new business model continuing to follow the overarching goals of established commercial logic. It remains unclear what the implications are when companies pursue service-based business models explicitly for their sustainability potential.

Institutional logics are implicit, socially-constructed guiding principles that assign legitimacy to specific objectives, values and practices (Friedland & Alford, 1991), and thereby help actors understand and navigate their social and organizational reality (Greenwood *et al.*, 2011; Besharov & Smith, 2014). In short, logics specify the "rules of the game" (Thornton & Ocasio, 2012:p.112). When multiple logics view diverging priorities or contrary behaviors as legitimate, companies experience tensions (Ocasio & Radoynovska, 2016; Pache & Santos, 2010). In corporate sustainability, emerging sustainability logic creates friction with the established commercial logic that underlies incumbents' business-as-usual (Stål & Corvellec, 2018). Logic tensions emerge concerning value creation (what type of value; value created for whom), legitimate means (selling products vs. circularity, sufficiency etc.), perceived responsibility (shareholders vs. stakeholders/system) or time horizon (short-term vs. long-term). While BMfS are not necessarily incompatible with conventional business logic, they add complexity and tension that can create conflict if left unmanaged.

How companies manage tensions from conflicting logics is explored comprehensively in research on hybrid organizations (Battilana *et al.*, 2015; Pache & Santos, 2013; Jay, 2013) and sustainable entrepreneurship (Belz & Binder, 2017; Stubbs, 2017) – however, focused on ventures explicitly founded with hybrid sustainability-oriented missions ("born hybrids" (Newth & Woods, 2014:p.199)). Consequently, literature focuses on how to minimize and control tensions (Battilana & Dorado, 2010) or avoid mission drift (Grimes, Williams & Zhao, 2019), rather than how to build constructive synergies (Vedula *et al.*, 2021) or – as needed for incumbents – how to move towards hybridity in the first place. It remains unclear how logic hybridization processes work for large incumbents that are challenged to integrate sustainability into their established commercial logic. The slow uptake of BMfS suggests that incumbent organizations struggle to productively manage tensions during transition.

Looking beyond 'the organization', this paper focuses on the microlevel processes of individuals affecting or affected by the BMfS innovating process who need to navigate these tensions and make sense of the underlying logics over time. Employees – for instance sales staff – whose ideas of appropriate behavior are steeped in a predominantly commercial logic, are unable to fully 'get' how

the BMfS works, where it creates value (beyond financial value) to customers (and other stakeholders), and thus – in case of sales staff – struggle to sell it successfully, with consequences for BMfS' acceptance and performance.

This paper, therefore, aims to explore and explain microlevel processes of how actors in incumbent firms make sense of and hybridize competing logics during (or perhaps through) BMfS innovation processes. I thereby hope to contribute to understanding the trajectories that BMfS adoption can take in incumbent firms and to extend existing knowledge on hybridization in 'born hybrids' to cases of 'becoming hybrids'. Thus, the paper addresses how logic hybridization unfolds in an incumbent firm and how actors in the firm respond to and navigate tensions that emerge from conflicting logics while adopting a BMfS.

Method

This process case study (Langley, 1999, 2007), follows a company's BMfS adoption process over >12 months. The case company is a large manufacturer of industrial motors (>110,000 employees in >100 countries) with recently-updated sustainability targets. In their Swedish division, a self-selected team around the Business development & Digitalization manager pioneers a BMfS enabled by circularity and digitalization. Essentially, this BMfS utilizes the company's remote-monitoring sensor technology but instead of selling sensors, they servitize the offering, analyze data in-house and provide customers with energy-efficiency-assessments that flag looming equipment failures or inefficient motors. The service further includes a take-back-system for scrapped motors to close the loop.

While the BMfS change appears rather incremental from a sustainability perspective, it represents a key steppingstone towards the team's agenda an 'everything-as-a-service' ('EaaS') BMfS, enabled by circularity and digital expertise. Yet, already in its current form and despite successful customer trials, the BMfS triggers considerable doubt and resistance among employees. Local management approves but has not provided explicit endorsement or budget support. Global management views the BMfS as an important pilot for other markets (the Swedish institutional context being progressive on sustainability and digitalization) but is not formally involved.

To explore and explain how actors in the organization make sense of conflicting logics during BMfS adoption, this longitudinal study generates rich insights into the phenomenon (Flyvbjerg, 2006). Therefore, we emphasize access to inside views and actors' reality over an extended period (with primary researcher embedded in the firm if Covid allows). Specifically, the case emphasizes development over time and therefore leans on process methods as developed by Langley (1999, 2007) to capture microlevel dynamics as they unfold (Langley *et al.*, 2013). For this purpose, the paper tracks key events, decisions and activities through triangulation from internal documents and interviews. Alongside this factual timeline, rounds of semi-structured interviews capture individuals' observations, experiences and (changing) understanding of BMfS and emerging difficulties. Interviewees include individuals (local level, global level and pilot customer organizations) who are/were involved in the BMfS and have first-hand experiences.

For data analysis, the focus will be on mapping the timeline of how BMfS develops against how individual narratives unfold over time, to identify where tensions and diverging rationalizations emerge, how individuals relate to them, how they are overcome/avoided, which implications this has on BMfS elements, when and how individuals show changing logic constellation etc., and interactions between these. For capturing logic constellations and sensemaking, the study follows

Reay & Jones' (2016) approach of using 'pattern-matching' to capture institutional logics by analyzing data against logics' ideal types (here, commercial and sustainability logics). Making such patterns and mechanisms explicit is a common approach in process research (Cornelissen, 2017) for abstracting rich narratives into more theoretical explanations (Langley *et al.*, 2013).

Expected results

Since this research is still in the early stages of the longitudinal set-up, the findings presented here are preliminary. Eventually, the intention is to create a process model of how microlevel dynamics evolve and shape BMfS adoption in incumbents. As we are following the BMfS process in real-time, it remains open-ended how the BMfS, its grounding in commercial and/vs. sustainability logics, the BMfS' digitalization element, or organizational dynamics more broadly are going to play out.

Preliminary conclusions

This study contributes to the literatures on BMfS and organizational hybridity by exploring and explaining the microfoundations and intra-organizational processes that underlie and shape how (and if) incumbents move towards BMfS and hybrid logics. Drawing on process methods emphasizing process thinking and development-over-time this paper develops a more dynamic and time-sensitive understanding of BMfS that complementsmore static views of BMfS configurations, value elements or stakeholder relations implied in the business model canvas. By conceptualizing the BMfS not just as an outcome but also a means for navigating competing logics and tensions on micro-level, the paper constructs parallels with current conversations in social/sustainable entrepreneurship. Further exploring how hybridity is created (in incumbents, to begin with) and re-created (in sustainable ventures, to reverse mission drift) through the BMfS as a moderating device represents a relevant direction for further research.

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Keywords

Business model; Sustainability; Institutional logics; Hybridity; Process study

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The Paradox of Designing a Data-Driven and Sustainable Business Model for Scalability

The Role of Conflicting Institutional Logics in a Complex Healthcare Innovation Ecosystem

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Extended abstract

The role of digitalization and its effect on different types of business models is a highly topical issue both in the academic as in practice discourses and across different industry settings in B2B and B2C contexts (e.g., Kohtamäki et al., 2019; Li, 2020; Sestino et al., 2020). This paper refers to how digitalization through digital health technologies/solutions and data sharing may serve as an enabler within healthcare innovation ecosystems. Despite the growing insights to the field of data-driven and/or connected business models during a transformative digitalization process in both established and emerging fields, it is surprising that so little has been written about the sub-field of health and the challenges the suppliers of digital health innovations face during the transition phase of digitalization.

A basic assumption of this paper is that a digital health company's design of a business model for the healthcare sector is not an isolated entity. Rather on the contrary, it depends highly on its surrounding actors which are embedded in a healthcare innovation context (Larisch, 2016). Moreover, actors in a healthcare innovation ecosystem hold different 'institutional logics', i.e., belief systems that both shape their cognition and guide their actions and they also face pressure due to divergent directions from multiple institutional logics (Greenwood et al., 2011). We argue that the role of different institutional logics during the process of commercializing and adopting new digital health technologies lacks clarity and problematization, when seen from a supply as well as from a demand side perspective. Especially important is to consider how a digitalization logic faces constraining regulatory logics, or even lacking rules of the games for digital health innovations along with the difficulties of interpretations regarding data privacy, security, ethics, and data ownership for different stakeholders within a healthcare context.

An issue of much controversy regards the regulatory logic in relation to cloud solutions which may enable data sharing across healthcare and its different stakeholders. However, when the different layers of regulations, laws, and norms diverge and are interpreted differently, the advantages of scalability become illusory. The regulatory logic also impacts funding, payment, reimbursement models and procurement processes in a politically governed healthcare system which differs across international, national, regional, and even local levels (Laurell, 2018).

A concept that relates to digitalization and scalability is sustainability in economic, ecological, and social dimensions. In this paper, we refer to sustainable health that may be supported by more effective and efficient digital health business models in co-production and alignment with critical stakeholders to ensure an efficient use and allocation of resources. Furthermore, digitalization in healthcare may also support social sustainability by connecting the patient to various peer groups, care personnel, relatives, and tools to better manage their health condition. Remote patient monitoring is here an example of how patients may be involved and take an active part in their own care through self-management.

The aim of this research is to unpack conflicting logics in digital health start-ups' business models during commercialization and to understand the challenges that are involved in designing both a scalable and sustainable business model during a company's commercialization process when operating in the highly regulated healthcare sector. This leads us to the following research question: *How do institutional logics influence the development of sustainable data-driven business models in healthcare?*

Based on our empirical findings (in total 20 interviews/workshops) from three digital health start-ups and their challenges to get their innovations adopted and implemented in healthcare organizations due to unclear rules of the games in relation to regulations and reimbursement and procurement practices, we have identified several conflicting logics that are analyzed from a business model perspective.

Our preliminary results and conclusions illustrate the role of four critical institutional logics as illustrated in table 1 and how their roles are interconnected in a healthcare innovation ecosystem and in turn affect scalability and sustainability for digital health start-ups' business models. The perception of time differs considerably between start-ups and different layers of healthcare organizations which implies a prolonged and often cumbersome process to achieve the full benefits of a scalable data-driven and sustainable business model. This is particularly the case if the political and regulative logics are conflicting, delayed and/or non-predictable with the digital and the reimbursement logics.

TABLE 1 CRITICAL LOGICS FOR (NON-)SCALABILITY AND (NON-)SUSTAINABILITY

Logics / Scalability/ Sustainability	Digitalization	Regulatory	Political	Reimbursement
Scalability/ Time	**Conflicting**: due to uncertainty in relation to how different countries interpret the Cloud Act legislation.[13] **Prolonged** commercialization and adoption as compared to other industry settings. Many firms depend on a digital infrastructure and electronic health records	**Conflicting**: from a firm's possibility to scale up as the data inspection's interpretation of the GDPR rules have led to on-prem solutions in many places instead of cloud solutions. A **bumpy** and **prolonged** commercialization and adoption due to much uncertainty	**Delay**: healthcare is politically governed. In a Swedish context the interpretation of the Cloud Act has implied a lot of uncertainty for both healthcare organizations and firms	**Non-predictability**: Uncertainty and non-scalability due to difficulty in framing public procurements for digital health solutions in a patient-focused care. **Prolonged** due to many organizational silos
Social sustainability for patient in relation to data access	**Enabling** empowerment from a patient-centric care logic	**Conflicting:** Overarching goal is to protect the patient in relation to privacy/security/ethical issues. However, the full advantage of digitalization is difficult to achieve if data sharing is not enabled and secured	**Enabling**: The trend goes towards a more patient-centred healthcare	**Conflicting**: The role of the patient within a more holistic, data-driven individualized, collaborative, and accessible care and the current reimbursement structure is not aligned accordingly
Economic/ ecological sustainability for providers in relation to using resources	**Enabling** effectiveness and efficiency when digital tools are integrated in daily practice	**Conflicting** within current organizational silos. Difficult to achieve effectiveness and efficiency if saving data on-prem instead of in the cloud	**Delay**: achieving the full benefits of a digital transformation takes time and the creation of a holistic and integrated care requires political courage and action	**Conflicting:** holistic economic gains of digitalization are still underdeveloped due to organizational silos

[13] In the Swedish context, there has been several key events since the Cloud Act was published in relation to how legislation should be interpreted and which consequences it has for the use of cloud solutions that are bought from US firms.

Our research contributes to the innovation management field by linking business model design with an institutional logic framework (Ocasio and Radoynovska, 2016; Laasch, 2018) for understanding the processes of commercializing digital health innovations when embedded in a complex healthcare innovation ecosystem. This displays a mixture of convergent and/or conflicting logics such as market/commercial, professional/science and public/bureaucratic logics (Nissen et al., 2017) or regulatory, normative, and cognitive logics (Johansson et al., 2021) whereas we have focused on the misalignment of digitalization, regulatory, political and reimbursement logics in this paper and how they in turn affect the development and adoption of data-driven business models. Second, we incorporate the concepts of scalability and sustainability in designing business models. Scalability refers to the advantages of digitalization. Sustainability is not only seen from the effectiveness (achieving goals) and the efficiency (using resources in the best way) that belong to the economic/ecological perspectives of sustainability but also the social dimension that relates to the transparency and democracy from a patient perspective who gain access to valuable data for its own care as in line with a patient-focused healthcare model.

Keywords

Digital health innovation, commercialization, adoption, ecosystem, institutional logics, digitalization, business models

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The Challenges in Leveraging Digital Business Models for Social Sustainability within the Next Generation Internet Ecosystem

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Abstract

This article is a second draft of a multiple case-study exploring the ecosystem of the so-called Next Generation Internet (i.e., a European initiative aiming to shape the development and evolution of the Internet into an Internet of Humans). By focusing exclusively on for-profit, data-driven ventures,it identifies the key challenges of such organizations in developing and leveraging viable digital business models to achieve social sustainability. Our research builds primarily on the business models for sustainability research stream (i.e., Boons and Lüdeke-Freund, 2013; Schaltegger et al., 2016) and, by applying the stakeholder value creation framework developed by Freudenreich et al. (2020), it strives to understand what prevents the involved ecosystem actors to level out the playingfield, hence establish sovereignty of the European digital market. Despite being currently in the works, the ultimate goal of this article is threefold. First, this it seeks to inform the policy makers on the status quo of the European digital ecosystem and provide them with recommendations regarding the related relationship management. Second, it aims to present contributions to the research on the business models for sustainability, mainly by focusing on the under-researched areaof digital business models built around socially sustainable value proposition. Third, it intends to prescriptively articulate the best practice in operationalizing such business models in the ecosystemof the Next Generation Internet, hence presenting the managerial implications in an implementable manner.

Track 2.2 - Business Model Experimentation for Sustainability

Track chairs: *Nancy Bocken, Marc Dijk, Jan Konietzko (Maastricht University), Ilka Weissbrod, Leuphana (University Lüneburg), Maria Antikainen (VTT), Sveinung Jørgensen and Lars Pedersen (NHH Norwegian School of Economics)*

The track explores the topic of “Business model experimentation for sustainability”.

The aim of experimentation is to put forward and accelerate novel and impactful solutions. Track sub-themes relate to the following aspects of business model experimentation: the process, impacts, and ethics and biases in experimentation.

Adopting green innovations: A consumer practice-perspective

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Abstract

What are the consumer practices involved in the adoption of green innovations and how does the process of adoption unfold? Existing literature has identified barriers and drivers of green consumption within a traditional understanding of how innovations are adopted. This paper argues that the adoption of green innovations should be understood as the gradual adoption of interrelated green consumer practices. These practices involve more than the individual decision-maker, encompass changes in habits and routines, and will differ across adoption stages. We investigate the adoption of green consumer practices in the context of zero-waste shopping. In two qualitative pre-studies, we identify drivers and barriers for such adoption among non-adopters and early adopters. Based on this, we propose an adoption model for green consumption practices, which we test in our main study, using two field surveys for non-adopters and early adopters. Our findings further the understanding of green consumer practices and the barriers.

Key words

Sustainability, Zero Waste, Innovation, Practices, Adoption

Introduction

Companies increasingly offer green products and services, and such sustainability innovations can improve the social and environmental footprints of consumption (Varadarajan, 2017; Schaltegger & Wagner, 2011). Therefore, there has been a growing interest among scholars to study consumers' willingness to adopt such solutions. However, what are the wider range of practices that must be changed when adopting a single sustainability innovation, and how does this unfold throughout the adoption process?

As reflected in Sustainability Development Goal 12, sustainability innovations involve both greener production and consumption. Thus, companies that offer green products and services need to

facilitate consumers' adoption thereof. This will often require comprehensive changes in consumer behavior and practices (Peattie, 2010; Purtik and Arenas, 2017) – changes that involve more than the individual decision-maker, encompass changes in habits and routines, and differ across adoption stages. Traditional models of the adoption of innovations have been criticized for not taking into account these aspects (Kristensson, Pedersen and Thorbjørnsen, forthcoming; see also Carberry, Bharati, Levy, and Chaudhury, 2017). In accordance with Nysveen, Pedersen and Skard (2020), we argue that in understanding the adoption of green innovations, we need to take three aspects into account: (1) what is being adopted are interlinked green practices (i.e. the object of adoption), not merely green products or services; (2) these practices are performed by a network of actors (i.e. the subject of adoption), not just the single consumer; and (3) adoption of green practices takes place through a dynamic process that changes over time (i.e. the stage of adoption), rather than in a single choice or decision at a discrete point in time.

In this paper, we apply this contemporary perspective on the adoption of green innovations, using zero waste (ZW) shopping as the empirical setting. In doing so, we aim to propose and test an expanded adoption model in which green consumption practices are integrated. We thus shed light on the complex web of practices and actors involved in the adoption stages of ZW shopping.

ZW shopping can be considered a green innovation as it represents a radical alternative to mainstream shopping. At the same time, however, large retailers are adopting ZW solutions, by means of refills, unpackaged products, and so on. ZW shopping implies packaging-free solutions that require consumers to use reusable containers, bags and other packaging for refilling and carrying items (Beitzen-Heineke et al., 2017). This type of shopping may require considerable changes in a variety of consumption practices for individuals and households, both in the store and in the home. We thus agree with prior scholars who have suggested that practice theory is a fruitful approach to understand the complexity of sustainable consumption (Perera, Auger, and Klein, 2018, Røpke, 2009). According to practice theory (Warde, 2005), practices are characterized as a routinized type of behavior (Reckwitz, 2002), which belongs to a temporally unfolding nexus of activities (Schatzki, 1996), carried out by different individuals (Reckwitz, 2002). Hence, the company's offering (e.g. a ZW store or a packaging-free product) is not regarded as the object of adoption, but as a property that initiates a series of practices that involve multiple actors (e.g. members of a household).

Based on two qualitative pre-studies and a main study based on two field-surveys, we identify four distinct domains of ZW practices: 1) shopping practices, 2) practices in the household 3) social practices, and 4) general environmental practices. To capture the dynamic nature of adopting new consumption practices, we investigate these practices among consumers at two different stages of the ZW adoption process: early adopters and non-adopters.

This paper is structured as follows: First, we outline relevant insights from existing research. Second, we present the findings from the two qualitative pre-studies, which reveal drivers and barriers for adopting ZW shopping practices among non-adopters and early adopters. Based on these findings, we present a conceptual adoption model for green consumption practices. Then, we present our methodology for the main study, in which we test the conceptual model for early adopters and

non-adopters in two separate field surveys. Finally, we discuss our findings and outline their theoretical and practical implications.

Literature Review

Lessons from Adoption Research

In the fields of information systems research, human-computer interaction, and consumer behavior, there are large volumes of research on the determinants of individual consumers' adoption of technologies, products and services. Through the theoretical lenses of the technology acceptance model (Davis et al. 1989), the unified theory of acceptance and use of technology (Venkatesh et al., 2012), theory of planned behavior (Ajzen 1991), and theory of trying (Bagozzi et al., 1992), a large body of individual studies and meta-studies (e.g. Blut et al., 2016) inform researchers about the factors that drive adoption intentions and behaviors.

Through various applications and extensions of these adoption models, a wide array of new adoption antecedents has been identified, including network factors (Steiner et al., 2016; Thorbjørnsen et al., 2009), self-confidence (Chaouali et al., 2017), social- and identity-related factors (Thorbjørnsen et al., 2007), consumers' personal wealth (Døskeland and Pedersen, 2019), and the role of complementary products (Cenamor et al., 2013). These antecedents are important also for understanding adoption behavior in other settings, because they tap into important factors pertaining to the consumers' social network, the role of identity expressiveness, and the role of the extended network of complementary products, services and platforms available to consumers. For the adoption of green products and practices, these factors are clearly relevant, and in various ways related to the practices in our expanded model, which we account for below.

However, traditional adoption studies narrowly focus on the single individual consumer as the subject of adoption, and the single technology or products/services as the object of study. With the exception of the effects of social norms, traditional technology adoption models treat both the consumer and the adopted technology as islands, free of influence from their environment and the complex set of networks and services surrounding them. Noticeable exceptions do exist, however, and more recent investigations of technology adoption explicitly deal with the complex dependencies between networks, platforms and complementary products (cf. Steiner et al., 2016). Such complex markets and settings seem to have much in common with the heterogeneous markets, platforms and value chains that characterize green consumption.

Still, as the object of study in consumer adoption studies is limited to the technology, product or service itself and the subject to the individual consumer, there is need for a more nuanced and realistic perspective on the adoption process. A natural place to look is the organizational innovation adoption literature (cf. Frambach and Schillewaert, 2002; Martin et al., 2016). Organizational contexts are richer than, and in some aspects perhaps also more similar to, the complex network of actors to which a ZW consumer has to relate. For instance, in deciding to adopt ZW shopping, the consumer may have to convince and onboard the rest of the family or household, like a manager needs to onboard co-workers in adopting a new technology.

The behaviors of individuals within organizations (such as within a household) are significantly influenced by prevailing norms, values and culture (e.g. Scott, 2008). Adopting ZW shopping may therefore be far more difficult for the consumer if the remaining parts of the family goes 'on strike'. Also, by the same token, the ZW consumer has to change habits and 'work'-processes, in the same manner as do new technology adopters in organizations. Hence, key theories of adoption at the firm level, including the technology-organization-environment (TOE) framework and institutional theory, might be fruitful to apply in understanding new green consumption practices. Trying to map out and understand the organizational and environmental contexts of such adoption seems particularly relevant for adoption contexts wherein the individual adopter is dependent on and influenced by others (Tornatzky and Fleischer, 1990; Martin et al., 2016). In this regard, a practice-theoretical understanding of adoption, in which a new set of routines, behaviors and activities are adopted by an interrelated set of actors in the household (Warde, 2006; Reckwitz, 2002; Schatzki, 1996) can provide a richer conceptualization of households' gradual adoption of green consumption practices.

Adoption of Green Practices

Object of adoption. There is an extensive literature on barriers and drivers of individuals' adoption of sustainability-oriented goods and services. The object of adoption in these studies is sustainable offerings, such as low-carbon transport vehicles (Stryja and Satzger, 2018), green electricity (Ozaki, 2011), smart grid technology (Toft and Thøgersen, 2015), and green household goods (Vermeir and Verbeke, 2006). Other studies investigate barriers and drivers of more general categories of sustainable behaviors, including waste behavior (Taylor and Todd, 1997), energy use (e.g., Wang et al., 2014), mobility behavior (Schoenau and Muller, 2017), and diets (e.g., Cadario et al., 2018). Some of the latter studies are relevant to our inquiry, because they deal with the adoption of practices rather than offerings.

Although most studies do not take into consideration the complexity of the interrelated practices that need to be changed or adopted, some scholars have argued that green consumption should be studied more holistically, taking a practice perspective. For example, Lim (2017) points out that there is still a lack of understanding of how to encourage more sustainable consumption patterns. Shove (2003) argues that green consumption is bound up with routine and habit and has implications for the use of tools, appliances, and household infrastructures. According to this perspective, the object of adoption is physical offerings or infrastructures, but the consumption patterns are reflected in everyday routines and habits. Since sustainable consumption is manifested in an interrelated set of consumer choices (e.g. electrical vehicles, sustainable food, etc.), consumption habits (e.g. reusable shopping bags, refill solutions, asset sharing etc.), post-consumption and lifestyle habits (e.g. recycling, reuse, etc.), green consumption is arguably a complex set of practices and lifestyle habits. Hence, in our understanding of the adoption of green consumer practices, we need to take an expanded perspective on what constitutes the object of innovation.

Subject of adoption. Most studies on adoption of green offerings investigate the likelihood of a single consumer's use of a product or service. However, some scholars focus on the network of actors that are involved in sustainable consumption. For example, Grønhøj (2006) points out that

green consumer practices often involve several members of a household, and that their reactions to new practices may include suggestions, support, questioning, opposition and other types of influence on prospective participation in such practices. Therefore, to carry out these lifestyle changes, several people in the household need to agree on changing existing consumption habits.

According to Reckwitz (2002, p. 250), "a practice is social, as it is a 'type' of behaving and understanding that appears at different locales and at different points of time and is carried out by different body/minds". Social practices are facilitated by three elements: 1) material things (e.g. technology or products), 2) motivations and emotions (embedded in social meanings, values and norms), and 3) know-how and competence (Jaeger-Erben et al., 2015). When companies innovate to facilitate sustainable consumption, then, they aim to facilitate alternative practices or new variations of practices that are substantially different from existing or mainstream routines (Jaeger-Erben et al., 2015). Hence, an evolutionary process underlies the adoption of new green practices, and in order to better understand the adoption of such practices, these factors need to be taken into account.

Jackson (2005) furthermore argues that understanding the adoption of practices implies understanding their collective nature. Sustainable consumer trends are often socially motivated and take the form of social movements (Hutter, Hoffmann, and Mai, 2015). As pointed out by Jackson (ibid.), understanding consumer practices as social also emphasizes the existence and the importance of social norms in human behavior. Crucially, adoption then needs to be understood in a social context, embedded in an ecosystem of actors in and outside the household.

In a sharing/collaboration economy perspective, adoption of new behavior occurs in a network of peer-to-peer interactions. An important motivational factor for consumers to engage in sharing practices is to maintain a more sustainable lifestyle (Hamari et al., 2016). Examples include food-sharing practices (Morone and Navia, 2018), car sharing (Bardhi and Eckhardt, 2012) and asset sharing and access-based consumption more broadly (Belk, 2014). Whereas studies on adoption of sharing practices per definition account for practices involving more than one consumer, they generally do not investigate the broader range of practices involved in using a service. Put differently, the literature on the sharing economy accounts for the network of actors, but not for the network of practices. Like for sharing services, the adoption of ZW consumption involves behavioral change and new practices also for other actors of the consumer's micro-ecosystem (i.e. household, friends, family). Adoption models should thus also incorporate these factors related to the subject of innovation when trying to explain and predict adoption decisions.

Adoption stage. Recent research has identified time and adoption stage as key variables to focus on when trying to identify determinants of adoption. Ferratt, Prasad and Dunne (2018) argue that the determinants of initial adoption (for non-adopters) and determinants of continued use (for early adopters) are fundamentally different. The experience gained from initial trial and subsequent new practices, significantly shape future adoption decisions, so that they gradually become more automatic, habit-based and unconscious, and less focused on the conscious cognitive mechanisms assumed in traditional adoption research. Practice theory suggests that practices are dynamic entities that evolve gradually, and the adoption of practices may spill over to new related practices (Nash et al., 2017). In line with Ortiz de Guinea and Markus (2009),

Ferratt et al. (2018) argue that traditional adoption models largely overlook how experience and new practices shape future adoption processes and that the concepts in these models (e.g. ease of use, usefulness etc.) may be useful when studying determinants of initial adoption (for non-adopters), but not necessarily continued use (for early adopters). Echoing these arguments on how determinants of initial adoption and continued use likely are different, we distinguish between non-adopters and early adopters in our empirical investigations and argue for differential antecedents across adoption phase.

Object and Subject of ZW Shopping Adoption

The empirical context of our investigation is ZW, which has been defined as "a goal [….] to guide people in changing their lifestyles and practices to emulate sustainable natural cycles [….]" (Zaman, 2015, p. 2). Adapting to a ZW lifestyle requires changes at many different levels. First, it requires considerable behavioral changes at an everyday basis. Changing habits is challenging, and it often requires substantial self-control and willpower (e.g., Verplanken and Wood, 2006). Even if consumers are motivated and positive to lifestyle change, they generally exhibit considerable status quo bias and psychological inertia during decision-making (e.g., Samuelson and Zeckhauser, 1988).

Moreover, changes of everyday habits and routines influence and involve other actors in the consumer's micro-ecosystems. Adopting ZW consumer practices will typically involve multiple members of a household – it goes beyond an individual decision maker conducting a consumption decision. For example, waste management in a household may involve all members in establishing new routines for recycling or composting kitchen waste (Grønhøj, 2006). This implies that the subject of adoption is often not limited to an individual consumer. In an ecosystem perspective, the motivations of consumers are embedded in routine and habit-based behaviors that are in part influenced by social norms and in part constrained by institutional contexts (Jackson, 2005).

Since ZW shopping is a matter of lifestyle, the object of adoption takes the form of an abstract idea (i.e. a sustainable lifestyle), rather than a physical object (e.g. a store or a product). ZW shopping involves new activities and routines, inside and outside the home, which at an accumulated level constitute the practice of ZW shopping. Consumers adopt such practices gradually over time, and as such, adoption should arguably be understood as a temporal process rather than a discrete decision at a given point in time (Nysveen et al., 2020). In established adoption models, the object of adoption is a product, service, or technology. Consumer practices, such as ZW, in contrast, cannot be easily delimited in a similar way, but needs to be understood as more complex adoption processes. Hence, we argue that existing perspectives on adoption of innovations must be updated, taking into account the complex nature of the object of adoption of new green practices.

Conceptual Model and Study Design

As outlined above, the adoption of green consumer practices involves decision-making and behavior change that goes beyond the individual and is instead interpersonal and social; it encompasses a behavior more complex and multifaceted than the mere choice of using a single product or service; and it involves an intertemporal process of gradual and increasing change in consumption and post-consumption habits in the store and in the home. We argue that existing

models of adoption only partially capture such aspects of the adoption process of green consumer practices.

In the following, we develop an adoption model that a) integrates new consumer practices as drivers of behavioral intentions, b) takes into account practices that also are social and involve other members of the household, c) can be applied at different stages of adoption (pre and post) and d) builds on established theoretical relationships from adoption research. We have chosen the theory of planned behavior (TPB) as point of departure for our conceptual model. The reason for this is threefold. First, this model is robust and well tested across a wide array of contexts and settings, including the adoption of green behaviors (Vermeir and Verbeke, 2008; Kalafatis et al., 1999). Second, the model is simple and allows inclusion of consumption practices as drivers of attitudinal beliefs, behavioral control and behavioral intentions. Conceptualizing and investigating the role of consumption practices are key contributions in the current paper. Third, the model is flexible and can be applied across different stages of adoption. These phases are important for understanding adoption of green consumption practices and the chosen model can be applied to both non-users and existing users. Our conceptual model is depicted in Figure 1:

[ADD FIGURE 1 HERE]

In the following, we first report on two qualitative pre-studies to identify green consumption practices. Pre-study 1 investigates the perceptions of the green practices associated with ZW shopping from the perspective of consumers in four different segments. The respondents are non-adopters of ZW; thus, the first pre-study investigates perceptions in this group. Pre-study 2 investigates the perceptions of such green practices from the perspective of ZW store-owners. The respondents thus shed light on the group of early adopters who already conduct ZW shopping. Using insight from these two qualitative pre-studies, we conceptualize different dimensions of consumption practices and refine and revise the above depicted adoption model (see Figure 1). The revised adoption model of green practices is then empirically tested in two related field-surveys in our main study. These surveys are conducted among non-users and early adopters (current users) respectively, to try to capture the dynamic processes of adopting green consumption practices.

Pre-Study 1: Non-Adopters

The purpose of pre-study 1 was to investigate consumer perceptions of ZW solutions and the drivers and barriers associated with adopting such shopping practices. We conducted focus group interviews with 20 consumers in four different segments on their perceptions of various refill-based solutions when shopping for consumer goods. Focus groups allow for data collection through group interaction on a topic determined by the researcher (Morgan, 1996), and for identifying perspectives that can be explored in more depth using additional methods (Stewart and Shamdasani, 1990). We conducted four focus groups in Bergen, Norway, in the spring of 2018. Four segments were included in the study: young female adults (aged 22-23), young male

adults (aged 25-27), adults with children (aged 30-45) and middle-aged and elderly female adults (aged 57-75).
We selected soap and detergent products in single-use packaging as the case for the focus groups. Participants were exposed to four different prospective distribution solutions that can reduce the plastic footprint of such products. These solutions were developed by a corporate partner in the research project from which this data is derived – a large Norwegian FMCG company. The solutions are illustrated in Figure 2, and are, respectively, (1) a big-bag product for home refill, (2) a refill station in the store, (3) home delivery of refill via e.g. Amazon Key, and (4) home delivery of refill via online grocery shopping. We structured the conversation around the characteristics and practicalities of the selected product category for increased comparability across focus groups (cf. Morgan, 1996).

[ADD FIGURE 2 HERE]

Results

Participants did not spend much time and effort on purchase decisions for liquid soaps and detergents, and their shopping behavior was habit-driven. A "hassle-free" shopping experience was generally regarded as the main concern, although there was some awareness related to "the plastic problem" of using single-use containers.
Participants emphasized price, environmental friendliness, effort, and the functionality of the solutions. Current refill packages were judged as being too expensive, when taking into account the effort required by consumers to refill the containers at home. Many participants experienced making a mess when trying to refill the containers and saw them as requiring different behavior when preparing for, and carrying out, shopping activities.
Several participants argued that bringing containers to the store for refill would be very difficult to do in practice. One parent explained that "it would be like the reusable grocery bags that they buy, but keep forgetting at home". Female students and senior citizens were less concerned with this, i.e. there was variation in the assessment of difficulty and effort.
Many participants across segments expressed an unwillingness to change current shopping practices, and there was little interest for refill solutions. Participants were moreover skeptical to their functionality: "They are not going to be easy enough to use", argued a 30-year old female. Several adult consumers feared functional risks like making a mess and the danger of mixing products.
In addition, various types of physical risks were pointed out. Parents disliked storing large quantities of soap products in the home, due to the risk for their children. Most segments felt that there were risks associated with home delivery, except the young male students. Participants emphasized that for refill solutions to be attractive, it would need to be part of a larger transformation of the way they shopped all types of product categories.
The focus groups revealed that consumers were skeptical to refill and ZW shopping due to the lack of a coherent system for such shopping, i.e. the barriers were not related to products (as objects), but to the broader ecosystem. Transportation, storage and waste handling from the store and in the house was also challenging. Furthermore, the adoption of such solutions required

coordination in the household, and functional or privacy risks for household members beyond the "shopper" were emphasized. Finally, since these products were habit-driven and alternative solutions required a larger transformation of how shopping was organized, consumers found them burdensome. Thus, the consumers expressed concerns of relevance to our understanding of what is the object of innovation, who is the adopter, and what is the broader process of adoption of a ZW lifestyle.

Pre-Study 2: Early Adopters

The purpose of pre-study 2 was to investigate the perceptions of ZW store owners of the nature and characteristics of ZW shopping and barriers and drivers thereof. We conducted semi-structured interviews in the fall of 2018 with the owners of the three biggest ZW stores in Norway, Mølleren Sylvia in Oslo, Råvarene in Bergen, and Unwrapped in Arendal. All of them are relatively small stores with a limited scope of products – that is, customers cannot carry out their entire grocery shopping in these stores alone. The interviews were conducted individually with each of the three owners, henceforth referred to as Subject 1, 2 and 3.

Results

The store owners argued that the early adopters shop most groceries in the ZW store, are driven by environmental concerns and altogether avoid plastic. Subject 3 stated that "the customers bring their own containers (...) and often stay for quite some time." Subject 3 emphasized that "...identity is absolutely important, it becomes more and more important for people to communicate who you are [through shopping practices]". Subject 2 described how "many people use this visit almost as a kind of 'meditation'". According to the shop owners, ZW customers accept that groceries cost a little more, both in monetary terms and in terms of time used. Subject 1 elaborated: "It requires a little more planning, and it is kind of a barrier for customers to make food from scratch." All subjects described early adopters as people who are willing to make substantial changes in their habits and planning. Subject 2 claimed that "the disadvantage [of ZW] is that you have to plan better. (...) There may also be a mental barrier, because you have to bring more things". In sum, she argued, "There are many steps you need to take to get there, which might prevent people from trying in the first place."

Subject 3 pointed out that ZW shopping is considered an "extreme" behavior. Subject 1 argued that ZW could become "mainstream", but that change is happening quite slowly. She emphasized the peer effects involved in new adopters being influenced by early adopters, who are "proud to live like this." She moreover pointed out that ZW stores are also almost like "lifestyle hubs" for consumers who want to live sustainably.

The shop owners believed that there were technological barriers for ZW. Subject 2 explained: "You must first weigh the empty jar, then you must fill it up with the goods that you want, and then you have to weigh it again and subtract the weight of the empty jar." She suggested scanning technology that identified the exact amount the customer had taken, which would make it easier for consumers.

Overall, the store-owners described shopping practices that are still a niche phenomenon of highly committed early adopters. However, they were seeing a steady expansion of the scope, i.e. the type of customers who tried ZW solutions. They also believed that integrating ZW solutions into "traditional" grocery stores could make it easier for consumers to adopt such practices, since it would be in the context of their familiar shopping routines. The perceptions of these key informants problematized whether adopting ZW necessarily becomes more burdensome, but had a keen understanding of how such barriers led consumers to avoid ZW. This was due both to the necessity of adopting planning and coordination practices that spanned from the store to the home, and because adopting ZW requires a shift in mindset. According to the informants, this relates to shopping, storing and making food in the house, and managing waste, as well as symbolic and identity-related dimensions of adopting such practices. Thus, they believed that rather than being a straightforward adoption of solutions in the store, ZW implied a comprehensive transition into a new set of lifestyle practices.

Refined Conceptual Model and Hypotheses

Based on prior adoption- and practice-research and the qualitative insights from pre-study 1 and 2, we conceptualized four broad categories of consumer practices involved in ZW-shopping adoption. First, shopping practices refer to activities during, and in the planning phase of, shopping. Second, household practices related to food include activities in the process of preparing and storing food and managing the household. Third, social practices refer to the perceived role of different actors in the shopping and household activities. Fourth, general environmental practices pertain to an overall pattern of sustainable consumer behavior. We propose that both actual and perceived changes in these four categories of practices influence consumers' beliefs and adoption intentions.

We integrated these practices as drivers/antecedents in a well-established adoption model, namely the theory of planned behavior (Ajzen, 1991). Building on an existing model makes the relative contribution of our concepts (consumer practices) both transparent and easy to test. We argue that consumer practices will influence three key constructs in this model; attitudinal beliefs, behavioral control and behavioral intentions. In line with recent research we expect the different practices to have differential effects for non-adopters and early adopters, respectively. Our adoption model is depicted in Figure 3, and we account for our hypothesized relationships between the variables in the following.

[ADD FIGURE 3 HERE]

Shopping Practices

We expect consumers' beliefs of shopping practices to significantly impact their attitudinal beliefs and behavioral control, and in turn, their intention to buy and use ZW products (behavioral intentions). As evident from pre-study 1, non-users are critical to the practical aspects surrounding ZW shopping and believe the practices to be cumbersome and unfamiliar. These

critical evaluations likely impact both attitudes and beliefs about behavioral control negatively. According to the ZW-shop owners, however (pre-study 2), the opposite effect can be expected for ZW-users (early adopters). They describe the shopping experience as a positive process that also have important identity-expressive motivations. Also, based on extant research on habits (Aarts, Verplanken & Van Knippenberg, 1998) and self-perception theory (Bem, 1967), one may expect that once a practice has been established and repeated, a positive link between the practice and attitudes towards that behavior is reinforced. One reason is that people observe and interpret their past behavior as being caused by their own attitudes. Consequently, we expect a different pattern of effects of shopping practice on attitudes and intentions for early adopters as compared to non-adopters.
Hence, we hypothesize;

H1: *Shopping practices will have a positive (negative) effect on a) attitudinal beliefs, b) behavioral control and c) behavioral intentions for early adopters (non-adopters).*

Household Practices

We expect a similar pattern for household practices. These practices are related to changes in how food is prepared and managed in the household. The qualitative interviews revealed that non-users of ZW have concerns pertaining to how their practices and behavior in the household have to change to adopt ZW. These beliefs likely impact attitudinal beliefs, behavioral control, and, in turn, behavioral intentions negatively. Based on the pre-studies, one can predict that negative beliefs about how to practically integrate ZW in everyday household activities (i.e. behavioral control) is a fairly strong adoption barrier for non-users. Conversely, the established habits and new household practices of early adopters likely impact attitudes and behavioral control positively. As they have already signaled to themselves and others that they are ZW-shoppers, have integrated new practices in their household and can look back on these practices to infer own attitudes (Bem, 1967), household practices likely drive future behavior and behavioral intentions towards ZW.

H2: *Household practices will have a positive (negative) effect on a) attitudinal beliefs, b) behavioral control and c) behavioral intentions for early adopters (non-adopters).*

Social Practices

Social practices refer to the perceived role of different actors in the shopping and household activities; that is, how social life and tasks in the household will change as a consequence of ZW adoption. Simply put, this primarily pertains to beliefs about who (will) perform different tasks in the household. ZW may carry beliefs of both positive and negative aspects of social practices,

including more coordination and tighter social life in the family, or that certain household members have to do more of the workload. Non-adopters in pre-study 1 voiced concern about increased required coordination in the household, and various forms of risk and uncertainty involved therein. How social practices affect attitudes for early adopters is more difficult to predict. The findings from ZW-shop owners (pre-study 2) suggest that in most households, ZW shopping is primarily driven by one eager, early-adopting household member. Although speculative at this point, as often not all household members are 'onboard' and equally enthusiastic about ZW-adoption, this may put strain on the social coordination and -practices, leading to negative effects of social practices on attitudes and intentions, even for early adopters.

H3: *Social practices will have a negative effect on a) attitudinal beliefs and b) behavioral intentions for both early adopters and non-adopters.*

General Environmental Practices

General environmental practices pertain to consumers' overall pattern of sustainable consumer behavior. Consumers that perform highly on these practices are generally focused on behaving environmentally friendly in everything from recycling behavior to public transportation and tend to display their sustainable consumption identity to others. We argue that consumers' overall pattern of sustainable consumer behavior positively influences both attitudinal beliefs (they believe ZW is something positive), behavioral control and behavioral intentions. Established environmental practices in other domains, whether habituated or newly adopted, likely drive consumers to see ZW through more rose-tinted glasses. The more environmental practices consumers have adopted, ranging from recycling to transportation, the more positive they typically will be towards other new environmental practices. Moreover, the more strongly they believe that they will be able to understand, use and maintain such new practices (i.e. exert behavioral control). Hence, we expect uniform positive effects of general environmental practices on attitudes, behavioral control and adoption intentions:

H4: *General environmental practices will have a positive effect on a) attitudinal beliefs, b) behavioral control, and c) behavioral intentions for both early adopters and non-adopters.*

Behavioral Control

A wide array of adoption research utilizing the TPB finds behavioral control to be a significant driver of both intentions and adoption. Consumers' adoption of innovations usually entails learning new practices or new ways of doing things. Whether a new technology, product or a new green behavior, consumers usually face certain challenges in how to learn, use, or manage them – and this personal assessment likely impacts behavioral intentions. We expect this to be true for both adoption and continued use of ZW shopping.

H5: *Behavioral control will have a positive effect on behavioral intentions for both early adopters and non-adopters.*

Social Norm

Social norm, or subjective norm, is also a well-established antecedent of adoption behavior. A key function of social norms is to alleviate risk and uncertainty, as well as guiding behavior when information is ambiguous. Across different contexts, social norms generally have a fairly robust explanatory power on intentions. Consequently, we propose the following hypothesis:

H6: *Social norms will have a positive effect on behavioral intentions for both early adopters and non-adopters.*

Main Study

The purpose of the main study was to test the proposed adoption model of green consumption practices. Moreover, to try to capture the dynamic process of green practices adoption, we empirically tested this model across two different samples: Non-adopters (i.e. consumers with no experience with ZW shopping) and early adopters (i.e. current users of ZW shopping). The purpose was twofold: First, to see if our model and measures fit both non-users and users. Second, to explore the dynamic dimension of practices adoption by investigating the hypothesized differences in model paths (driver pattern) across different stages of the adoption process.

We therefore conducted two related field surveys for non-adopters and early adopters. The surveys comprise eight overarching topics (see Table 1). First, we developed measures of the four broad categories of consumer practices that could be expected to be influenced by the adoption of ZW solutions. These were based on our review of prior studies and on insights from the two qualitative pre-studies. We asked participants to assess to what extent they believed that ZW shopping would influence these practices. Second, we included measures from the TPB (Ajzen, 1991), capturing attitudinal beliefs, social norm and behavioral intentions related to ZW shopping solutions. Finally, we measured socio-demographic characteristics.

[ADD TABLE 1 HERE]

Sample Characteristics

We conducted the two field surveys in the fall of 2018. First, 171 current non-adopters of ZW solutions were interviewed at two shopping malls outside Oslo, Norway. Second, we surveyed 205 early adopters of ZW solutions in one of the ZW stores mentioned above and through special interest forums for the Norwegian ZW community. Respondents in the non-adopter study self-reported not to have adopted ZW shopping.

The wording in the items in the surveys were slightly modified to account for whether or not respondents had experience with ZW solutions (e.g. by changing the present tense to the future

tense in questions about adopting such practices; cf. Table 1). The sample consisted of 376 participants in two different groups. In the non-adopter group, 65.29% of respondents were female (mean age = 52, min = 18, max = 86), while the percentage of female respondents was 85.71% for early adopters (mean age = 32, min = 17, max = 87. Though the distribution of age and gender seems to be different across our two groups, a robustness check shows that age and gender have no significant effects on behavioral intentions and any other structural relationships of our interest when they were included as control variables in our main model.

Results

Measurement model. As we are interested in substantive cross-group comparisons, we first needed to test whether our measurement model was invariant across groups (Kline, 2010). As shown in Table 2, we find that metric invariance was supported, meaning that it is valid to compare structural relationships among latent constructs between groups (e.g., Kline, 2010; Steenkamp and Baumgartner, 1998). Note that scalar invariance was untenable, and it is not valid to compare means of latent constructs across groups.

[ADD TABLE 2 HERE]

We conducted multi-group confirmatory factor analysis (CFA), using Lavaan package version 0.6-3 in R (Rosseel, 2012), to check if our studied latent concepts were psychometrically valid within each group of participants. This model provided adequate global fit measures: Satorra-Bentler's (SB) scaled $\chi^2(238)$ = 335.617 ($p < 0.001$), robust CFI = 0.964, robust TLI = 0.954, RMSEA = 0.047 (90% CI: [0.035, 0.059]), and SRMR = 0.054 (Hu and Bentler, 1999). Furthermore, all items significantly loaded on the expected latent variables and their standardized factor loadings were all higher than 0.55 (see Table 3), providing high evidence for convergent validity (Bagozzi and Yi, 1991; Hair et al., 2010). The values of average variance extracted (AVE) ranged from 0.52 to 0.72, while those of composite reliability (CR) ranged from 0.69 to 0.89, indicating high convergent validity. Following previous research (e.g., Tomczyk et al. 2016), in order to improve the model fit, we allowed the error terms of two items measuring behavioral intentions to be correlated. Our results remained robust when we did not include the correlation between these two error terms.

[ADD TABLE 3 HERE]

To assess discriminant validity, we merged the two samples into a single data set (e.g., Kadic-Maglajlic et al., 2018). Our results show that all the AVE values surpassed the required threshold of 0.50 (Fornell and Larcker, 1981). Importantly, we confirm discriminant validity of the studied constructs because (1) the square roots of the AVE scores for any two constructs were both larger than their shared variance (except for the square root of the AVE of attitudinal beliefs (0.77), which was slightly lower than its correlation with behavioral intentions (0.79)), (2) the 95% confidence

intervals of all the correlations did not contain 1.0 (Bagozzi and Yi, 1991), and (3) the heterotrait-monotrait (HTMT) values were all below the recommended cut-off value of 0.85 (Henseler et al. 2015) (see Appendix 1).

Structural model. As our measurement model was metrically invariant across groups, we could examine if structural paths were also invariant across groups. First, we performed a multi-group structural equation model (SEM) in which all structural coefficients were freely estimated between groups. This "totally free" structural model yielded good global fit measures: SB scaled $\chi^2(314)$ = 454.163 (p < 0.001), robust CFI = 0.949, robust TLI = 0.938, RMSEA = 0.050 (90% CI: [0.039, 0.060]), and SRMR = 0.072. Next, we performed a fully constrained structural model in which all structural parameters (regression coefficients) were set to be equal across groups. This model yielded worse global fit measures: SB scaled $\chi^2(328)$ = 490.396, p < .001, robust CFI = .941, robust TLI = .932, RMSEA = .051 (90% CI: [.042, .062]), and SRMR = .083. More importantly, the scaled chi-square difference test showed that the fully constrained structural model was significantly worse than the "totally free" one: $\Delta\chi^2(14)$ = 37.63, p < .001. Therefore, we focused on the "totally free" SEM model to test our hypotheses. As shown in Figure 4, this model explained about 65% of the variance in the behavioral intentions of participants in both groups. The details of model estimates are shown in Appendix 2.

[ADD FIGURE 4 HERE]

Hypothesis Testing

Shopping practices. Our results reveal that while the effect of shopping practices on attitudinal beliefs was positive but non-significant for early adopters (β = 0.026, n.s.), it was negative and significant for non-adopters (β = -0.167, p = 0.033). Therefore, H1a was partly supported. The effects of shopping practices on behavioral control however were not significant for both early adopters (β = -0.069, n.s.) and non-adopters (β = 0.083, n.s.), meaning that H1b was not supported. In contrast, shopping practices had a positive, significant direct effect on behavioral intentions for early adopters (β = 0.102, p = 0.049), while it was negative and marginally significant for non-adopters (β = -0.120, p = 0.066), supporting H1c.

Household practices. We found that household practices only had a significant and negative effect on non-adopters' behavioral control (β = -0.591, p = 0.001), while all other effects of this variable were non-significant. Therefore, only H2b was partly supported, while H2a and H2c were not supported.

Social practices. Similarly, social practices also had only one marginally significant (negative) effect on early adopters' attitudinal beliefs (β = -0.122, p = 0.058), while all other effects of this variable were non-significant. Therefore, while the data partly supported H3a, it did not support H3b.

General environmental practices. We reveal significant and positive effects of general environmental practices on attitudinal beliefs for both early adopters (β = 0.308, p < 0.001) and non-adopters (β = 0.475, p < 0.001). Similarly, its effect on behavioral control was also positive and significant in both groups (early adopters: β = 0.274, p = 0.068; non-adopters: β = 0.504, p = 0.003). Therefore, both H4a and H4b were supported. The effect of general environmental practices on behavioral intentions was also positive and marginally significant for non-adopters (β = 0.182, p = 0.068), but was not significant for early adopters (β = 0.078, n.s.). Hence, H4c was only partly supported.

Behavioral control. The effects of behavioral control on behavioral intentions were positive and significant for both early adopters (β = 0.092, p = 0.006) and non-adopters (β = 0.103, p = 0.042), supporting H5.

Social norms. The effects of social norms on behavioral intentions were however nonsignificant for both early adopters (β = -0.029, n.s.) and non-adopters (β = 0.053, n.s.). Thus, the findings did not provide support for H6.

Table 4 summarizes the results of all our hypothesis tests.

[ADD TABLE 4 HERE]

Discussion

For early adopters, shopping practices had a significant direct effect on behavioral intentions. Moreover, social practices (β = -0.180**, 95% CI = [-0.522, -0.009]) and general environmental practices (β = 0.349***, 99% CI = [0.102, 0.731]) had significant indirect effects on behavioral intentions through attitudinal beliefs, while only general environmental practices (β = 0.037*, 90% CI = [0.0003, 0.089]) had a marginally significant indirect effect on behavioral intentions through behavioral control.14 In contrast, for non-adopters, shopping practices had a marginally significant negative direct effect on behavioral intentions, while the direct effect of general environmental practices was marginally significant and positive. Similarly, only shopping practices (β = -0.164*, 90% CI = [-0.461, -0.016]) and general environmental practices (β = 0.362***, 99% CI = [0.139, 0.828]) had significant indirect effects on behavioral intentions through attitudinal beliefs. In addition, general environmental practices (β = 0.051**, 95% CI = [0.010, 0.152]) and household practices (β = -0.060*, 90% CI = [-0.191, -0.010]) had significant indirect effects on intentions through behavioral control.

The fact that shopping practices had a positive effect on behavioral intentions for those who already have adopted is interesting, and in contrast to non-adopters. Whereas early adopters seemingly have integrated these new shopping habits into their daily life to the extent that it positively drives behavioral intentions, the same model path was negative for non-users. Hence, and as mentioned above, non-users likely perceive ZW shopping practices as cumbersome and unfamiliar, and this is reflected in these practices as a negative antecedent of behavioral intentions. For early adopters, social practices had an indirect (via attitudinal beliefs) negative effects on behavioral intentions. Although speculative at this point, this finding may suggest that ZW shoppers have a hard time onboarding the rest of their household to the ZW practices pertaining to food storage, preparation

[14] The significance of indirect effects was evaluated using the bootstrap method with 10,000 samples and bias-corrected, accelerated confidence intervals; * p < .10, ** p < .05, *** p < .01;

and cooking. Evidently, for early adopters, there is something pertaining to social practices that leads to a negative influence on intentions for continued ZW consumption.

General Discussion

Discussion of Findings

The nature and characteristics of ZW shopping solutions are likely to change over time. Similarly, consumer preferences also gradually evolve, and environmental concerns will perhaps shape consumer behavior and practices more in the future. Through the lens of practice theory (Warde, 2005), our study sheds light on three dimensions of green consumer practices that are insufficiently captured in existing models of adoption. First, we have expanded on the object of adoption, by conceptualizing green consumer practices along four distinct, but related dimensions: shopping practices, household practices, social practices, and general environmental practices. Second, we have gone beyond an understanding of the subject of adoption, i.e. "the adopter", as an individual. Instead, we suggest that adoption should be understood as taking place in a web of related actors that also includes social practices. Finally, we have investigated the dynamic aspect of such adoption by comparing two groups of consumers: early adopters of ZW and non-adopters, who display different patterns in their perceptions and assessments of ZW practices.

Our study demonstrates that a consumer practice-perspective is a useful approach to understanding adoption of green innovations like ZW shopping. Pre-study 1 revealed barriers and drivers related to various aspects of the adoption process. It showed that consumers had concerns related to the influence of new shopping practices on the broader set of actors in the household. Moreover, they believed that for ZW solutions to be attractive, a broader set of solutions would have to be available and adopted in concert. Participants thus viewed ZW as something to potentially adopt in the future, when such solutions were available. Pre-study 2 suggested that ZW is still a relatively niche phenomenon, with a dedicated subculture of people embracing the lifestyle. Moreover, the dedicated ZW shoppers had embraced new practices, but also an overarching mindset that led them to change the nature of their shopping and household practices.

The two field surveys in our main study lent empirical support to the proposed green practice adoption model. Multi-group invariance testing showed that the parameters of our measurement model were equivalent across the two groups: early adopters and non-adopters. Hence, our measurement model is valid, and that the structural model is replicable across settings (Chin et al., 2014). We thus showed that consumers distinguish between a set of various practices in relation to ZW shopping, and that these practices influence the intention to (continue to) use ZW, either directly, or indirectly through attitudinal beliefs about ZW and/or behavioral control.

Theoretical Contributions

We have argued that established adoption models should be updated with a consumer practice perspective. Practice theory posits that consumer behavior comprises a set of interlinked routinized activities (Warde, 2005). Applying this perspective on adoption of sustainable innovations, we contend that the object of adoptions should be understood as the set of practices carried out by the consumer, rather than a single product or service. Accordingly, we have conceptualized and

tested an extended TPB model, showing how consumer practices involved in a green innovation (ZW shopping) influence consumers' behavioral intentions towards the innovation. Therefore, a key theoretical contribution of our paper is to provide a new perspective on how the object of innovation should be understood. Although prior research has conceptually established the idea of practices as a way of understanding green consumer behavior (Hargreaves, 2011; Røpke, 2009), empirical research on the role of consumer practices in adoption processes is lacking. Perera, Auger and Klein (2018) criticized traditional models for not being able to predict behavior due to the attitude-behavior gap, and instead advocated the need for in-depth analyses of consumer practices. We have bridged the practice perspective with existing adoption models and adhere to the criticism of existing models, but we argue that established models, such as the TPB, are applicable to the extent that we are able to integrate the practice perspective.

Practice theory posits that practices are social and dynamic processes. We contribute to adoption theory by showing that the adoption of green practices involves several actors (i.e. is a social process) and varies across stages in the adoption process (i.e. is dynamic). Many adoption decisions influence the lives of other members of the household and adoption models should explicitly consider this social aspect. The findings in the main study on negative (indirect) influences of perceived changes in social practices on adoption intentions among both early adopters and non-adopters clearly point to the importance of social networks in adoption decisions. Our study also brings support to the idea that adoption of green practices is likely to be a function of time. Our findings for the two distinct groups, representing different stages of the adoption process (non-adoption and early adoption), support the idea that adoption should be regarded as a process that occurs and changes over time. Although a longitudinal design would be a proper test of the dynamic function of adoption, the difference between the two groups in our research resembles different stages in an adoption process. These cross-group analyses also respond to Pietzsch et al.'s (2017) for a richer understanding of drivers of ZW among different consumer groups, and Bocken and Allwood's (2012) call for consumer insights that can enable business models with lower footprint in consumer goods and beyond.

Managerial Implications

Our study has practical implications for companies that aim to introduce ZW solutions for consumer goods and other products, as well as for governments and regulatory bodies that aim to facilitate such consumer practices. Anecdotal evidence suggests that retail stores are increasingly experimenting with refill-based and packaging-free shopping. For instance, the "nude food" packaging-free movement has been embraced by retailers on several continents. The scalability of such solutions requires insight into factors that determine their adoption. Our study has several implications for such managerial decisions.

First, knowledge about the sets of practices associated with ZW shopping and the drivers and barriers related to them can inform the design of ZW solutions. Moreover, the varying degrees to which early adopters and non-adopters perceive changes in such practices to be burdensome suggest that there is a need for differentiated product and service design to stimulate ZW consumption. Also, the communication of such solutions should likely be tailored to address the specific concerns of various segments. For instance; our studies reveal that shopping practices negatively influence behavioral intentions for non-adopters, but are in fact a positive driver for early adopters. Hence, illustrating and communicating to non-adopters the ease and enjoyment of

shopping practices (as experienced by early adopters) may be one way of overcoming barriers to adopt for this segment.

Second, our findings suggest that complete and standardized solutions across product categories are likely to increase the inclination of consumers to adopt ZW practices. This implies that larger-scale ZW solutions integrated in traditional retail stores can be fruitful, given that they are designed in a manner that takes the barriers adopted in this paper seriously. Importantly, our findings suggest that the embracing of new practices related to ZW shopping require lifestyle changes at many levels. Since such lifestyle changes are less likely for less enthusiastic shoppers, our findings suggest that the mainstream adoption of ZW would require innovation in ZW solutions, enabling technologies and the ecosystem of products and services that could reduce the burden on the "ordinary" consumer. Finally, from a government and regulatory perspective, various incentives can be considered in order to lessen the burden on consumers who adopt ZW shopping. Examples are tax breaks of the sort that are offered in some countries for services related to the repair of products.

Limitations and Avenues for Future Research

Our study demonstrates that consumer practices can be integrated into the TPB as antecedents of attitudinal beliefs about a green innovation, perceived behavioral control, and intention to use the green innovation in the future. We have specifically studied consumer practices in relation to ZW shopping. Although we have tried to cover the most relevant practices related to this type of adoption, as informed by our qualitative studies, we recognize that other practices that belong to a broader nexus of behaviors could have been included. According to practice theory, a practice consists of a large variety of interconnected elements, such as bodily activities, mental activities, know-how, and emotional states (Warde, 2005). Taking this broad perspective of practices, a practice-based adoption model can be expanded to include a larger variety of practices than the ones proposed in our research. We encourage future research to develop practice-based adoption models with more generic dimensions of practices that can be applied to all kinds of innovations.

In our study, we investigated the dynamic aspect of adoption by comparing two groups of consumers who correspond with different stages of the adoption process. Future studies would benefit from longitudinal research designs through which the dynamic dimension can be investigated more properly. With regards to the subject of adoption, we encourage researchers to investigate the social processes involved in adoption processes. The finding that practices, attitudes and behaviors of other actors (here: members of the household) significantly influences the adoption process, suggests that institutional theory and theories of adoption at the firm level may provide valuable insight for understanding adoption at the consumer level as well.

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Table 1: Measures used in the study

Variable
Perceived changes in shopping practices (ShP) (1 = *to a very small extent*, 7 = *to a very large extent*)
ShP1 How much I buy
ShP2 How often I shop
ShP3 How many different stores I shop in
Perceived changes in household practices (HP) (1 = *to a very small extent*, 7 = *to a very large extent*)
HP1 The way I store food products at home
HP2 The way I cook
HP3 What types of ingredients I use
HP4 How much food I make "from scratch"
Perceived changes in social practices (SoP) (1 = *to a very small extent*, 7 = *to a very large extent*)
SoP1 Who in my household will do the shopping
SoP2 What tasks the different members of my household have with regard to shopping, cooking, etc.
SoP3 Who in the household will do the cooking
Perceived changes in general environmental practices (OEP) (1 = *to a very small extent*, 7 = *to a very large extent*)
GEP1 How I show my environmental commitment to others
GEP2 How likely I am to recycle products and other waste
GEP3 How eco-friendly (non-food) products I buy
Attitudinal beliefs (1 = *completely disagree*, 7 = *completely agree*)
AB1 Packaging-free shopping is beneficial for the environment
AB3 I generally see many benefits with packaging-free shopping
Behavioral Control (BC) (1 = *completely disagree*, 7 = *completely agree*)
I would not have had any trouble understanding how packaging-free shopping works
Social Norm (1 = *completely disagree*, 7 = *completely agree*)
I care about what others think about packaging-free shopping
Behavioral Intentions (BI) (1 = *completely disagree*, 7 = *completely agree*)
BI1 I am going to shop packaging-free going forward
BI2 When grocery stores offer packaging-free solutions, I will choose such solutions rather than products with packaging
BI3 I am more likely to shop packaging-free than most others

Table 2: Results of invariance test

Model	RMSEA	CFI	AIC	BIC	$\chi^2(df)$	$\Delta\chi^2(df)$
Configural model	.047	.964	22648	23198	335.6 (238)	
Metric model	.048	.961	22646	23149	354.6 (250)	19.0 (12)
Scalar model	.060	.936	22706	23162	435.3 (262)	80.7*** (12)

Note: * p < .05, ** p <. 01, *** p < .001

Table 3: Factor loadings, reliability, validity, and fit measures

Construct	Early adopter			Non-adopter		
	FL[a]	**CR[b]**	**AVE[c]**	**FL[a]**	**CR[b]**	**AVE[c]**
Shopping practices (ShP)		*.78*	*.54*		*.85*	*.65*
ShP1	.785			.787		
ShP2	.783			.875		
ShP3	.621			.744		
Household practices (HP)		*.82*	*.54*		*.88*	*.65*
HP1	.556			.756		
HP2	.780			.800		
HP3	.805			.833		
HP4	.763			.845		
Social practices (SoP)		*.89*	*.72*		*.87*	*.69*
SoP1	.831			.728		
SoP2	.875			.896		
SoP3	.839			.864		
General environmental practices (GEP)		*.79*	*.55*		*.81*	*.59*
GEP1	.599			.729		
GEP2	.819			.807		
GEP3	.795			.758		
Attitudinal beliefs (AB)		*.69*	*.52*		*.75*	*.61*
AB1	.656			.679		
AB2	.786			.868		
Behavioral intentions (BI)		*.77*	*.53*		*.87*	*.69*
BI1	.788			.817		
BI2	.812			.872		
BI3	.570			.803		

[a] FL: Standardized factor loading; [b] CR: Composite reliability; [c] AVE: Average variance extracted.

Table 3: Summary of hypothesis testing

Hypothesis	Path	Direction		Supported?
		Early adopter	Non-adopter	
H1a	ShP → AB	+	-	Partly
H1b	ShP → BC	+	-	No
H1c	ShP → BI	+	-	Yes
H2a	HP → AB	+	-	No
H2b	HP → BC	+	-	Partly
H2c	HP → BI	+	-	No
H3a	SoP → AB	-	-	Partly
H3b	SoP → BI	-	-	No
H4a	GEP → AB	+	+	Yes
H4b	GEP → BC	+	+	Yes
H4c	GEP → BI	+	+	Partly
H5	BC → BI	+	+	Yes
H6	Social norms → BI	+	+	No

Figure 1: Conceptual model

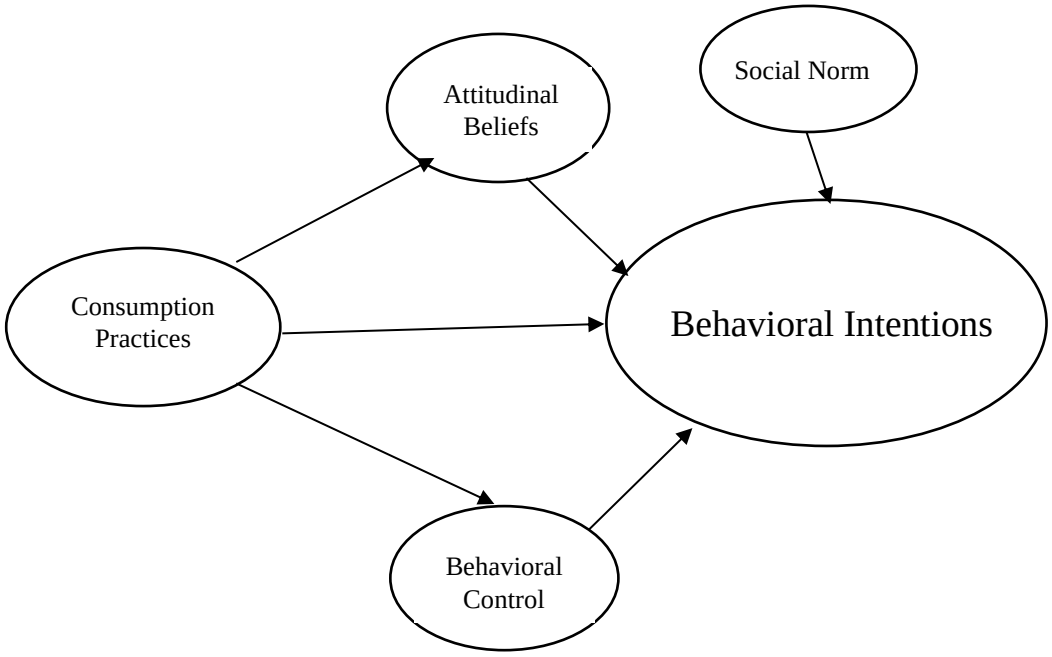


Figure 2: Four distribution solutions for reduced plastic packaging

Figure 3: Revised conceptual model

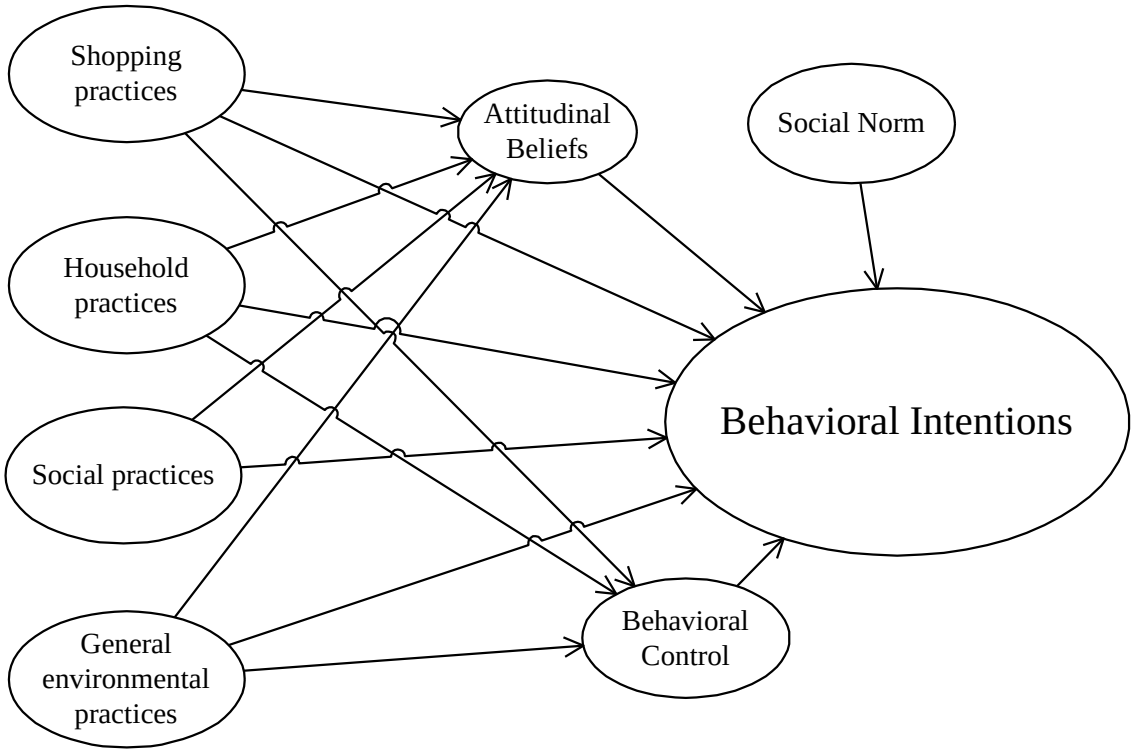
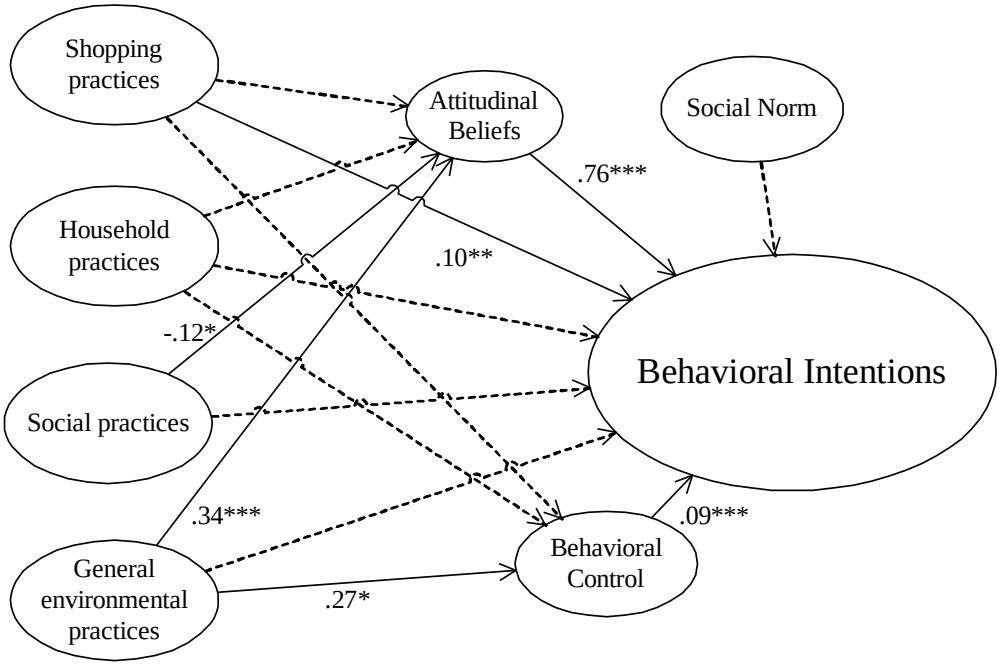
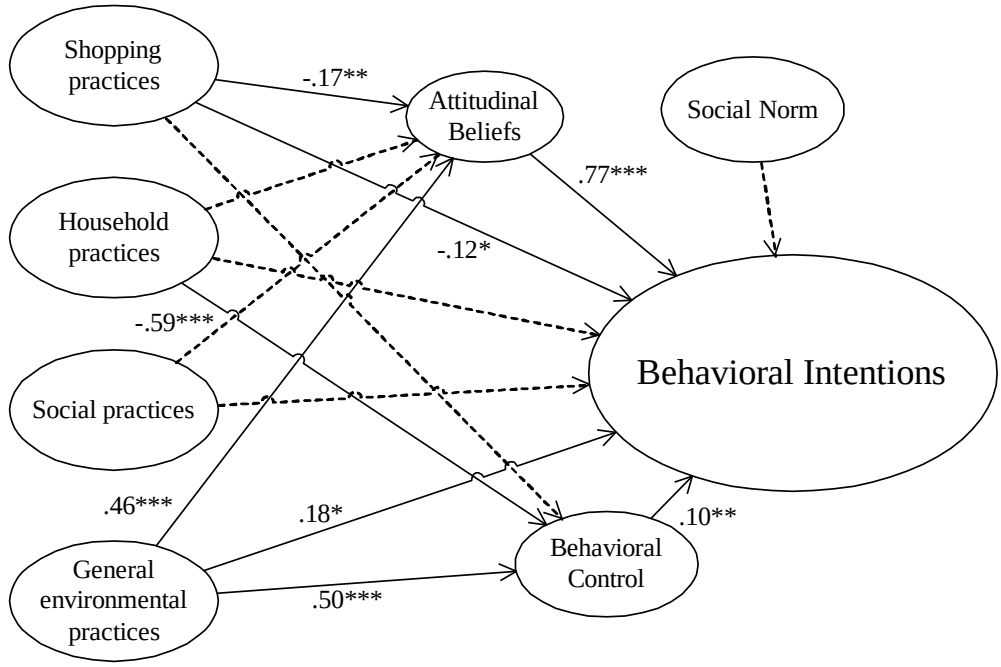


Figure 4: Estimation Results for "Totally Free" Structural Model

Early Adopter



Non-Adopter



Appendix 1: Correlation matrix between latent constructs (merged dataset)

	ShP	HP	SoP	GEP	AB	BI
ShP	**0.768**	*0.597*	*0.476*	*0.368*	*0.070*	*0.123*
HP	0.570 (0.054)	**0.775**	*0.649*	*0.567*	*0.128*	*0.185*
SoP	0.465 (0.060)	0.655 (0.045)	**0.849**	*0.482*	*0.080*	*0.137*
GEP	0.338 (0.066)	0.570 (0.057)	0.473 (0.061)	**0.775**	*0.450*	*0.546*
AB	-0.038 (0.070)	0.092 (0.064)	0.013 (0.066)	0.423 (0.054)	**0.768**	*0.814*
BI	0.045 (0.071)	0.161 (0.060)	0.112 (0.064)	0.492 (0.055)	0.787 (0.041)	**0.819**

Note: Diagonal and bold elements are the square roots of the AVE;
Below the diagonal elements are the correlations between the constructs (standard errors are in brackets). Above the diagonal elements are the HTMT values (in italics).

Appendix 2: Parameter Estimates on Structural Paths

Early Adopters				
Dependent Variable	**Independent Variable**	**β**	**SE**	**t-value**
Behavioral intentions	Attitudinal beliefs	.762***	.140	5.452
	Behavioral control	.092***	.033	2.741
	Shopping practices	.102**	.052	1.972
	Household practices	-.015	.071	-.215
	Social practices	-.026	.062	-.423
	General environmental practices	.078	.083	.944
	Social norms	-.029	.025	-1.127
	R^2		.646	
Attitudinal beliefs	Shopping practices	.026	.081	.316
	Household practices	-.017	.117	-.149
	Social practices	-.122*	.065	-1.892
	General environmental practices	.341***	.101	3.371
	R^2		.214	
Behavioral control	Shopping practices	-.069	.131	-.529
	Household practices	.023	.193	.118
	General environmental practices	.274*	.150	1.825
	R^2		.045	

Non-Adopters				
Dependent Variable	**Independent Variable**	**β**	**SE**	**t-value**
Behavioral intentions	Attitudinal beliefs	.770***	.155	4.957
	Behavioral control	.103**	.051	2.036
	Shopping practices	-.120*	.065	-1.837
	Household practices	-.107	.094	-1.130
	Social practices	.060	.095	.631
	General environmental practices	.182*	.100	1.828
	Social norms	.053	.050	1.073

	R^2		.654	
Attitudinal beliefs	Shopping practices	-.167**	.078	-2.133
	Household practices	-.120	.136	-.886
	Social practices	-.086	.113	-.759
	General environmental practices	.457***	.124	3.839
	R^2		.265	
Behavioral control	Shopping practices	.083	.107	.773
	Household practices	-.591***	.175	-3.373
	General environmental practices	.504***	.171	2.957
	R^2		.144	

Note: Table reports standardized coefficients. * p < .1; ** p < .05; *** p < .01.

From niches to socio-technical regimes: exploring factors influencing business model innovation towards sustainable mobility transitions

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Abstract

Drawing on the idea that business model innovation (BMI) may impact sustainable transitions, driving changes in the current socio-technical regimes, this research aims to understand which factors influence the BMI process from niches to socio-technical regimes. Although the BMI process may influence sustainable transitions, few studies have focused on understanding which factors influence the BMI process to be integrated into socio-technical regimes and foster changes. Therefore, multiple case-based research was adopted through an empirical analysis among mobility players. The research results were organized according to the factors influencing the stabilization process of new business models at the firm and meso-levels of the socio-technical regime. As practical implications, the findings assist both policymakers and practitioners in understanding what factors may influence BMI towards sustainable transitions in the mobility field.

Keywords

Business model innovation, sustainable business models, sustainable transitions, emergent countries, China, Brazil

Introduction

Research at the intersection of business models and societal transitions is growing due to the primary importance of sustainable development for society. Enriching the body of knowledge that brings these approaches closer is critical to this discussion, and it is just starting (Bidmon and Knab, 2018).

In the context of socio-technical transitions to sustainability and, more precisely, under the lens of the multilevel perspective (MLP) – landscape, regime, and niches - business model innovation (BMI) may play different roles and influence different dynamics in the socio-technical systems (Bidmon and Knab, 2018; Sarasini and Linder, 2018).

New business models could act as drivers for transitions in the regime, breaking the rules in which current regimes operate and modifying them. Moreover, in the niches, they can act as drivers for sustainable transitions that are not necessarily anchored in new technologies, influencing a new regime that does not depend on technological innovation through new services propositions (Bidmon and Knab, 2018). Therefore, BMI may play both an enabler and an obstacle role in the changes process for new socio-technical mobility regimes.

Once a business model is marketed and anchored in a value proposition not related to innovative technology, it is no longer situated at the niche level within a protected and controlled space where radical innovations are fostered (Geels, 2012). Based on this idea, BMI is a process that links the niche and regime levels. Additionally, regardless of the role played, business models do not act alone as a basis for socio-technical transformations, as they depend on the positioning and dynamic interactions of other actors and elements within the regime (Sarasini and Linder, 2018).

Although BMI may influence sustainable transitions, promoting tensions in current socio-technical regimes, few studies have focused on understanding how BMI may be integrated into socio-technical regimes to foster changes (Sarasini and Linder, 2018). Additionally, the transitions perspective presents many opportunities to broaden the dialogue with the firm's theories, connecting the firm elements with established concepts in the transition studies (Köhler *et al.*, 2019).

On the other hand, the business model perspective is widely applied as an essential tool for researchers and practitioners to understand and progress sustainable innovation, but few tools that assist BMI have been investigated (Weissbrod and Bocken, 2017).

When we analyze the transitions perspective in emerging countries, the focus of this research, the transformation of the regimes may not be associated with niches as the only sources of change. For instance, it is possible to observe transitions pathways in which the focus is on improvements in the dominant regimes of mobility rather than on a new niche development, reinforcing the idea that BMI could play a relevant role in this context (Ghosh and Schot, 2019; Marotti de Mello, Valsecchi Ribeiro de Souza and Marx, 2021).

Complementary, there is a growing awareness and extensive literature related to the need to transition to more sustainable mobility systems in cities (Banister, 2008; Stead, 2013).

Sustainable urban mobility has been configured as a fertile ground for new business models, especially those related to the provision of new and ICT-based services. On this last aspect, it is evident that the increasing entry of new players towards sustainable mobility may reveal a variety in the patterns of niche development, involving coalitions between new entrants and incumbents, configuring as a relevant research perspective (Turnheim and Geels, 2019).

Drawing on the idea that BMI may positively impact sustainable transitions, driving changes in the current socio-technical regimes, this research aims to understand which factors influence the BMI process in these transitions. In particular, we answer the following research question: which factors influence the stabilization process of new business models in the socio-technical regime?

We address this research question by analyzing some case studies of companies in Brazil and China that developed new business models in mobility anchored on services supported by ICT through in-depth interviews.

The paper's primary contribution is to the business model perspective by revealing relevant factors that could impact the implementation dynamics of the strategic and operational activities involved in the BMI process in the socio-technical regime from the firms' perspective.

In this sense, through the lens of sustainable business models, research in this field benefits from more integrative approaches than those oriented towards strengthening this topic as a stand-alone positioning or a sub-field of other areas (Lüdeke-Freund and Dembek, 2017).

Another complementary contribution is to sustainable transitions research by examining the dynamics of BMI and what factors influence its evolution from the niche level to stabilization in the regime, supporting identifying the links between niches to regimes more consistently, including helping to answer why some niche-level innovations succeed whereas others fail (Sarasini and Linder, 2018).

Finally, the paper contributes to the development of public policies based on integrating multiple actors involved in business initiatives that promote sustainable mobility, elucidating critical aspects from the firm's side relevant to creating of these policies.

This paper is structured as follows. Section 2 presents the theoretical background. Section 3 details the methods used to carry out this research. Section 3 presents the results and discussions based on the empirical evidence found. Finally, section 4 presents the conclusions and implications of this research.

Theoretical background

Stabilization in the socio-technical regime: beyond the strategic niche management (SNM)

Transitions encompass nonlinear processes resulting from multiple interactions at three analytic levels: niches (sources for innovative transformations), socio-technical regimes (established valuable sources and associated rules), and a socio-technical landscape. Therefore, MLP helps to

explain why different interactions happen simultaneously at the niche levels (micro-level in constant change and experimentation) - and the regime level (stable meso-level with well-established and relatively accepted rules) (Geels, 2004, 2012).

Within the MLP, novelties emerge in niches, known as 'protected spaces' such as R&D laboratories, subsidized demonstration projects, or small market niches where users have particular demands and are willing to support emerging innovations based on the development of new technologies. Niches are fundamental for transitions because they provide the seeds for systemic change. For a niche innovation to eventually break through and replace the current regime, its degree of stability needs to increase (Geels, 2012).

Although niches are crucial for transitions, the literature has historically paid much attention to technological niches as the primary sources of innovation for regime change and, in practical terms, it is already known that different typologies of innovations determine the transitions paths (Geels and Schot, 2007). This is also reinforced by the research reported by Ghosh & Schot (2019).

According to Hoogma, Kemp, Schot, & Truffer (2002), there are some sub-processes of stabilization in the regime: (1) articulation of visions and expectations, (2) learning processes, and (3) building of social networks. Expectations and visions are related to stability if they are more robust (i.e., shared by more actors), more specific (i.e., may provide orientation for the coordination of actors), and with higher quality (i.e., substantiated by ongoing projects). Learning processes are related to higher stability if they allow the reapplication of accumulated learning (i.e., enable changes of previous assumptions). Finally, social networks are related to stability if they are a) broad (i.e., involve different stakeholders) and b) deep (i.e., able to mobilize commitment and resources).

BMI in societal transitions

Complementary, organizations recognize the emergence of dynamic markets in which competitiveness must be based on variables besides the price: intangible customer solutions - complementary to products that can meet their needs - and demand - because customers can be part of undeveloped markets. Due to this context, business models have lately received more attention (Teece, 2010).

Business models themselves have increasingly been considered subject to innovation, as they may be an enabler of innovations, acting as a promising unit of analysis or a starting point for innovation strategies within the companies (Schneider and Spieth, 2013).

In the context of societal transitions and as subject to innovation, business models are an example of a non-technological niche innovation that already fulfills in some extant the sub-process of stabilization in the regime described by Hoogma et al. (2002).

Richardson (2008) indicated three essential business model parts: (1) value proposition – what an organization intends to deliver to its customers and the reasons why they would pay for it; (2) value creation and delivery system — how an organization articulates resources, capabilities, processes, and networks of customers and suppliers to create and deliver the value intended; and (3) value capture — how an organization generates revenue and profit from activities.

Novel business models emerge at a higher level of stability than a technological innovation niche and directly build up a substantial part of the new regime, but with different degrees of maturity concerning these processes (see Fig 1). (Bidmon and Knab, 2018).

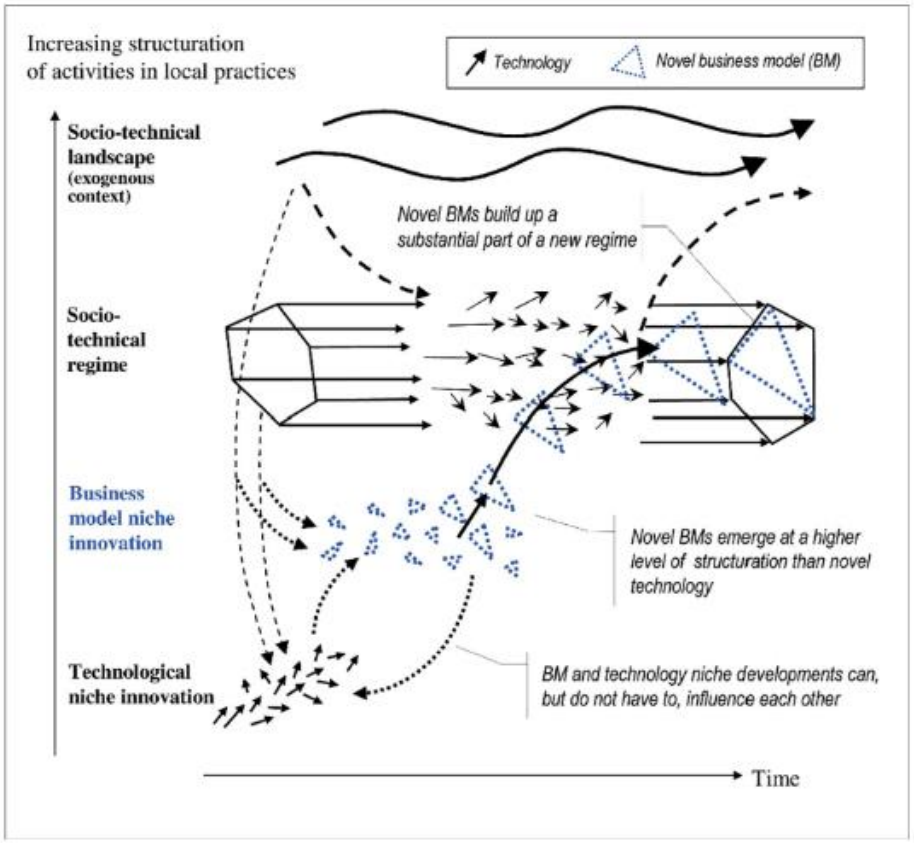

Fig. 1. Business models as non-technological niche innovation (Bidmon and Knab, 2018).

Framework of analysis

Even if new business models as a subject of innovation – specifically as a form of a non-technology niche - already fill in some extant the sub-processes that guarantee their stabilization in the regime according to different degrees of maturity, we argue that the stabilization process of new business models in the socio-technical regime is related not only to the organization and management of its operational activities at the firm level (micro-level) but also to how these sub-processes are managed (meso-level).

In this sense, how the processes that guarantee the stabilization of new business models in the regime are managed may be influenced by different factors and, therefore, contribute in different degrees to this stabilization.

Therefore, the comprehension of both processes regarding the development of business models at the firm level and those related to their stabilization in the regime are relevant to understand how BMI drives sustainable transitions.

We propose to analyze which factors influence the BMI process of stabilization in the socio-technical regime by applying a framework that investigates the micro-level perspective – drawing

on the BMI approach – and the meso-level perspective – drawing on the sub-processes of stabilization, through cases of mobility (see Fig. 2).

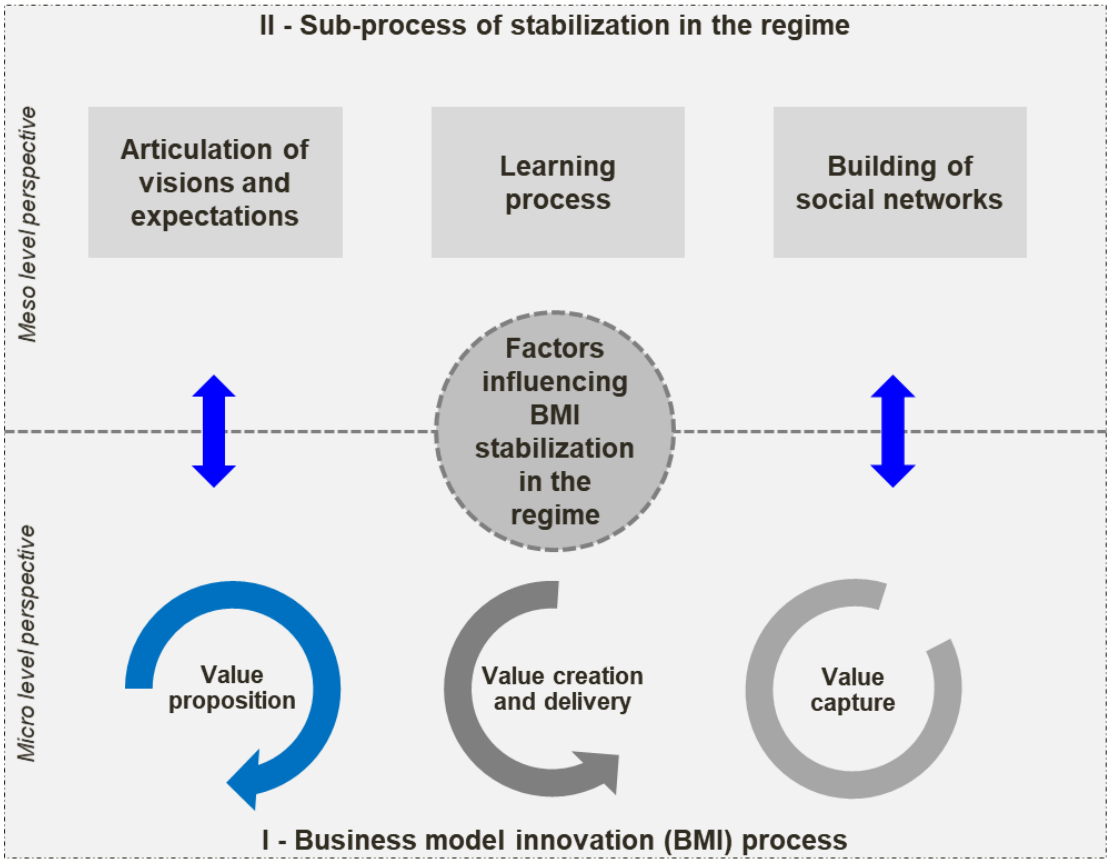

Fig. 2. Framework analysis (own figure based on Bidmon & Knab, 2018; Geels, 2012; Hoogma et al., 2002; Richardson, 2008)

Methods

Since the research objective is to investigate which factors influence the stabilization process of new business models in the socio-technical regime, a qualitative research approach was chosen. Among the available qualitative research techniques, we chose to carry out a multiple case study, and the primary source of data was semi-structured interviews performed with executives of the selected companies who have deep knowledge about the strategy and operation of the analyzed business model (Eisenhardt, 1989; Voss, Tsikriktsis and Frohlich, 2002).

This approach is essential and advantageous to collect the type of information we were looking for since this data is not available in a structured way and depends on the specific context of each company concerning the dimensions analyzed (Meredith and Mccutcheon, 1993).

Therefore, semi-structured interviews were used to allow respondents to freely explore the aspects addressed, without the content being limited only to the constructs discussed in the literature, which is an advantage of this technique (Yin, 2005).

Mobility services companies in Brazil and China were selected for the research due to the relevance of the urban mobility issue in these countries; in addition to concentrating in large urban centers, in addition to the fact that they have particularities in their trajectory in the planning of transport solutions compared to developed countries (Cervero, 2013; Marotti de Mello, Valsecchi Ribeiro de Souza and Marx, 2021).

In order to identify application areas compatible with the idea of new business models oriented to sustainable urban mobility, we based on a framework proposed by Souza, Mello, & Marx (2019). Table 1 describes the selected firms.

Firms	Country	Business models
Firm 1	Brazil	A platform for integration of public transport fare payment
Firm 2	Brazil	Bike-sharing operator
Firm 3	Brazil	Corporate carpool sharing service
Firm 4	Brazil	Carsharing service for companies as an alternative for fleet management
Firm 5	Brazil	A platform for provision of public transport information
Firm 6	China	Ride hailing service provider
Firm 7	China	Bike-sharing operator

Table 1 – List of companies selected to the study

According to the constructs reviewed in the literature and summarized in the analysis framework (Fig. 2), the authors prepared a set of questions. This interview guide was structured so that the interviewees first describe which factors influenced the structuring of the analyzed business model - the BMI process - according to the framework proposed by Richardson (2008) – value proposition, value creation, and delivery system, and value capture. Subsequently, it were investigated which factors are influencing the sub-process of stabilization in the regime described by Geels (2012) and Hoogma et al. (2002) – articulations of visions and expectations, learning process, and building of social networks - and how the company has managed each one of these sub-processes.

The transcript of the interviews was analyzed using the thematic analysis approach. This included highlighting the parts in the interview transcripts that seemed related to the dimensions of the research analysis framework according to the interviewer. This process was carried out based on the methodology suggested by Nowell, Norris, White, & Moules (2017). According to these authors, the thematic analysis comprises identifying, analyzing, organizing, describing, and reporting themes found within a data set. This approach's main advantages benefit from summarizing critical features of a large data set.

As the aim of the paper is to reflect and add to the findings previously existing in the literature, a deductive approach was primary applied (Nowell *et al.*, 2017). This means the content of the interviews was tagged according to the categories present in the framework of analysis. Sub-categories were also proposed inductively when the authors perceived a particular logical pattern

of the tagged content, especially in the dimensions of factors directly related to how the business models were structured according to their parts.

In order to supplement the interviews, secondary data were considered, mainly information available in the news about the analyzed companies, such as interviews with founders, reports of companies' trajectories, or investor analyses, in addition to the companies' institutional websites.

Results and discussion

Factors influencing the BMI process

Value proposition (VP)

When analyzing the VP of the business models, despite the specific benefits offered by each one of them, four factors were identified influencing their value proposition: improvement of the journey's convenience, offering more options to make trips, provision of more accessibility, provision of an environmentally friendly alternative and ensuring safety risk to make trips (see Table 2).

The improvement of the journey's convenience indicates if the VP intends to improve the conditions in which urban mobility is accessed by its users according to their local context and reality. In this sense, all the analyzed business models are explicitly concerned with providing better conditions for their users to move around.

Offering more options to make trips indicates that the VP diversifies the existing modal options for the users, thus generating new travel alternatives in addition to the private car option. Only business models that encourage the use of public transport do not offer a new modal as the main benefit from the service (Firms 1 and 5), but somehow, they are also contributing to the replacement by more sustainable alternatives.

Provision of more accessibility indicates if the VP intends to increase accessibility in the business model's contexts, i.e., extending the access or benefits of specific travel options to more people. It is evident in most firms, including features facilitating transport access from remote places with fewer travel options.

The provision of an environmentally friendly alternative indicates if the VP is explicitly concerned with providing environmental benefits, especially in reducing pollutant emissions in urban mobility, as is the case of the business models based on sharing.

Ensuring safety risk to make trips if the VP is concerned with the security of users in the whole system, providing safe conditions for their users, as is the case of the hide-hailing and carpool sharing services.

	Factors influencing value proposition				
Main aspects of value proposition (VP)	**Improvement of the journey's convenience**	**Offering more options to make trips**	**Provision of more accessibility**	**Provision of an environmentally friendly alternative**	**Ensuring safety risk to make trips**

Firm 1	Increase degree of integration of public transport Improvement of the conditions for using public transport Promote intermodal integration	•				•
Firm 2	Additional transport alternative Convenience for quick and short trips Expansion of the access to the bicycle as a transport alternative Promotion of healthy and active life Promoting intermodal integration	•	•	•	•	
Firm 3	Less pollution and reduction of wasted resources Decrease the mobility impact in the surroundings Access to a safe, practical, affordable, comfortable, and low-cost transportation option	•	•	•	•	•
Firm 4	Additional benefit to employees for seasonal commuting Savings of resources used in corporate travels Transport alternative based on comfort, practicality, and convenience	•	•	•	•	•
Firm 5	Provision of relevant information about public transport Contribution to more efficient use of public transport Contribution to the sustainable development of mobility in cities	•		•		
Firm 6	Provide more convenient, safer, and more comfortable service Reduce empty and idle vehicles in transport and save resource Create opportunities for green trips using electric vehicles	•	•	•	•	•
Firm 7	Additional transport alternative Convenience for quick and short trips Expansion of the access to the bicycle as a transport alternative Promotion of healthy and active life	•	•	•	•	

	Complement the public transport

Table 2 – Factors influencing value proposition

Value creation and delivery system (VCD)

The VCD is influenced by the local government and urban mobility system involvement, the type of technological resources, and the dependence on user behavior change for product adoption (see Table 3).

Government involvement indicates if the VCD requires the public sector involvement to organize the critical activities of the business model, such as public policies and specific regulations, i.e., those that are essential for delivering the product to customers. Even services based on car or ride-sharing, less dependent on government action, could benefit from greater cooperation with local public authorities to increase the possibilities of delivering value to the user.

Urban mobility system involvement indicates if the VCD is oriented to create synergies with existing transportation systems in cities as part of its key activities, especially public ones, enabling a higher level of integration between transport systems and then creating a mutual relationship of value generation for all of the users.

Own technological resources indicate if the VCD concentrates as part of the set of crucial competencies on developing its own technological applications that support the core activities of the operation. Therefore, technological resources are often considered a primary competence of the analyzed firms and guarantee the scalability and evolution of the business.

The dependence on user behavior change for product adoption indicates if the VCD requires some degree of change in the travel behavior patterns of users for product adoption - because transportation alternatives depend on an individual choice and change of mindset, like many innovations in this field emerge as experimental initiatives.

		Factors influencing value creation and delivery system of BMI			
	Main aspects of value creation and delivery system	**Local government involvement**	**Urban mobility system involvement**	**Own technological resources**	**Dependence on user behavior change**
Firm 1	Partnerships and cooperation agreements with Municipalities Technical aspects of the model for charging and payment of transportation fees Technological competence for the payment integration	•	•	•	•
Firm 2	Response to public bids Partnerships with sponsors for financial viability Acquisition and maintenance of physical and technological resources for operating	•	•	•	•

Firm 3	Corporate agreements to sell the service Technological competence to operate Encouragement of users to adopt it			•	•
Firm 4	Technological competencies for operation Acquisition, adaptation, and maintenance of vehicles			•	•
Firm 5	Technological competence for platform development Relationship with users	•	•	•	
Firm 6	Response to public bids Acquisition and maintenance of physical and technological resources for operating Integration with digital payment platforms	•	•	•	•
Firm 7	Acquisition of own fleet, focus on new energy car Technological competence to operate Integration with digital payment platforms	•		•	•

Table 3 – Factors influencing value creation and delivery system

Value capture (VC)

VC structure is influenced by government subsidies, cross-subsidization, and direct sales.

Government subsidies show the revenue structure is supported by public resources, either through the financial resources themselves or other types of funding that allow the business to become feasible, such as the commercialization of services to the public sphere.

Cross subsidization reveals the revenue structure is supported through the commercialization of aggregate services, ranging from advertising, sale of name or brand rights, indirect sale of services, or commercialization of user's information such as travel patterns contained in the databases, which seems to be very frequent as a way to ensure the maintenance of the business.

Direct sales indicate if final customers resources support the revenue structure by acquiring the product.

		Factors influencing value capture of BMI		
	Main aspects of value capture	**Government subsidies**	**Cross subsidization**	**Direct sales**
Firm 1	Commission paid by the entity responsible for managing public transport that acquires the service Commission from aggregated services added to the platform (generally payment services)	•	•	

Firm 2	Sponsorship for name rights exploration User fees charged Incentives of the public sphere (less usual)	•	•	•
Firm 3	Fee paid by the contracting company Commission paid by the user for using the service			•
Firm 4	Fee paid by the contracting company			•
Firm 5	Commercialization of aggregate services Commercialization of advertising Commercialization of information about the user's database	•	•	•
Firm 6	User fees charged			•
Firm 7	User fees charged Cars leasing		•	•

Table 4 – Factors influencing value capture

Factors influencing the sub-process of stabilization

Articulations of visions and expectations

The actors involved in structuring the business models reinforce the idea that the articulation of visions and expectations in this field occurs not only through the direct involvement of many different players but often through dependence on other specific actors interested in supporting business initiatives analyzed here.

In this sense, business models are starting points that may initiate transformations in current mobility regimes, but they cannot change this dynamic on their own.

In some cases, they can offer complementary services that can encourage the adoption of more sustainable mobility alternatives, such as models based on sharing or even public transport incentives, but they will not replace the current conventional alternatives, complementing the findings provided by Ghosh & Schot (2019).

However, regardless of the role played, the results converge to the idea that business model's implementation requires articulation of visions and expectations, observed above all by the need for the involvement of multiple actors when establishing their operations (Hoogma *et al.*, 2002).

In Firms 2 and 7, the bike-sharing operators, the municipalities must first demonstrate an interest in carrying out projects of this nature and then formalize an agreement with the service operator through a kind of public bid.

In addition to this, the agreement's success depends on rules included in the public bid, which is only possible according to the ability to articulate and find synergies between the interests and expectations of public actors with those of the service's operator.

In Firm 5, the application that offers information on public transport, this dimension is associated with the fact that the company needs to access the open data policies of the municipalities to provide users with accurate information about public transport. Without this agreement, it is practically impossible to implement the business model.

Without this alignment of visions and expectations - even if there were no impediments to the installation of sharing systems -the business models would risk losing relevance by not being integrated into the dynamics of the transport city. This is the case, for instance, of the bicycle stations installed close to public transport, as is the case of Firm 2, which facilitates the generation of value for the user and encourages intermodal integration but requires the previous alignment.

Indeed, for a business model to emerge, it already needs to have its visions and expectations well-articulated and communicated among the multiple actors involved in this process (Bidmon and Knab, 2018).

Learning process

The dimension of the learning process is of fundamental importance in the evolution of the business model and the development of new service characteristics, requiring a continuous review of the value proposition.

For instance, in Firm 1, a service that directly impacts another third service – the public transport system in cities - managers perceive the application of the learning accumulated from the relationships established with partners as a relevant practice for the maturation of the business model.

This is also the case for the carpooling service (Firm 3). The learning aspects are present, above all, in the various adaptations the business model has undergone. For example, the service had a more comprehensive initial proposal for sharing rides for anyone and needed to specialize in corporate mobility to establish itself as a business. As a result, rides are shared only between employees of the same companies that hire the service from Firm 3 and are willing to offer its employees this type of initiative.

This process was linked to the recognition, through the relationship with users, that the habit of taking rides in Brazil was not explored and, therefore, requires changes in behavior and incentives in the public sphere, such as the possibility of using exclusive lanes of buses for cars with more than three people, although this last aspect is not yet fully explored.

The company that offers a fleet management service based on carsharing (Firm 4) emphasized the dimension of learning related to users' accountability of consumption practices. Since different people can use shared cars and are often not used to carsharing services, it is encouraged to check before using the vehicle, ensuring that it is in proper condition and report any abnormality. The more the user is responsible for the vehicles he uses, the cheaper the service is for the contracting company and, consequently, for the customer, reinforcing the relevance of this learning – at the company and the customer level - to the business model consolidation.

The learning dimension is in line with the idea discussed by Sarasini and Linder (2018). The BMI approach is intrinsically experimental and an iterative process that allows the replication of accumulated learning more quickly, facilitating its adaptation to act in a socio-technical regime.

However, this transformation can often only occur when it is possible to influence the change of other business models besides the firm.

Building of social networks

Building a social network is a fundamental aspect of implementing business models, and different factors influence it.

One of them is the VC, covering how the revenue model works. Incorporating different revenue sources through the aggregation of services is an example, and it requires constructing a network of actors to support the commercialization of these services.

To some extent, some of these business models substantially expand their initial scope of operation by building networks with other actors. For example, this is the case of the hide railing firm in China (Firm 6), which currently buys the vehicles and lends them to the platform's drivers in a leasing model as a complementary source of revenue, and the case of the bike-sharing operator in Brazil (Firm 2), which has partnered with a vast food delivery company to offer e-bike rentals to couriers.

This aspect also influences local competition. For example, the bike-sharing operator in China (Firm 7) highlighted the need to establish greater cooperation between other actors operating in the same market, aiming to obtain a "one voice" speech that could represent the interests of this sector, highlighting the need to strengthen networks as an essential factor for business maintenance.

Building of social networks also takes place at the operation level. Firm 7 has partnered with one of the largest digital payment operators in China, which facilitates the instant payment of bike rentals by the user, in addition to having significantly expanded the service user base.

These findings empirically reinforce the idea presented by Bidmon and Knab (2018) that business models require multiple actors to collaborate beyond the authority of a single organization, including demanding a high degree of commitment from these other actors. This is evidenced by the fact that a new business model presented by an actor will probably also require changes in the business models of other actors, as is the case of the companies analyzed.

The figure below summarizes the updated analysis framework after empirical evidence (Fig 2).

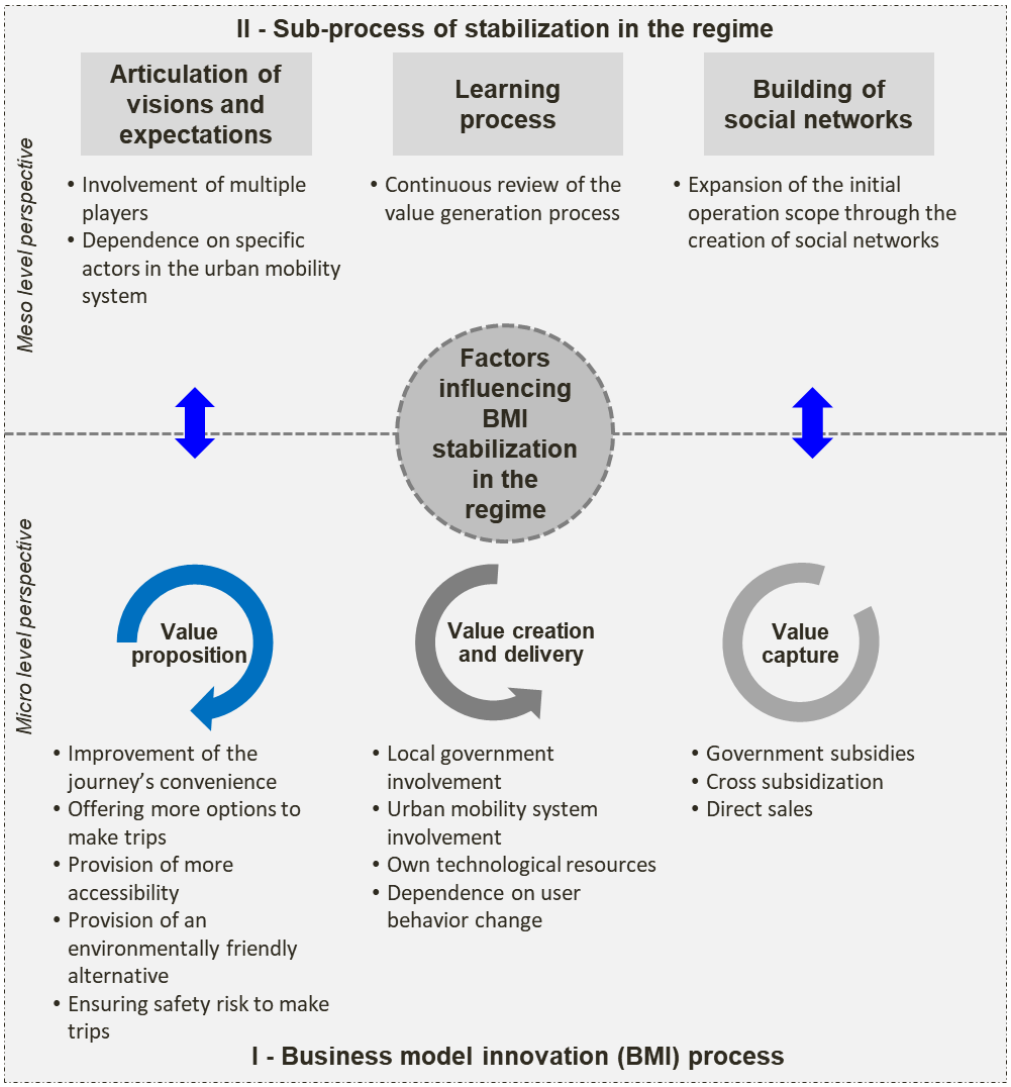

Fig. 2. Updated framework analysis (prepared by the authors)

Conclusions

As a first theoretical contribution, the research revealed that the BMI process might act as intermediaries between niches and regimes with a higher level of structuring than a technological niche, empirically reinforcing the findings proposed by Bidmon & Knab (2018) and Sarasini and Linder (2018), revealing specific factors from the firm level that must be taken into account in the process of experimenting with new business models in the field of mobility.

BMI in the mobility field can bring complementary and incremental mobility alternatives to the current regimes, incorporating concerns toward more sustainable mobility that may be integrated into the established transport options.

Considering the reported cases, these ICT service-based business models should have the conditions to manage the processes to stabilize the regimes. Furthermore, it is evident how the BMI process requires cooperation opportunities with multiple other actors to complement the necessary competencies, even modifying the dynamics of other complementary business models.

The analyzed business models indicate that the factors associated with their stabilization in the regime are crucial even for the emergence of these initiatives. When these aspects are neglected or poorly managed, the business model loses relevance.

However, the findings also revealed that the dependency relationships with some specific actors involved in the dominant mobility regimes could also be reinforced by implementing the analyzed business models, as they do not have enough resources to ensure their operationalization activities on their own.

As another contribution, the research evidenced factors that influence the BMI process, which can be considered to create similar or complementary business initiatives from the managerial practice of view.

Even if BMI for mobility can deliver, in some cases, sustainability and contribute to transitions when there is no support from public policies, as Sarasini and Linder (2018) argue, this lack of support can indeed compromise its consolidation. It is evident throughout numerous analyzed cases since many opportunities for evolving the business model are constrained by the lack of supportive and specific public policies.

Future studies could investigate what roles these business models can play in a sustainable transition according to the different scenarios in which they operate, recognizing the BMI process's particularities in regime stabilization.

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Managing the Transition from a Conventional Business Model to a Portfolio with Sustainable Business Models

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Extended abstract

Problem

Confronted with rapidly changing environments, firms are required to adopt strategies and develop innovative business models (BMs) to overcome inertia and create competitive advantage (Tushman & O'Reilly, 1996; Markides, 2013). One of the most recent and impactful external changes relates to the rising demand for sustainable development in society, presenting a potentially fundamental transformation of the business environment. Several recent studies suggest that firms transitioning to a sustainability-oriented BM often end up running several BMs in parallel, exploiting existing conventional BM alongside new sustainable BMs (cf. Frishammar & Parida, 2019). Managing multiple BMs can be particularly challenging because new BMs involve different and often incompatible activities, requiring a delicate balance of exploitation and exploration activities (Markides, 2013). In general, firms may deal with this challenge by adopting appropriate integration and separation strategies across different domains and contexts, as suggested in the ambidexterity literature (Winterhalter, Zeschky, & Gassmann, 2016). While it appears widely acknowledged that many firms run multiple BMs concurrently, there is little knowledge about how they successfully transition to a portfolio of BMs (Visnjic, Jovanovic, & Raisch, 2021). Furthermore, we know even less about how this process unfolds in the particular context of sustainability (Dentchev et al., 2018).

Current understanding

Adoption of multiple BMs within a firm have been identified as an emergent trend (Li, 2020), and can be a valuable tool for businesses to exploit distinctive resources and capabilities, or an effective entry strategy in new markets (Sabatier, Mangematin, & Rousselle, 2010). The literature on multiple BMs includes conceptualizations of BM diversification, dual and parallel BMs, and BM portfolios. Sabatier et al. (2010) distinguish between two approaches for firms transitioning to multiple BMs:

(1) extensions of core competence to increase the market and address additional customers, and (2) redeployment of core competence to serve similar markets with the same core competence. Research on BM portfolios generally separates between supply and demand side perspectives, exploring complementarities or conflicts of managing multiple BMs, and/or the outcomes of these activities, without particular attention to sustainability. While BMs are commonly understood as the design and architecture of value creation, delivery, and capture mechanisms of a firm (Teece, 2010), sustainability-oriented BMs offer certain distinction, incorporating environmental, social, and economic value, and a wide set of stakeholders (Bocken & Geradts, 2020). The extant literature offers rich insight into the processes and practices of firms managing multiple BMs, yet yield limited understanding of how companies successfully transition from a single BM to a portfolio, encouraging recent calls for more research on ambidexterity (Winterhalter et al., 2016; Visnjic et al., 2021), and the impact of sustainable BMs (Dentchev et al., 2018). Ambidexterity is defined as the ability to "implement both incremental and revolutionary change" (Tushman & O'Reilly, 1996: p. 8). Different modes have been identified; *structural* ambidexterity refers to the simultaneous balance of exploration and exploitation in different units across the spatial dimension (Tushman & O'Reilly, 1996), whereas *sequential* ambidexterity deals with balance across the temporal dimension (Duncan, 1976). *Contextual* ambidexterity refers to adaptability of individual employees and their balance of exploration and exploitation in an organizational context (Gibson & Birkinshaw, 2004). While these modes of ambidexterity may be implicitly understood as mutually exclusive, more recent studies suggests a less dichotomous posture, introducing *blended* ambidexterity (Foss & Kirkegaard, 2020), taking into account the possible co-presence of structural and contextual ambidexterity.

Research question

In this paper we focus on the transition from a single conventional BM to a portfolio that includes sustainable BMs, and how an organization balances exploitation and exploration activities during this process. We raise the following research question (RQ): How do firms balance exploitation and exploration activities when transitioning from a conventional BM to a portfolio that includes sustainable BMs?

Research design

To answer the research question raised in this study, we employ an inductive exploratory research design, using a qualitative in-depth single case study, adopting multiple embedded units of analysis within the case. We have purposely selected a case organization that offers opportunities to build theory about the transition to a portfolio of conventional and sustainable BMs, and we are currently collecting empirical data through in-depth interviews, participatory observations, and investigation of documents. So far, seven interviews have been conducted, ten workshops have been observed and internal strategic documents have been investigated, data collection will however continue until saturation is reached.

Findings

Our preliminary findings shows that the conventional BM success largely rests on the ability to exploit existing products and markets, institutionalising structural and cultural rigor that is not suited for exploring new sustainable BMs. This encourages initial division of exploitation and

exploration activities in order to overcome inertia in the transition to a BM portfolio. Our findings indicate that, despite such initial structural separation, BM activities converge closer over time, enabling synergies, and may eventually expand into broader and more fruitful BM activities across the portfolio, for the purpose of creating an overall competitive advantage for the firm. In balancing these activities, we find evidence that blended ambidexterity, the co-presence of multiple modes of ambidexterity, alternating between contexts, and changing across spatial and temporal dimensions, may be vital for firms to manage the transition to a BM portfolio. Moreover, our findings reveal the transition process as iterative, where customer experimentation and cooperation is central, particularly in conducting activities that are specific to novel sustainable BMs.

Contribution

We contribute to an ongoing debate in the literature about managing the transition to a BM portfolio. Furthermore, we provide insight on how firms can manage the transition from a conventional BM to a portfolio that includes sustainable BMs. Our findings can enable us to propose a novel model explaining this transition process.

Practical implications

The practical experiences reported in the paper offer an understanding of how transitions towards sustainable BMs can be navigated and potentially accelerated by managers.

Keywords

Business model, Sustainability, Business model portfolio, Ambidexterity, Experimentation

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Sustainable By Design: A Tool for Organizational Design to Facilitate Sustainable Business Model Innovation

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Extended abstract

While firms increasingly recognize the need to implement sustainability improvements, they often struggle to meet sustainability targets (Geissdoerfer et al., 2018). Radical innovation at the level of the business model — how a firm creates, captures, and delivers value — is often needed to achieve sustainability goals (Rashid et al., 2013). Traditional business model innovation — the act of devising new, innovative business models by altering existing models and/or designing and implementing new ones — can yield higher returns than product or process innovation alone (Chesbrough, 2007). Meanwhile, sustainable business model innovation (SBMI) — the act of designing and implementing new, sustainable business models (SBMs), i.e. those which "create significant positive [impact] and/or significantly reduced negative impacts for the environment and society, through changes in the way the organization and its value-network create, deliver value and capture value…or change their value propositions" (Bocken et al., 2014) — offers firms a number of tangible firm- and sustainability-focused benefits (Geissdoerfer et al., 2018; Bocken & Geradts, 2020). It can mitigate long-term risk (Choi & Wang, 2009), improve resilience (Buliga et al., 2016), reveal new diversification and value creation opportunities (Nidumolu et al., 2008; Tukker & Tischner, 2016), provide competitive advantage (Porter & Cramer, 2011), reduce costs (Bocken et al., 2014), anticipate future legislation and stakeholder expectations (Schaltegger et al., 2012), boost reputation (Homburg et al. 2013) and attractiveness for top talent (Greening & Turban, 2000), and address long-term sustainability challenges (Bocken & Geradts, 2020; Foss & Saebi, 2017; Laasch, 2019).

However, despite the purported benefits of SBMI and its importance for meeting sustainability targets, there remains a design-implementation gap: companies struggle to successfully design and implement new SBMs. One clear reason for this is a lack of adequate tools (Geissdoerfer et al., 2018). While many tools exist for traditional business model innovation (e.g. the Business Model

Canvas (Osterwalder & Pigneur, 2010)), there are few tools for SBMI. Those that exist often suffer from design issues and/or were designed for specific contexts, thus lacking broader applicability.

Recently, it has also been determined that firms often lack the dynamic capabilities to engage in SBMI (Bocken & Geradts, 2020). Dynamic capabilities refer to an organization's ability to "integrate, build, and reconfigure internal and external competencies to address rapidly changing environments" (Teece et al., 1997), often understood as the ability to sense and seize new opportunities and transform the organization. Further, recent research has highlighted the importance of organizational design for developing adequate dynamic capabilities in general (Teece, 2018) and for SBMI in particular (Bocken & Geradts, 2020). A tool which can help firms build dynamic capabilities for SBMI by addressing fundamental organizational design considerations could therefore prove useful for organizations attempting to design and implement new SBMs.

This paper presents the Sustainable By Design tool (Figure 1). The tool is built in Miro, an online collaboration platform. It approaches SBMI at the level of organizational design. It aids firms in developing the dynamic capabilities needed for SBMI. By identifying and mapping barriers and drivers to SBMI at the level of organizational culture, strategy, and operations, firms can take action to improve organizational design, boosting drivers for SBMI and breaking down barriers.

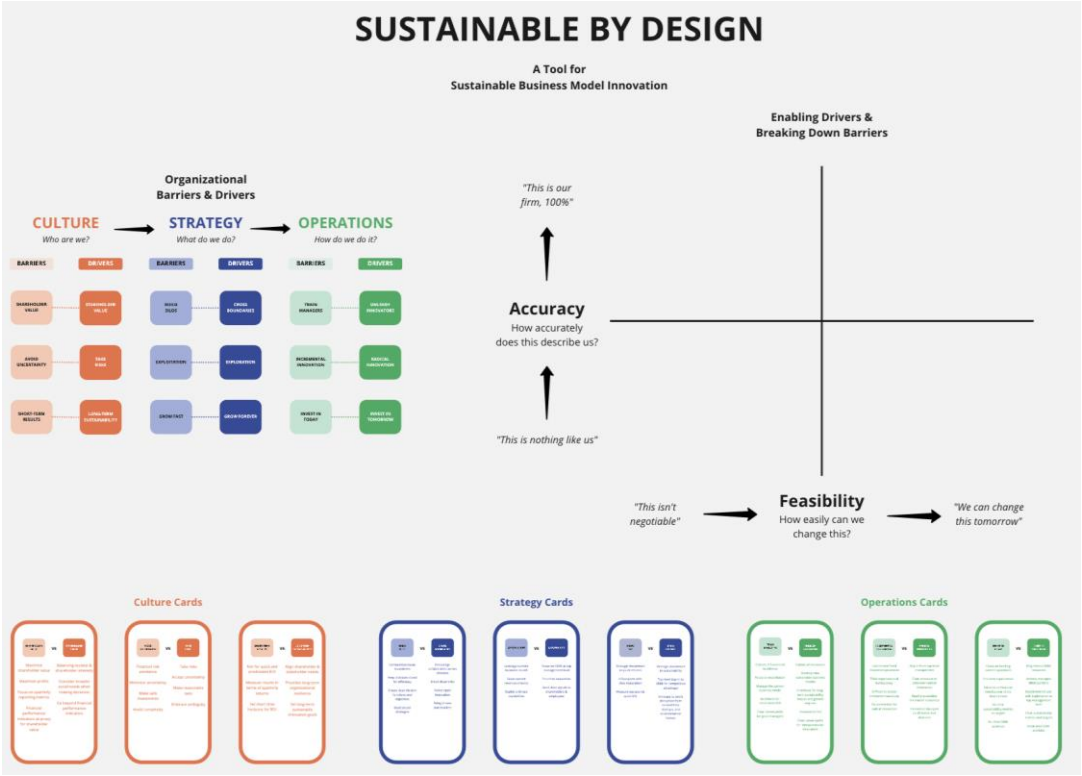

Figure 1. The Sustainable By Design tool.

The tool is grounded in empirical insights from a study on dynamic capabilities, organizational design, and SBMI, involving 56 interviews with top, senior, and mid-level management from 7 MNCs engaged in SBMI, including Philips, Unilever, AkzoNobel, Johnson & Johnson, and Pearson (Bocken & Geradts, 2020). Interviewees were asked to identify organizational factors that supported or inhibited SBMI processes. Analysis of responses revealed common conceptual themes across very

different industries and innovation projects. These were ultimately aggregated into 13 barriers and drivers, each associated with an organizational dimension, as shown in Figure 2.

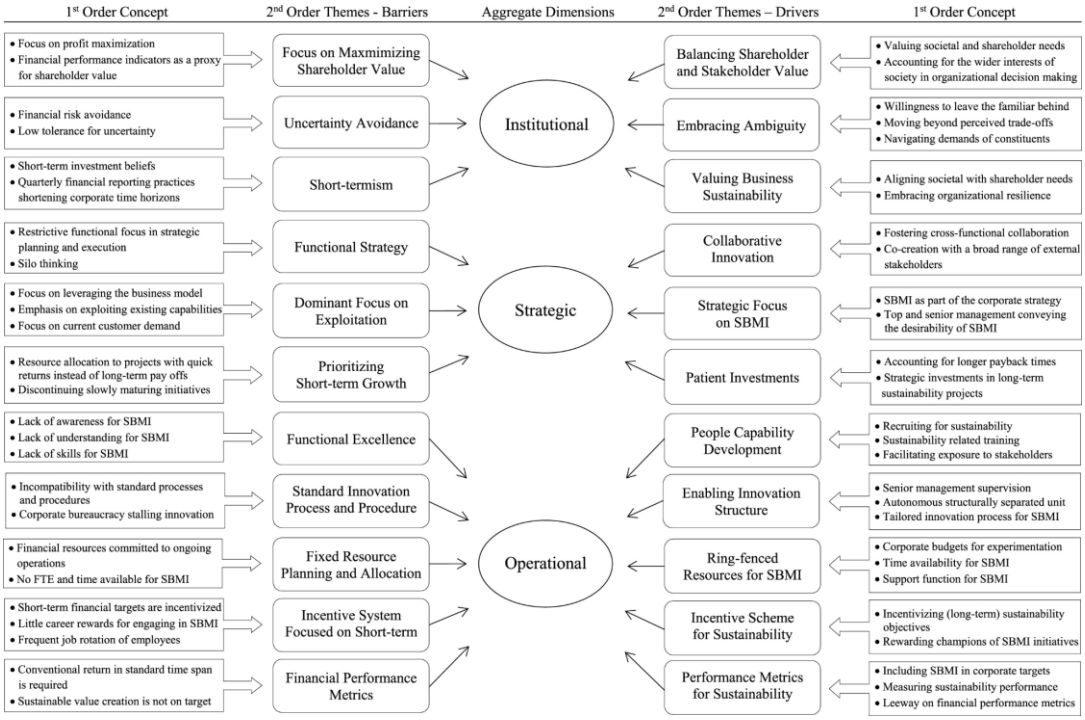

Figure 2. Identifying barriers and drivers for SBMI. Adapted from Bocken & Geradts, 2020.

Working from this data, the tool is under development following a multi-stage design science research (DSR) process as outlined in Peffers et al. (2007) (Figure 3). We began by identifying and motivating the problem, as discussed in the introduction above: firms need tools for SBMI; barriers and drivers exist which impact firms' ability to develop dynamic capabilities for SBMI; a tool addressing these barriers and drivers could serve to bridge the SBMI design-implementation gap. We then defined objectives of our proposed solution (the tool): it should be easy to use, eliminate jargon wherever possible, reduce complexity, adhere to the checklist for circular (sustainable) business model innovation tool best practices outlined in Bocken et al., 2019 (p. 13).

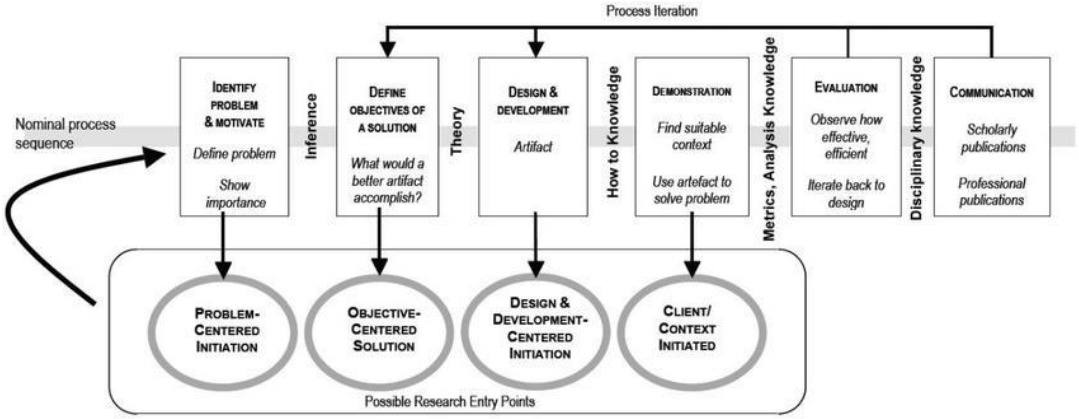

Figure 3. Design science research process sequence. Adapted from Peffers et al., 2007.

Next, the lead author designed an initial version of the tool, as pictured in Figure 1. The tool consists of three parts: the Barriers & Drivers Map (Figure 4); the Culture, Strategy, and Operations Cards (Figure 5), and the Design Grid (Figure 6).

Figure 4. Barriers & Drivers Map.

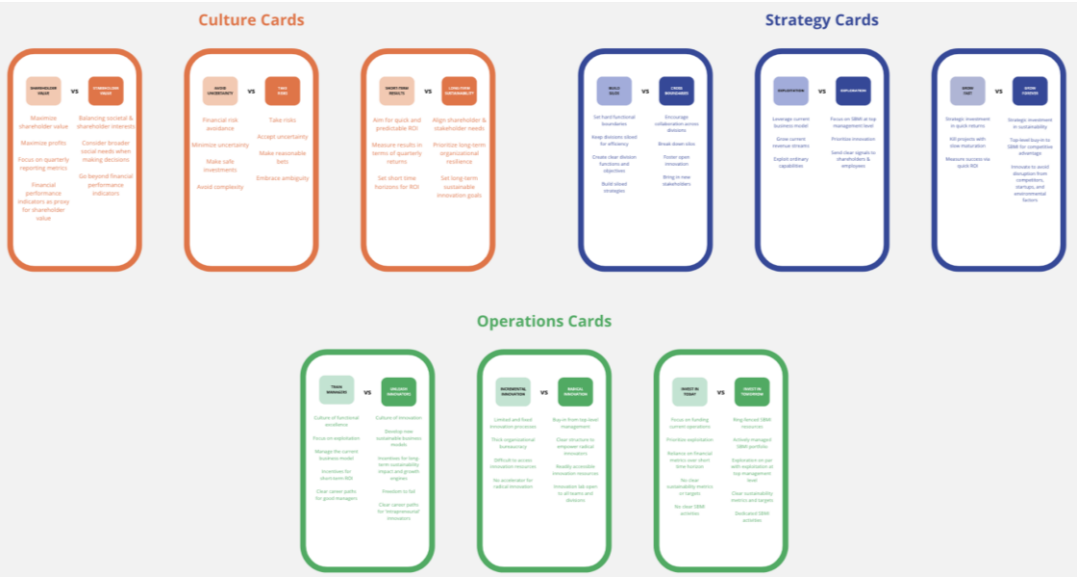

Figure 5. Culture, Strategy, and Organization cards.

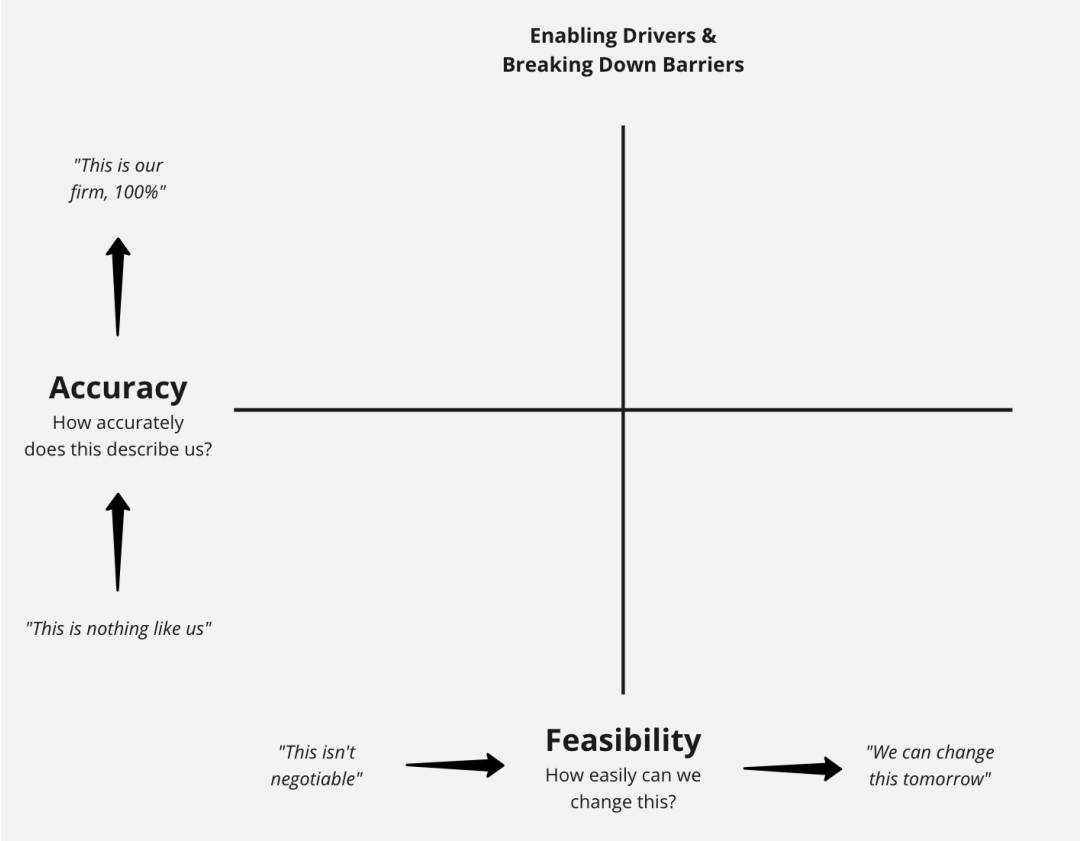

Figure 6. Design Grid.

In a workshop setting, participants (top and senior management) map out barriers and drivers for SBMI. Beginning with the Culture column, participants consider each Barrier-Driver pair, referring to the corresponding Card descriptions. For each pair, participants ask themselves: 1) Accuracy: how accurately does this describe our organization today? and 2) Feasibility: how easily could we change this? Next, participants map the Barrier-Driver pair on the Design Grid. Those barriers and drivers which are highly descriptive of the organization are placed higher on the Y (Accuracy) axis, while those which could most feasibly be changed are placed further to the right on the X (Feasibility) axis. This process is repeated for each Barrier-Driver pair, until all have been mapped onto the grid. At the end of the session, participants consider the Barriers in the upper-right quadrant (highly descriptive of the organization, feasible to change) and the Drivers in the bottom-right quadrant (not descriptive of the organization, feasible to change) (Figure 7). These are the Culture, Strategy, and Operations components which should be addressed first for maximum impact on SBMI. Senior management can proceed to develop strategic interventions to address these barriers and drivers.

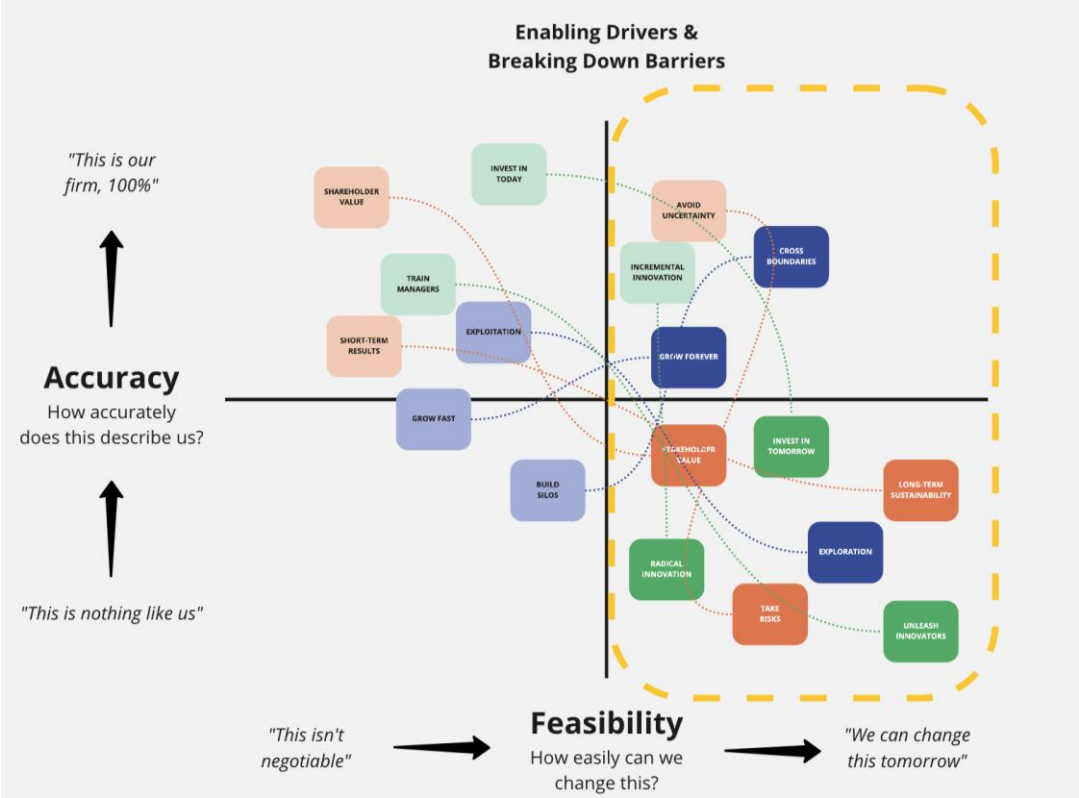

Figure 7. Barriers and drivers mapped onto the Design Grid. High impact barriers and drivers inside dotted yellow line.

To complete the DSR process (Figure 3), the tool will be tested (the Demonstration phase) in workshop format, with feedback gathered following each session. We will evaluate the tool's effectiveness (the Evaluation phase), proceeding to re-define the tool's objectives and/or make design alterations. Further iterations of the tool will then be workshopped, with new feedback gathered from these sessions. The design science process will continue until the tool meets the desired objectives, at which point it will be communicated via publication (the Communication phase). We anticipate the tool will undergo significant improvements prior to presentation at NBM 2022.

This extended abstract and the accompanying tool are intended for NBM 2022 Theme 2: Exploring the Sectoral and Organizational Levels - Business Model Experimentation for Sustainability. It addresses a central concern of this theme, namely: what kind of tools and methods are needed for sustainable and circular business model innovation? More broadly, it addresses the conference theme of innovation for economic recovery by providing organizations with a tool which can aid in SBMI.

Keywords

business model innovation, sustainable business model innovation, tool, organizational design, dynamic capabilities

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Sustainable Business Model Design and Scale in Nascent Impact Ventures

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Extended abstract

Abstract

Impact entrepreneurs play a decisive role in addressing pressing societal grand challenges such as climate change. However, during their venture development process, they face particular challenges such as aligning sometimes conflicting social, environmental, and commercial value mechanisms that traditional for-profit firms have not to deal with to the same extent. Against this backdrop, developing a better understanding of how impact entrepreneurs engage in the process of designing and scaling business models is gaining relevance to inform the transition toward a sustainable economy. This study sets out to explore this process through adopting a qualitative research design comprising a grounded theory approach and a subsequent multiple case study tracing several nascent impact ventures over two years. Our study potentially contributes to sustainable business model and entrepreneurship research by developing a process theory of how and when impact entrepreneurs develop, adapt, and scale sustainable business models over time and thereby overcomes the predominantly static perspectives in previous literature. In this vein, we also aim to provide a better understanding through which mechanisms nascent impact ventures successfully manage possible paradoxical tensions and successfully grow to competitive established firms or, by contrast, fail and fade.

Introduction

Various stakeholders such as policymakers, investors, activists, and customers increasingly demand private firms to help solve societal "grand challenges" such as climate change, resource scarcity, or poverty beyond merely generating profits. (George *et al.*, 2016; Salmivaara & Kibler, 2020). Such a realignment of a firm's purpose usually requires a substantial transformation of how a firm creates value, which is why established firms often struggle with such transitions due to, among others, path dependence and inertia (e.g., Bohnsack, Kurtz & Hanelt, 2021; Sydow, Schreyögg & Koch, 2009; Sirén *et al.*, 2017). In contrast, a rising number of "impact" entrepreneurs respond to these stakeholder demands by creating firms based on a hybrid institutional logic, i.e., scaling a business

and capturing adequate profits while pursuing a social and environmental purpose (i.e., higher purposes) (Markman *et al.*, 2019; George, Merrill & Schillebeeckx, 2021; George *et al.*, 2021).[15]

However, reconciling different logics can be a difficult task. This is because striving to fulfill both aspirations, profit and higher purpose, can lead to competing demands and tensions such as generating profits with a product while making it accessible for people in need (Pache & Santos, 2013; Davies & Chambers, 2018). Moreover, impact entrepreneurs face further challenges such as initiating institutional change without a level playing field (e.g., competing with non-sustainable and thus incorrectly priced solutions that do not consider costs of externalities) and limited access to financial resources (e.g., due to difficulties in measuring their societal impact and capturing adequate value). Purely for-profit firms might not have to deal with these challenges to the same extent (Pinkse & Groot, 2015; Hoogendoorn, van der Zwan & Thurik, 2019). Overall, these can be decisive barriers for nascent impact ventures to survive in a market, reach profitable growth as a prerequisite to expand their societal impact, and become successful established firms (Hahn, Spieth & Ince, 2018; Schaltegger, Lüdeke-Freund & Hansen, 2016).

Scholars have increasingly turned their attention to a business model perspective to understand these barriers better and identify ways to overcome them (e.g., Bocken & Geradts, 2020; Geissdoerfer, Vladimirova, & Evans, 2018; George, Merrill, et al., 2021). The term business model refers to a firm's activity system describing how it creates, delivers, and captures value (Zott & Amit, 2010; Foss & Saebi, 2017). Such a holistic and systematic perspective on a firm's value architecture allows impact entrepreneurs to incorporate and align social and environmental value mechanisms in their business and generate profits while maintaining or regenerating ecologic, social, and economic capital beyond the firm's boundaries (Schaltegger, Lüdeke-Freund & Hansen, 2016). Thus, a business model perspective can be a valuable tool to identify possible tensions and develop measures to align different logics in impact ventures (Joyce & Paquin, 2016).

Against this backdrop, prior research has investigated how sustainable business models can be designed (Hahn, Spieth & Ince, 2018; Gregori & Holzmann, 2020) and how particular a hybrid institutional logic can be managed (Davies & Chambers, 2018; van Bommel, 2018; Davies & Doherty, 2019; Klein, Schneider & Spieth, 2020). Overall, this literature shows possible elements and their conjunctions to create sustainable business models and provides valuable insights on strategically dealing with challenges and tensions regarding sustainable business models. However, this prior research has predominantly adopted a static perspective, leaving open the following important questions: how do impact entrepreneurs engage in the process of building business models, how and when do they adapt them, and how do they deal with tensions between competing logics in that process over time? Moreover, how and when do they scale their business models in the course of time (i.e., achieve profitable growth and increase their societal impact) or, by contrast, fail and disappear from the market?

[15] Entrepreneurship literature uses different terms such as "sustainable entrepreneurship" and "impact entrepreneurship" to designate entrepreneurial activity that combine social, environmental, and commercial value mechanisms. In the following, to reduce complexity, we solely use the term "impact entrepreneurship" to refer to the development and provision of solutions addressing societal "grand challenges", in a socially, environmentally, and financially sustainable manner (Markman et al., 2019). Accordingly, we refer to "impact ventures" as for-profit ventures with higher purposes aiming to resolve societal "grand challenges".

Applying a dynamic perspective could particularly help to find out whether hybrid logic conflicts play out differently in varying phases of the process and if the dominance of one logic varies over time. In particular, impact entrepreneurs are often driven by idealistic values, which, together with the impact venture's higher purpose, can also help in the recruitment and motivation of employees. However, these idealistic values may conflict with commercial interests, even though some revenue or other financial resources are needed for the survival or growth of the nascent firm (Pache & Santos, 2013; Hahn, Spieth & Ince, 2018). As an example, in an impact venture that wants to address the grand challenge of climate change, the goals of maximizing profits and minimizing the environmental footprint might be mutually exclusive. For instance, sourcing goods from an overseas supplier may maximize profits due to lower production costs but may increase CO2 emissions because of greater transportation efforts. In the literature on dealing with such tensions in sustainability, there are two emerging research streams: the paradox theory perspective and the instrumental perspective. Whereas the paradox theory perspective posits that none of the dimensions of the triple bottom line (social, environmental, and economic) should be neglected, although a short-term temporary focus on one dimension is possible (Hahn *et al.*, 2018; Ozanne *et al.*, 2016), the instrumental perspective favors the economic dimension over the social and environmental dimensions. Thus, in the instrumental view, social and environmental goals are only pursued if they pay into economic interests (Gao & Bansal, 2013).

While traditional for-profit ventures often take an instrumental view and focus predominantly on their commercial logic, impact ventures face the challenge of addressing and bringing together the three different dimensions (Hahn, Spieth & Ince, 2018; Davies & Chambers, 2018). For instance, on the one hand, the question arises as to whether impact ventures initially proceed pragmatically by also adopting an instrumental perspective, i.e., prioritizing economic growth and shareholder value. This approach would possibly lead to better access to financial resources but might threaten legitimacy as an impact venture and decrease stakeholder support (Klein, Schneider & Spieth, 2020). On the other hand, it could also be that they first prioritize the social and ecological dimension so that the higher purpose logic is dominant to generate stakeholder legitimacy but possibly at the cost of higher financial barriers (Pache & Santos, 2013; Klein, Schneider & Spieth, 2020). The following example is meant to illustrate possible dynamics in dominant institutional logics: an impact entrepreneur driven by idealistic values starts off with a dominant higher purpose logic. Following this logic, the firm sources only from local suppliers to reduce the environmental footprint of its products. However, after a while, the firm gets under pressure to grow its business faster and become more cost-efficient because of, for instance, increasing customer demands, investor demands, or new competitors. Since local supply is limited and more expensive, the firm decides to source from less environmental-friendly overseas suppliers to meet customers' or investors' demands or drive a competitor out of the market and, through this, deprioritizes at least temporarily its environmental and social goals. Once the firm is either more established in the market or stakeholders start to penalize the firm for falling short on its environmental and social goals, the higher purpose logic becomes, again, more dominant. Considering this example, taking a dynamic perspective might additionally help to explain how and why it comes to the respective prioritization, how impact ventures manage emerging tensions and challenges, and to which outcome the respective decisions and approaches lead (i.e., growing to an established competitive firm versus stagnation or failing). Therefore, answering the above research questions would overcome hitherto static perspectives in the literature and provide impact entrepreneurs with

important insights on promising practices over time. Furthermore, such insights might inform the decision making of policymakers and funders to create an institutional environment that nurtures societal impact through entrepreneurship to drive the transition to a sustainable economy and, thus, help to resolve today's grand challenges (Hahn, Spieth & Ince, 2018; Terán-Yépez *et al.*, 2020; George, Merrill & Schillebeeckx, 2021).

Due to limited theory and empirical evidence to answer our research questions, we employ a qualitative research design comprising two steps. First, to get an initial understanding of the entrepreneurial processes in the field of sustainable business model design and scale, we follow a grounded theory approach (Corley, 2015). For this purpose, we have already carried out 7 semi-structured in-depth interviews and are planning to conduct additional 20 interviews with founders and employees of various impact ventures and venture capital firms as well as accelerators and incubators with a focus on sustainability and societal impact. With this approach, we aim to obtain first insights from impact ventures while capturing the external perspectives to generate a holistic understanding of the topic. In a second step, we adopt a multiple-case theory-building approach (Eisenhardt, 1989) to study the process of how nascent impact entrepreneurs design and scale business models over time. This approach is well-suited for exploring process research questions (Langley, 1999). In this regard, we intend to use in-depth interviews with founders, managers, and employees of the case firms, which we repeat after every four to six months over two years. We consider this period of time as sufficient to generate a decent understanding of the process and observe particular venture outcomes such as successful scaling, stagnation, pivot, or failure. We will complement these interviews with archival data, including homepages, social media posts, blogs, newspaper articles, and podcasts. Moreover, we intend to add information about two extreme groups considering the data sources mentioned above: currently very successful impact ventures in terms of profitable growth and societal impact and, by contrast, failed impact ventures. Such information would further enrich our understanding of the impact venture development processes leading to success or failure.

Overall, our study potentially contributes to existing research at the intersection of sustainable entrepreneurship, strategy, and organization theory in various ways. First, by investigating impact ventures over several years, we add to both literature on sustainable business models in general and research on how entrepreneurs engage in business model processes in particular. The first research stream on sustainable business models has applied a rather static approach, mostly describing possible schemas to develop and manage such value architectures. The second stream provides valuable insights on how entrepreneurs deal with ambiguity, uncertainty, and environmental dynamics by engaging experimentation and learning processes (e.g., McDonald & Eisenhardt, 2020; Andries, Debackere & van Looy, 2013). Yet these research streams mainly focused on traditional for-profit firms leaving the question open on how to deal with particular challenges in the context of sustainability over time. Combining these streams will add to both by developing a process theory of how and when impact entrepreneurs create and adapt business models, engage in learning processes, and successfully scale and establish their ventures or fail. Against this backdrop, we also aim to highlight differences to business model processes of traditional for-profit ventures and, therefore, provide a more nuanced understanding of the topic by introducing the context of sustainability. Finally, we respond to the call for research on how impact entrepreneurs deal with complexities they face when establishing a business (Hoogendoorn, van der Zwan & Thurik, 2019; Cohen & Winn, 2007). In this regard, we intend to add to the emerging literature on

paradoxical tensions examining how to deal with challenges occurring from competing institutional logics (van Bommel, 2018; De Angelis, 2021; Jay, 2013).

Keywords

Sustainable entrepreneurship, business model, growth, grand challenges, process theory.

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Circular Economy – Business model experimentation, contradictions, and conflicts

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Extended abstract

Providing a critical perspective on contemporary production and consumption systems, the proposed contribution to the conference addresses a glittering concept that has gained growing popularity, not only in corporate strategy designs, but also in economic policymaking arenas: Circular business models (CBM). Beside digital technologies, they are seen as a fundamental cornerstone to effectively operationalize sustainability in daily business practices. Advocates construe CBMs as pragmatic solutions that enable firms to address climate change, natural resource scarcity, and ever-increasing landfills with economic opportunities. CBMs facilitate the emergence of new value creation ecosystems and function as moderators for the reorganization of production and consumption conditions in terms of content, space, and time.

Since the successful diffusion of CBMs has so far occurred in niche markets, their social acceptance is far from the desired ideal. The reasons why viable CBMs are seen as rare phenomena are the subject of current research efforts (Gusmerotti et al., 2019; Hansen et al., 2021; Linder & Williander, 2015; Tura et al., 2019; Vermunt et al., 2019). Recently, the experimentation approach has received greater attention in sustainability-oriented management and organizational research to explore conditions, recipes and practices that irritate the reproduction of unsustainable business models, and thus enable first tentative steps towards CBMs. (Baldassarre et al., 2020; Bocken et al., 2021; Brown et al., 2021; Hofmann & Jaeger-Erben, 2020; Konietzko et al., 2020; Weissbrod & Bocken, 2017). Business model experimentation plays a prominent role in testing, piloting, and validating radically novel value creation activities for circularity. Intra-organizational lifeworld laboratories for CBM innovation may provide insights for incumbents that help overcome organizational and structural inertia, and trigger an evolutionary discovery process to renegotiate what constitutes business in sustainability transitions.

However, the practical implementation and successful execution of CBM experimental spaces are highly conflictual in market-based environments. Most of the successful market launches of CBMs have so far occurred in niches in the premium segment, therefore, CBM innovation is not yet a part of the mainstream. Path dependencies, organizational cultures and ingrained value creation, information processing, and resource allocation logics that have grown over decades, which are based on the systematic exploitation of nature, make lifeworld laboratories for decelerating production and consumption seem remarkably grotesque and absurd. How do incumbents deal with these obvious contradictions? What kind of conflicts arise within the organization, but also in the dynamic reciprocity with its external environment spheres? Are there possible approaches to actively address existential conflicts that arise from the inherent contradictions between "circular-new" and "linear-old"?

Drawing on a systematic within- and cross-case analysis with two fundamentally different firms that nevertheless share the same objective—the dynamic stabilization of a long-term viable CBM—the planned conference contribution tries to draw a picture how they handle and moderate the fundamental incompatibilities in their value creation activities and the conflict between "circular-new" and "linear-old". The case studies involve one international operating company form the electrical appliances sector and a self-appointed social-ecological pioneer from the outdoor textile industry. Both have been experimenting with novel CBMs for more than three years.

Keywords

Circular Economy, circular business models, experiments, transition conflicts, business model experimentation

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Experimenting with Business Models for Sustainable Value-creation in Established Firms

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Abstract

This work is to extend studies of business model (BM) experimentation for sustainable value creation using three cases; here incumbent firms apply resources/networks in pursuit of sustainability-oriented BMs via corporate entrepreneurship. A focus query is: *How do organisations apply experimentation to learn, signal and convince key resource holders to engage with shifts (from incumbent BMs) to more circular and servitized models?* Research is to deliver insights into how BM microprocesses described for startups apply to incumbents, and if the roles/forms and influence of experimentation in modeling processes are similar. It is also to unravel how incumbents leverage and extend networks, strategic alliances with stakeholders, and the role of ecosystem partnerships, to support BMs. A process study approach is applied and analysis will triangulate data from in-depth interviews, participant-observation, and archival sources as processes are reconstructed, followed (>2 years), and subject to cross-case analysis. This early analysis finds incumbent cases with deliberate, purposeful experiments that aim to secure resources. However, context differs from earlier studies, as new BMs disrupt incumbent business logics and structures. Evidence is also found of 'corporate entrepreneurs' extending firm domain-competence via new combinations of internal resources and external value chain alliances. This analysis indicates that research extension in two areas is needed: a) analysis of where inertial effects and tensions with firm logics influence experimentation framing, and its role to secure resources; b) the role, and function of alliances with value-chain stakeholders and how they are influenced, shaped, and developed by experimentation processes.

Keywords

business model experimentation, learning, signaling, convincing, corporate entrepreneurship

Extended Abstract

INTRODUCTION

This text presents early stages of research that aspires to extend knowledge of experimentation and learning for new business models (NBMs). This departs in study of start-ups in clean-tech (Bojovic, Genet and Sabatier, 2018; e.g., Aagaard, Saari and Mäkinen, 2021) and circular economy (CE) (e.g., Bocken, Schuit and Kraaijenhagen, 2018) but focuses on larger incumbents, where experiments reflect business model (BM) diversification (cf. Geissdoerfer *et al.*, 2020) where a parent firm's main business BM continues. Here, innovation applies firm resources and networks to either integrate NBMs into the firm, or spin them off; it can also enfold joint BM innovation with other organizations. As such, this work can extend work to the realm of 'internal corporate ventures' where new resource efficient and/or circular BMs are pursued.

This study uses 3 collaborative research cases with Swedish original equipment manufacturers (OEMs). Focus is on emergence of sustainability-oriented BMs via forms of corporate entrepreneurship (Burgelman, 1984a; cf. Glinyanova *et al.*, 2021). Protagonists present experiments as response(s) to three specific 'megatrends': decarbonisation imperatives; electrification of motion, and digitization that they see significantly disrupting their markets and the socio-technical (S-T) regime (cf. Geels, 2002; Geels and Schot, 2007) as it enfolds their firm.

Proponents have shaped experiments to probe the future and new markets (Brown and Eisenhardt, 1997) and to acquire knowledge of the business environment (Andries, Debackere and van Looy, 2013). Cases address efforts to commercialize new approaches and/or technologies via NBMs, and the BM experimentation appears consistent with forms discussed by a suite of scholars (Chesbrough, 2010; McGrath, 2010; Andries, Debackere and van Looy, 2013; Bocken, Schuit and Kraaijenhagen, 2018; Bojovic, Genet and Sabatier, 2018; cf. Aagaard, Saari and Mäkinen, 2021). Managers frame efforts within the contexts of the CE and servitization (Kamal *et al.*, 2020), and in the context of recent public undertakings by corporate leadership related to *carbon emissions* and *circularity*. Two cases emerge as bounded and internal experiments where the firms appear to 'prototype' the BM, with smaller-scale, ongoing experimentation involving a limited number of partners; one is formulated as a large-scale, time-bound project with multiple stakeholders (cf. Bojovic, Genet and Sabatier, 2018).

KNOWLEDGE GAPS

We target a lack of clarity into how processes of experimentation, *learning, signaling and convincing* (L,S&C) are enacted in OEMs. We also seek stronger evidence to support our premise that such microprocesses are meaningful in our cases. Further, we envisage that we must develop a tailored analysis frame adapted from earlier work if such knowledge is to be codified in ways that

help OEMs *bridge the design-implementation gap of sustainable BM innovation*[16] (cf. Geissdoerfer, Savaget and Evans, 2017). Specifically, this work first addresses calls for in-depth insights into: if and how the microprocesses of business modeling described for clean tech startups apply to established companies as they shape NBMs; whether roles/forms of experimentation in business modeling process are similar, and if and how purposeful interactions take on the role of convincing (cf. Bojovic, Genet and Sabatier, 2018). Second, it targets a gap indicating a need (Geissdoerfer *et al.*, 2020, p. 12) to examine of the leverage and extension of firm networks, strategic alliances with stakeholders (cf. Gulati, 1998), and the role of ecosystem partnerships to achieve CE BM transitions. Pursuant to these gaps, an initial guiding question is:

How do (these) organisations apply experimentation to learn, signal and convince key resource holders to engage with shifts (from incumbent BMs) to more circular and servitized models?

METHODS

Understanding dynamics within an industrial setting is a key area for case study application (Eisenhardt, 1989). These cases use a qualitative approach to examine the micro-processes of experimentation as teams pursue sustainability-oriented BMs within an enfolding organization. Longitudinal cases (2021-23) should deliver rich insights into this phenomenon (Flyvbjerg, 2006). A process study approach (Langley, 1999, 2007) is chosen pursuant to the processual forms of experimentation and BM formation we observe, and to support comparison to related studies (McGrath, 2010; Bojovic, Genet and Sabatier, 2018; e.g., Aagaard, Saari and Mäkinen, 2021). Analysis will triangulate data from in-depth interviews, participant-observation and archival data as internal processes are reconstructed to the present, and followed – and subject to cross-case analysis.

INITIAL RESULTS

While, informed by initial interviews and research interactions/meetings with proponents (>30), analysis frames are still under development and results are preliminary.

Processes of experimentation & similarity of roles and forms – We find NBM experimentation for learning clearly related to earlier studies, and variously described as: visualization, experimentation, mapping, prototyping, co-creation, and value-demonstration. Managers have started with questions about NBMs, hypothesized new pathways to value creation, and are engaging the environment to learn (see particularly Bojovic, Genet and Sabatier, 2018, p. 148). Further, experimentation seek to signal the legitimacy of the incipient BMs so as to convince resource holders in the firm, customers, and value chain partners to establish relationships. Proponents frame initiatives with sequenced visions for BMs that implement cleaner technologies and move towards servitization (Kamal *et al.*, 2020) in ways driven by megatrends. Thus, cases

[16] An explicit objective within the Swedish Mistra-funded research programme that support this work; see www.mistrarees.se.

appear consistent with 'deliberate experimentation' (cf. Murray and Tripsas, 2004) pursuing strategic alignment to access resources. In contrast to small firms however, we note that these OEMs are better positioned to orchestrate activities in the external required for systemic change (Lahti, Wincent and Parida, 2018).

Microprocesses in experimentation – While BM microprocesses described for startups are recognizable, these cases differ as the incumbent context implicates NBM disruption to firm-internal business logics and structures. Informants relate how experiments conflict with existing assets and BMs (Chesbrough, 2010) and encounter internal political constraints, and/or resistance to changes, related to issues such as: sunk costs in resources/assets and specialised personnel; inferred changes to firm structure, and redistribution of resources across business units (Hannan and Freeman, 1984).

Processes of convincing – Managers relate the importance of experimentation and effectuation, and of leadership of organizational change (Chesbrough, 2010) – and see themselves within such processes. They describe efforts to establish acceptance/understanding of the emerging or potential offerings in the firm and with (existing and potential) value-chain partners. This seen as requiring professional organization to demonstrate and communicate achievements, and build quality stakeholder relationships (Aldrich and Fiol, 1994; Zott and Huy, 2007). Legitimacy building among firm resource-holders based on evidence of value provision appears central, and is interpreted as effort(s) to strategically legitimate (Bojovic, Genet and Sabatier, 2018 p. 153) ventures.

Firm networks & alliances – Demonstration to stakeholders how core business assumptions may be challenged (Doz and Kosonen, 2010) is a common case theme. Each involves specific 'initiative proponents' or 'corporate entrepreneurs' (Burgelman, 1984b, 1984a; Glinyanova *et al.*, 2021) that seek to extend the firm's domain-competence via new combinations of internal resources and external value chain alliances (Burgelman, 1984a, 1984b).

PRELIMINARY CONCLUSIONS

We conclude that the OEM cases are rich in the phenomena of experimentation, L,S&C and strategic legitimation. Studies of processes in OEMs as they pursue sustainable business value creation thus offer novel insights, and earlier studies of how experimentation in nascent firms has addressed challenges contribute a firm theoretical foundation. However, we note areas where the form/role of experimentation, and how these impact business modelling processes, differ significantly. To contribute theoretically to deeper understanding of such processes in incumbents we conclude that next steps must pursue two additional areas. First, a focused analysis of where inertial effects, tensions with firm logics, political constraints and/or resistance influence how L, S & C activities are framed, and how they are used by proponents as they seek resources. Second; the role, and function of alliances with existing and new value-chain stakeholders and how they are influenced, shaped, and developed by experimentation processes.

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New Ventures in the Face of the Covid-19 Pandemic:

A Potential Opportunity for Business Model Experimentation for Sustainability

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Extended abstract

The covid-19 pandemic has affected businesses all around the world to varying degrees. The pandemic constitutes a change in the external environment of the firm, posing a potential threat to the continued operations of businesses. When facing such a change, business model adaptation is a potential strategy to overcome the disruption (Ferreira, Proença, Spencer, & Cova, 2013; Zott & Amit, 2007). Business model adaptation can be defined as a process of actively aligning a business model in response to a change in the external environment (Saebi, Lien, & Foss, 2017).

If managers perceive a change in the external environment as a potential threat, previous studies predict that they will be likely to engage in business model adaptation (e.g. Demil & Lecocq, 2010; Saebi et al., 2017). That is, a perceived threat will prompt an active effort to change the business model to be better suited for the new environment. If the change in the external environment is perceived as an opportunity on the other hand, inertia is supposed to kick in and business model adaptation will be unlikely to occur (Saebi et al., 2017). These results draw on prospect theory, stating that managers are likely to be risk averse when facing of a potential gain, i.e. an opportunity, leading to inaction rather than action, in this case business model adaptation.

However, as these findings are derived from studies of business model adaptation in large firms with long-established operations (Saebi et al., 2017), they might not apply to new ventures, which are defined by being in the early years of operation (Zimmerman & Zeitz, 2002). In fact, studies of new ventures seem to attribute them with a higher propensity for adaptation, due to the shorter decision-processes, less path-dependencies and a more flexible structure (Stoica & Schindehutte, 1999). New ventures also tend to succeed in a disrupted market, where incumbent firms are challenged, and with a business model that is very different than the one launched from the outset (Drucker, 2014), meaning that adaptation has occurred. For new ventures, a disruption can

therefore be a potential trigger for faster growth, towards market leadership (Akpan, Udoh, & Adebisi, 2020). Thus, new ventures could, compared to incumbent firms, potentially be more likely to view the covid-19 pandemic as an opportunity.

Hence, the question arises as to how the framing of the covid-19 pandemic, as an opportunity or as a threat, will impact the potential resulting business model adaptation in new ventures. Furthermore, little is known about the mental processes that precede the framing of a change in the external environment as a threat or an opportunity (Saebi et al., 2017). A better understanding of the reasoning behind managers' framing of a change in the external environment could explain potential differences between existing and new ventures.

Therefore, the purpose of the study is to bring insights into new venture managers' mental processes that lead to a framing of a change in the external environment, and how that framing can act as a potential driver of business model adaptation. Hence, the research question aims to understand managers' underlying mental reasoning that lead to the framing of a change in the external environment (as a threat or as an opportunity), and what consequences the framing has for the resulting business model adaptation, or lack thereof. In turn, the study contributes to understanding whether the previous findings that an opportunity-framing will lead to inertia rather than business model adaptation (Saebi et al., 2017), is applicable to new ventures. Previous studies have pointed to a novelty-orientation as a driver of business model design and as a determinant of performance in entrepreneurial firms, but nothing to our knowledge has been established in terms of change-framing and mindset in new ventures (Zott & Amit, 2007).

To answer the research question, a qualitative multiple case study has been conducted of ten new ventures in Sweden. The new ventures were selected using convenience sampling and comes from various industries such as; MedTech, transportation, FinTech, event industry, and marketing. A qualitative case study is suitable for creating an in-depth understanding of a phenomenon, such as mental processes of managers, providing a rich description in the respondents own words (Patton, 2014). At the beginning of the pandemic, in late spring and early summer 2020, interviews were conducted with the CEO's of all ten firms. The interviews gave rich insight into the mental reasoning of the managers, relating to how they framed the covid-19 pandemic and why. The second part of our study consisted of a document analysis, where we followed the development of the new ventures and how they responded to the external threat using social media, newspaper articles and other publicly available material. Through these means, we were able to create an understanding of how the business models changed, or did not change, in response to the changing external environment. All data collected was analyzed using the Gioia-approach, aiming at an open-disposition towards the data in order to create a deeper understanding of the meaning of what is stated (Gioia, Corley, & Hamilton, 2013).

The preliminary analysis of the interviews showed that almost all of the new ventures viewed the covid-19 pandemic as a short-term struggle, but a long-term opportunity for their business. The preliminary findings also show that an antecedent of how an external change is framed, that is as an opportunity or as a threat, is the perceived compatibility between the ethos of the business model and the post-change environment. The ethos of the business model, that is the manifested purpose, is often mentioned as a crucial factor in sustainable business model development (e.g. Bocken & Short, 2016; Stubbs & Cocklin, 2008). The ethos characterizes the fundamental

composition of the business model, and in regards to sustainability, it relates to the social, environmental or economic nature of the business model.

In this case, the preliminary findings show that if the fundamental ethos of the business model was viewed as compatible with the post-change environment, the change in the external environment is likely to be viewed as an opportunity. Particularly, the companies that had a socially or environmentally oriented ethos, tended to have a positive outlook on the business models' compatibility with the post-change environment, compared to a purely economic orientation. As a socially or environmentally oriented ethos is aligned with the long-term sustainability trend in the market, it was seen as compatible with a so called "new-normal" post-covid-19 environment. These findings both support the claim of new ventures having a more positive outlook on potential disruptions (Andries & Debackere, 2007; Drucker, 2014), and explains the reasoning behind the framing of an opportunity.

However, contrary to previous findings that suggest that business model adaptation is unlikely when an external change is perceived as an opportunity (Saebi et al., 2017), the preliminary findings in our study point to new ventures actually engaging in business model adaptation in spite of framing the external change as an opportunity. Several of the new ventures studied considered some type of business model experimentation. Business model adaptation was in some cases considered as a temporary response, meeting transitory needs resulting from the pandemic, but for some it was seen as a window of opportunity for business model experimentation that sometimes lead to more permanent changes. The changes led some new ventures making substantial changes to their business models, while it for other simply meant survival (Balboni & Bortoluzzi, 2015).

These findings add nuance to the previous findings of Saebi et al. (2017), demonstrating that even if the ethos of business model is seen as compatible with the longer-term post-change environment, and therefore the change is framed as an opportunity, the changing environment can still trigger the willingness to experiment with the existing business model and how its components interrelate. Furthermore, the findings provide a more granular understanding of how business model adaptation relates to the traditional threat/opportunity framing for new ventures, giving insights into the mental antecedents for framing a change in the external environment, the role of a sustainability-oriented ethos, and the potential business model adaptation outcomes for new ventures.

Although the study might carry limitations in terms of generalizability, managerial implications can be derived in terms of the potential benefits from having a more socially and environmentally oriented ethos, as it might encourage a positive outlook and ferment opportunities for business model experimentation. Future research could focus on better understanding these differences between a value-oriented ethos characterizing business model development and a purely financial-gain-oriented ethos, which was implicated as a foundational factor for viewing the business model as compatible with a post-change environment in our study.

Keywords

Business Model Experimentation, Business Model Adaptation, New Ventures, Sustainability, Covid-19

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Sustainable Steel: through Industry 4.0 towards the Ecological Transition

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Extended abstract

As required by the EU (European Union) Green Deal and Climate Action Plan, by 2050, EU industries have to fulfill the challenging goal to become a climate neutral economy (European Commission b, 2021). Requirements (-55% reduction in greenhouse gas emissions, compared to 1990, +32% renewable energy, +32,5% energy efficiency) will impact EU manufacturers structurally (European Commission c, 2021). Energy intensive industries (cement, steel, chemicals), the so-called hard-to-abate sectors (Energy Transitions Commission, 2018), will experience a significant impact on their business models, especially concerning economic viability, due to still experimental technologies and energy sources (like hydrogen and carbon capture) (Vogl et. al., 2018). With "Next Generation EU - NGEU", the EU planned 750 billion EUR to support EU industries in their ecological transition (Lavallée, 2021), also to cope with the economic difficulties caused by the Covid-19 crisis (European Commission *a*, 2021). NGEU pushes EU manufacturers to sustainable business models, supported by Industry 4.0 and digital technologies.

Experimenting successful sustainable business models challenges industries structurally, pushing to build new partnerships in the supply-chain, and to remodel financial feasibility by considering social and environmental issues (Boons & Lüdeke-Freund, 2013; Inigo et al., 2017). Actually, sustainable business models measure company performance on the so-called triple bottom line, i.e. on the economic, social and environmental level (Bocken, 2021), by fostering the convergence of multiple stakeholders' interests (Matos and Silvestre, 2013). Recent research has increasingly developed about the key-role of Industry 4.0, the so-called 4th Industrial revolution, as enabler of sustainability strategies and sustainable manufacturing (De Marchi and Di Maria, 2020;Stock & Selinger, 2016). Industry 4.0 empowers the efficient integration and interconnection of internal production processes through cyber-physical systems and digitization, leading to a tighter collaboration among different actors in the external ecosystems of manufacturing companies (Büchi et al., 2020). The benefits of Industry 4.0 technologies can affect all the triple bottom line dimensions (Kiel et al., 2017), especially boosting Circular Economy practices (Di Maria, De Marchi, Galeazzo, 2022), in a

perspective of environmental business model innovation (Prieto-Sandoval et al., 2019). However, the way to environmental sustainability for manufacturers is still an open experimental path (Bauer et al., 2022), and there is room for a deeper research concerning how manufacturing industries are pursuing sustainable business models (Frank et al., 2019), especially on the environmental dimension, and how Industry 4.0 is really supporting manufacturers in this ecological transition (Gabriel and Pessel, 2016).

We individualized a sector, which is at the moment highly impacted by the EU green economy goals, but which has not been widely explored in the transformation required by Industry 4.0 and sustainability business models (Liu et al., 2021): the steel sector. Steel industries represent the backbone of the European economy and they are the most advanced in the energy intensive sector in the opportunities given by environmental sustainability, with the experimentation of breakthrough technologies, like hydrogen- and electricity-based metallurgy and carbon capture and storage (Eurofer, 2020). Carbon neutrality pushes steel producers to innovate their business model, either shifting to completely new production technologies (like induction ovens reducing CO2 emissions) or diversifying their products range, by integrating their business value proposition (Axelson et al., 2021).

We analyze a specific company case, in order to gain new insights about Industry 4.0 benefits and impact on manufacturer business models in the context of sustainable growth (Eisenhardt & Graebner, 2007). We focus on the case of Feralpi Group, which is a significant case study and can give new insights in the topic, which could be eventually further explored and benchmarked with quantitative analysis (Eisenhardt, 1989).

Feralpi Group is an internationalized leader in steel products for the construction industry and it was the first among competitors to voluntarily commit to sustainability reports since 2004. Scrap, a continuous recyclable material, is the main raw material of the production cycle, imprinting the company business model from the very beginning to sustainability. We employed exploratory semi-structured interviews to give interviewees a certain degree of freedom to underline possible additional aspects on the topic (Cassell and Symon, 2004; Symon and Cassell, 2012). Companies were selected based on their level of maturity for Industry 4.0 and sustainability initiatives. We pursued a first round of nineteen qualitative interviews, during the period of one month (from 21.04.21 to 31.05.21).

Preliminary results underline how Industry 4.0 contributes to the experimentation of sustainable business models, especially regarding Circular Economy and democratization strategies. IOT, machine learning and Big Data analysis support environmental sustainability in energy efficiency, monitoring of CO2 emissions, traceability, optimization of resources and employment of renewable materials in an optic of Circular Economy. A constant element in the realization of environmental sustainability is experimentation, not only in the employ of prototypal technologies (with no certain success, often capital intensive investments, implying high entrepreneurial risk), but especially in the relationships of the actors in the supply chain. The most innovative element of experimentation in the fulfillment of the ecological transition is the creation of new partnerships in the value chain beyond the traditional consolidated business relationship, which is perceived as a great opportunity. Evident example of business model experimentation, is the partnership of Feralpi with other stakeholders into a company which reuses its production black slag into a certified product employed in other sectors. The characteristic of networking seems to unify the concept design of

both Industry 4.0 and sustainability. Often these new collaborative networks are generated through interpersonal contacts. Engwall et al. (2021) talk about "experimental network", intended as "a group of organizations collaborating in a time-limited, cross-industry network to explore potential business models for an anticipated, profound change in sociotechnical systems." (p.2). Actually, what could be observed in our company case is that those new experimental networks are initiated to create technological and organizational prototypes, but then they last over the period of experimentation and they continue, contributing to a more consolidated framework of business projects. Industry 4.0 and sustainability are opening steel industries to new possible business models paradigms, where also producers can come closer to the end customers and where byproducts can become an employable resource both in the own production cycle and in other sectors (Atif et al., 2021). Customers are actually more and more interested in the traceability of CO2 emissions, due to norms contingency, and the opportunity to have economic advantages.

We think our research can contribute to the current literature on sustainable business models, which is an open field for incremental and radical innovation (Bocken et al., 2013), being the organizational and technological path to environmental sustainability for energy intensive industries still an experimentation field. The experimental character of sustainable paths is a fundamental element to develop a successful approach of management to business transformation and business model innovation (Sosna et al., 2010), and to the successful achievement of ecological transition. We acknowledge that results are at the beginning of understanding the paradigms of Industry 4.0 and sustainability for energy intensive manufacturers. Further research should go deeper on the exploration of success factors of sustainable business models and supply chain integration of those industries.

Keywords

Industry 4.0, sustainable business models, collaborative experimentation, circular economy, ecological transition

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Covid-19 impact on sustainable consumption: Implications for Entrepreneurs Experimenting with Zero Waste Stores

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Extended abstract

The main goal of this research is to provide empirical data how sustainability entrepreneurs currently experiment with innovative business models to reduce consumption by leveraging changes in consumer behavior, created by the Covid-19 pandemic. The coronavirus pandemic has created unprecedented changes in the society and business operations globally, many of which are here to stay. Some researchers see these as an opportunity to foster a transition to a more sustainable society with less consumption and waste (Cohen, 2020). In such a transition, business model innovation is key, and research has found that entrepreneurs are best positioned to experiment with different strategies for product and service delivery, which create both environmental, and social benefits (Hockerts & Wustenhagen, 2010). At the same time, "the role of business as lever for change through experimentation in sustainability transitions remains underexplored," according to Bocken et. al. (2021). There is a need to better understand the opportunities and challenges created by the Covid-19 pandemic, and the tools, processes, and dynamic capabilities applied by sustainability entrepreneurs, when experimenting with innovative business models for sustainability (Bocken et. al. 2021).

One example of such experimentation is the emergence of Zero Waste Stores, typically launched by entrepreneurs passionate about eliminating waste and plastics. Leveraging the growing consumer awareness of waste and its environmental and social impacts (including the impacts on climate change), a growing number of zero waste (ZW) stores are emerging around the world and in the United States. These stores represent an alternative to the traditional retail stores and typically offer reusable packaging (e.g. reusable bags, refillable containers), organic food, ethically sourced and fair-trade products, and local sourcing (Beitzen-Heineke et. al. 2017). For instance, Boston's first ZW store, Uvida, was opened in 2020 by Maria Vasco, a young entrepreneur and graduate of UMass Boston School for the Environment, who was passionate about eliminating plastics and wanted to offer customers packaging-free and plastic-free options (Bremer, 2022). Going through several stages of experimentation (from an online only store, to traditional

storefront, to expanding offerings to include plants), the founder has developed dynamic capabilities and collaborations which have helped it succeed and open a second store in Boston in November 2021. While a niche player, such business model experimentation is key for understanding and leveraging emerging consumption trends and opportunities. According to Cohen et. al. (2017), in the current capitalist economy where consumption is seen as key to economic success, changing the dominant "regime" is challenging and more likely to happen gradually through incremental changes in in niches which do not seem to pose any immediate threat to dominant institutions.

Considering that young people, Generation Z and Millennials, represent a major and growing group of consumers, it is important to understand how the Covid-19 pandemic might have changed their attitudes and behavior in regard to sustainable consumption. Research has found that "Generation Z along with Millennials are the most likely to make purchase decisions based on values and principles (personal, social, and environmental)" (Petro, 2021). On the other hand, young people are driving the new online and "To Go" shopping culture, which is increasing waste and emissions.

The proposed presentation and related research aim to address the existing research gap on sustainable business model experimentation after the coronavirus pandemic and provide empirical data from the first Zero Waste Store in Boston, Massachusetts. The study is based on interviews with the founder of Uvida (Boston's first Zero Waste Store) and 137 responses to a 20-question survey of undergraduate students enrolled at UMass Boston, USA, and the Economic University in Varna, Bulgaria, conducted in April 2021 (the response rate was approximately 80%; or about 80% of the students enrolled in the selected courses completed the survey). The research aims to explore the following questions: What are the main challenges and opportunities for sustainability entrepreneurs focused on reducing consumption and waste after the Covid-19 pandemic? What tools, practices, capabilities, and collaborations are leveraged by Uvida Zero Waste store, and how does the company articulate and inspire its customers to change their behavior? What is needed to scale up emerging Zero Waste stores and move these from a niche to a mainstream business model in the future?

Applying George et. al. (2016) framework for Grand Challenges, the presentation will analyze key societal barriers to advancing sustainable consumption, and Uvida's main lessons learned during two years of business model experimentation for sustainability. The author aims to build on previous research on business models for sustainability and a study by Sarkis (2020) that reported that "associating with external stakeholders during the COVID-19 crisis may result in a transition to further supply chain sustainability because it fosters local markets, build community trust, reduces risk, and builds resilience".

The main contribution of the proposed presentation is that it provides empirical data on business model innovation for sustainability transitions, and identifies key enablers, main challenges, and future opportunities in scaling up successful business experiments after the Covid-19 pandemic.

Keywords

Sustainable consumption, Zero Waste stores, sustainability entrepreneurs, business models for sustainability, Covid-19 pandemic

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Opportunities for Co-Designing Circular Business Models with Game-Based Approaches

A literature and practice review

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Extended abstract

As a response to growing concerns for the unsustainability of our modern society, Circular Economy (CE) promotes a transition away from wasteful, linear modes of production and consumption to systems with circular material flows that can significantly improve resource productivity. In a CE, firms and users of the firm's products or services both need to contribute to circular flows of products or materials. Firms do so by offering circular products and services through circular business models (CBMs), and users do so by being the customers of these CBMs and engaging in the three main phases of circular consumption: obtainment of a product, use, and clearance (Rexfelt & Selvefors, 2021). Yet, despite the potential benefits that circular solutions represent, transition to CBMs has not yet taken off. One reason is the difficulty of creating attractive CBMs that encourage a shift to circular consumption patterns and address users' needs in a satisfactory way (Rexfelt & Selvefors, 2021). At the same time, firms appear reluctant to implement CBMs if they are not perceived as valuable either in terms of the value captured by the firm or created for the user (Hankammer et al., 2019).

Because of this mismatch between users' needs and firms' business offerings, previous research emphasizes the importance of creating value propositions that align with CE goals without comprising user needs (Tunn et al., 2019). But, to complicate matters, today there is only limited understanding of what circular consumption entails for users in their everyday lives and their needs (Selvefors et al., 2019). Added complexities for firms when it comes to CBMs include the need for multiple value propositions to retrieve products from users and challenges in finding value chain actors that can partner with firms to enable CBM offerings; however, there is evidence to suggest that one way to address such challenges is through business model innovation (Whalen, Milios &

Nußholz, 2018). The process of business model innovation is portrayed as a non-linear process based on multiple episodes of cognitive search and experiential learning (Berends et al., 2016). To navigate uncertainties and complexities involved, business model innovation scholars often highlight the role of design, prototyping, and experimentation (Andries, Debackere & Looy, 2013; Sosna, Trevinyo-Rodriguez & Velamuri, 2010). Experimentation allows improving the business model elements with limited risks and resources through continuous and collective learning with relevant stakeholders (Bocken, Schuit & Kraaijenhagen, 2018).

Several tools and methods for CBM innovation exist, but most have not been empirically tested nor widely used in practice (Bocken et al., 2019). Even though existing CBM innovation tools often stress that a user perspective can be valuable, e.g., to assess the market potential of CBMs, current tools do not show how to gain these user insights or how to successfully transform them into circular value propositions (Rexfelt & Selvefors, 2021). Furthermore, existing tools overlook the opportunity to create user-centered CBMs through co-design and experimentation with users (van Dam et al., 2021). Co-design between firms and users is an established method within the design domain to create a deep understanding of user needs and better address both current and future (i.e., currently unmet) needs (Sanders & Stappers, 2014; Sleeswijk et al., 2005). Co-design requires design-oriented research methods that probe the everyday and reveal participants' ideas about the future. But this transformation to designing *with* users has not been transferred to the domain of CE (Lofthouse & Prendeville, 2018), which inhibits the understanding of what circular consumption entails for people in their everyday lives cf. (Selvefors et al, 2019) and results in missed opportunities for user-centered CBM innovation (van Dam et al., 2021).

Among the different types of tools that firms can use to support innovation, game-based approaches such as gamification (i.e., applying game elements to non-game scenarios) and serious games (i.e., standalone games played for purposes other than amusement) have received attention within sustainable innovation (Whalen & Kijne, 2019). The reason for this is that game-based approaches can help stimulate interaction and engagement (Connolly et al., 2007), encourage critical thinking by mimicking complex systems (Whalen et al., 2018), and even encourage changes in human behavior (Froehlich, 2015). This research therefore aims to examine how games can promote the co-design of CBMs between firms and users by merging perspectives from design and business model research. Games' abilities to facilitate the development of user-centered CBMs through co-design with users are assessed through a literature and practice review focused on the intersection of CBM tools and participatory design approaches. This analysis seeks to support knowledge on tools for CBM experimentation by framing a research agenda to facilitate future efforts in the development and use of games for CBM innovation. Gaps in the existing landscape of tools are highlighted and the findings suggest there are numerous opportunities where games can be used to facilitate experimentation with circular business models, especially in the development of circular value propositions.

Keywords

Circular business model, business model experimentation, serious games, co-design, gamification

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Track 2.3 - New Business Models in an International Context

Track chairs: *Svante Andersson, (Halmstad University) and Petri Ahokangas (University of Oulu)*

Most business model literature does not deal in which countries business models' value creating, delivering and capturing activities are localized or how the internationalization of the firm takes place. Especially for new international firms' localization and internationalization decisions are important as these firms must deal with liabilities if newness, smallness, foreignness.

Thus, this track aims at attracting scholars to discuss their current research on sustainable business models in an international context.

Cascading Business Models: A Study of Non-Fungible Tokens

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Abstract

This study sets out to explore how Non-Fungible Tokens (NFTs) are influencing future business applications with unique value creation and capture mechanisms. Building on existing theoretical insights and learning from real-world examples, we demonstrate how NFTs enable a new business model type, which we coin the Cascading Business Model. A clarification of NFTs and related concepts, together with their unique use-values and exchange value determinants led us to argue that the Cascading Business Model differs from existing business model types. NFT ecosystem including the involved stakeholders and relationship levels is analyzed to provide a better understanding of how value is created and captured under NFT-based business models. This study extends the business model literature by introducing a new business model type that opens novel value creation and capture opportunities. Practical applications and prospects for future research are also discussed.

Keywords

Non-Fungible Tokens, NFTs, use-value, exchange value, business ecosystem, Cascading Business Model

Introduction

The worldwide emergence of blockchain, as a Distributed Ledger Technology, perhaps dates back to the financial crisis of 2007–2008, where centralized payment and monetary systems failed to detect and avoid the collapse of the global banking and financial transactions (Ateniese *et al.*, 2017). A centralized system relies on a single source of authority responsible for connecting and controlling different groups of users whilst in decentralized systems, users have control over their decisions and behavior following transparency and public transparency which make the system less prone to corruption, failure, and collapse (Kshetri, 2017). The blockchain technology with its decentralized structure and promising potentials has been applied to many fields ever since. The first application was in the financial transactions that led to the creation of cryptocurrencies (digital forms of money) with Bitcoin being the most prominent and widespread decentralized currency system (Notheisen,

Cholewa & Shanmugam, 2017). Non-Fungible Token (NFT) is perceived as one of the most recent and innovative applications of blockchain technology that is revolutionizing different aspects of digital asset management systems such as ownership, exchange, investment, traceability, protection, and control (Dowling, 2022).

NFTs came into popular parlance in early 2021, when a digital artwork, called 'Everydays: The First 5000 Days' was traded for $69.3 million as a digital asset containing 5000 images (Valeonti *et al.*, 2021). The NFT boom continued to even higher trading values with the digital work called 'The Merge' being sold for $91.8 million on December 2021 (Hale, 2021). According to a report from NonFungible.com, the NFT exchange market is experiencing a rapidly rising growth rate as the total sales in 2021 reached over $9 billion showing a more than 25-times increase relative to 2020 with $340 million. Over the last five years from the first sale back in June 2017, more than 21 million NFTs are sold surging the total value to over $14 billion (NonFungible.com).

The NFT sector signals the genesis of Web 3.0 as the next Internet revolution where everyone is able to create and trade digital assets under decentralized governance and control systems (Valeonti *et al.*, 2021). Having the current market value of NFTs reached over $9 billion, many individuals and businesses have embarked on NFT investments and projects. However, after the successful 2021, new controversies are being discussed about potentialities and effects of NFTs such as their long-term effectiveness in protecting ownership rights, negative ecological consequences, and users' unwillingness to participate in NFT programs (Morrow, 2022). Adding to this the rough and tumble of cryptocurrency markets, concerns have been raised about the likelihood that NFT-based businesses may not achieve the potential promises. Therefore, there is a timely need to study NFTs and the ways businesses can integrate these digital assets into their operations and processes.

To better approach this research aim, a proper interpretive lens is needed to be employed. The business model perspective is of great relevance to the context of NFTs as it has the potential to explain how disruptive technologies can stimulate new value creation and capture mechanisms (Warner & Wäger, 2019). The theoretical implications of this perspective for studying digital transformation technologies in terms of Internet of Things (IoT) (Zhang & Wen, 2017), big data analytics (Loebbecke & Picot, 2015), cloud computing (Khanagha, Volberda & Oshri, 2014), and, more recently, blockchain technology (Morkunas, Paschen & Boon, 2019) subscribe to the case for exploring NFT-based business models. This conceptual paper, therefore, seeks to address the questions of what is value in the context of NFTs? And how it is created and captured under NFT-based business models?

NFTs and related concepts

An NFT is a virtual certificate of ownership of a digital asset registered in a public ledger and stored on a certain blockchain (Dowling, 2021; Regner, Urbach & Schweizer, 2019). NFTs are non-fungible aka not mutually interchangeable and each NFT represents one single item owned by a specific individual (Rawat, 2021). The non-fungible characteristic of NFTs makes them an alternative investment asset to stocks and cryptos (Rossolillo, 2021). NFTs were initially used for digital artwork where artists prove ownership of their creations and sell their work in a more innovative way (Nadini et al., 2021). Given the nature of NFTs – that they are mutually interchangeable hence

cannot be replaceable by other identical items, a great deal of attention is paid to the creation, trade, applications, and implications of NFTs (Nadini et al., 2021). NFTs can be linked to any type of digital content such as images, videos, music, pieces of writing, and so on.

To better understand NFTs, we here define related concepts that should be distinguished from NFTs. NFTs differ from blockchain as the latter is a decentralized technology that enables the safe and transparent storage and transmission of information in a public database accessible to all relevant stakeholders (Kshetri, 2017; Morkunas, Paschen & Boon, 2019). There are several providers of blockchain technology that offer different benefits to users. Ethereum (ethereum.org) is the leading platform that is being challenged by competitors such as Solana (Solana.com) or Celo (celo.org) (Caldarelli & Ellul, 2021). Despite high security and privacy standards, Ethereum is criticized for slow transaction speeds and high gas fees (commissions earned for using blockchain services) (Geron, 2021). NFTs are traded in specific marketplaces using cryptocurrencies as virtual mediums of exchange that use cryptographic techniques to regulate and secure the generation and transaction of units of currency (Pilkington, 2016). Bitcoin (BTC) is the most popular cryptocurrency with the highest market value followed by ETH (by Ethereum) and Binance Coin (BNB) (Royal, 2022).

NFT marketplaces are digital platforms where NFTs can be created and traded between the original creators, buyers (collectors), and speculators (Martinique, 2021). NFT creation process is called 'minting' under which an NFT is generated and linked to a digital asset through blockchain technology (Wilson, Karg & Ghaderi, 2021). OpenSea (opensea.io) is the most popular NFT marketplace followed by Rarible (rarible.com) and Mintable (mintable.app) based on their age, audience volume, training and support provided, and technology integrations (Brain, 2022). NFT marketplaces provide security for transactions and earn commissions on each trading process. To be able to trade NFTs, users need to create and fund a crypto wallet with cryptocurrencies. A crypto wallet is a virtual bank operated by a third party that stores three main pieces of information, namely a public key (virtual account number used for receiving transactions), a private key (password used for making the transactions), and a seed phrase (a group of words used for accessing the private key) (Yang, 2021). Metamask (metamask.io) and Rainbow (rainbow.me) are the most commonly used software crypto wallets while Ledger (ledger.com) and Trezor (trezor.io) provide the most popular hardware wallets (Agrawal, 2022).

NFTs are offered for sale in the marketplace through smart contracts. A smart contract is a computer program stored inside a blockchain that serves as an immutable (cannot be changed once created) and distributed (the terms of the contract are validated by all the involved parties) digital contract (Arora, Kumar & others, 2022). Once pre-defined conditions are met, these contracts are self-executed allowing the involved parties to activate their role by receiving or sending crypto coins, for example (Chirtoaca, Ellul & Azzopardi, 2020). Compared to traditional, non-smart contracts in the real-world, there is no need for third parties to verify authenticity allowing the participants to save time and money (Arora, Kumar & others, 2022). Using smart contracts, NFT owners are able to trade quickly as the whole process is executed digitally, and hence no paperwork is involved (Geroni, 2021). These contracts allow NFT sellers to reserve the right to receive a percentage of payments in next aftermarket trading, called NFT royalties (Tunstall, 2021). This makes NFTs a potential source of passive income for the genesis or speculators who buy and sell NFTs in the hope of making a profit. Figure 1 is a presentation of NFTs and related concepts illustrating the processes through which NFTs are created and traded in the marketplace.

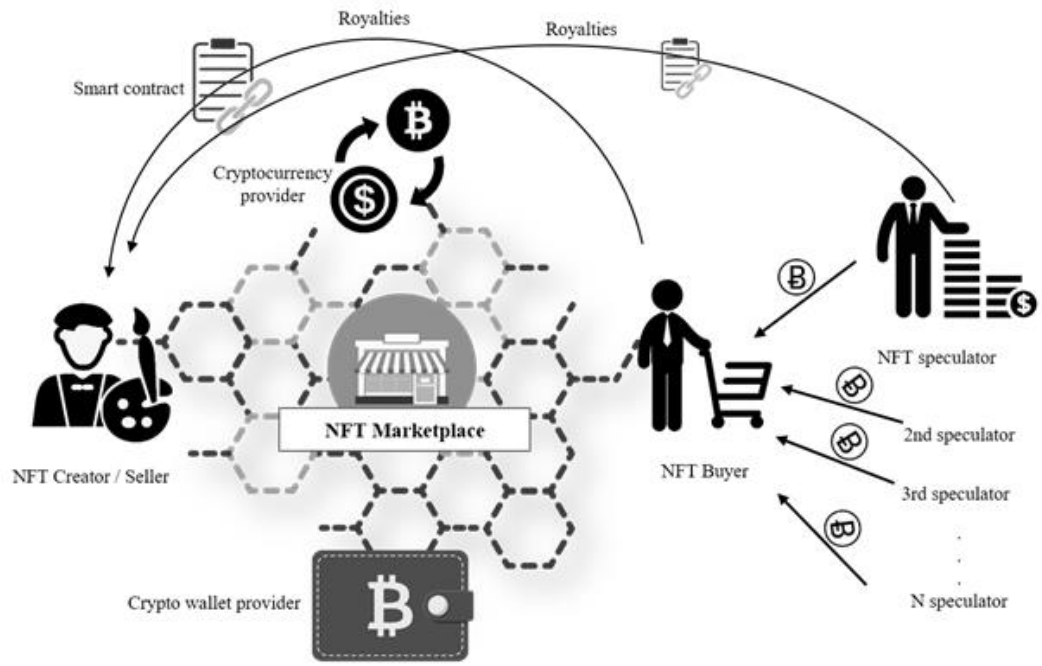


Figure 1. NFTs and related trading concepts

NFTs' Use-Values

To better understand the novelty of NFTs, we disentangle their 'use-value' and 'exchange value' (Bowman & Ambrosini, 2000; Lepak, Smith & Taylor, 2007). Any specific quality or feature of an offering that reflects customer needs is recognized as 'use-value' whilst 'exchange value' represents the amount paid by the customer for receiving the offering and its use-values (Bowman & Ambrosini, 2000). The application of these concepts to the understanding of NFT-based business models leads to a better conceptualization of how value is created and captured within NFT ecosystems.

Due to the unique nature of NFTs, different types of use-value can be identified. First, they provide the creators of digital content with the possibility to certify ownership and trading rights, protecting legal and regulatory values (Jones, 2021). Digital content can be anything that is created, stored, and accessed virtually (Clark, 2021), including media files such as a piece of writing presented in a Microsoft WORD or PDF file, music recordings in MP3 formats, static or dynamic images as JPEG or GIF covers, video files, and any other forms of virtual creations (Dowling, 2021). Using a platform such as Opensea.io, the digital artists can mint an NFT and link it to their digital artwork to be stored and monitored as encrypted blocks of data in a blockchain (Howcroft, 2021). This makes the history of the asset transparent and unchangeable so that its original creation and following trading practices are known to anyone (Concas, 2021). Granted that NFTs are not-fungible, they prove ownership of verifiable digital contents that can be easily traded on the blockchain (Goodwin, 2021). Mike Winkelmann, the creator of the Consecutive Days collection, Trevor Jones the creator of the Bitcoin Angel, and Micah Dowbak, the artist behind the Replicator project are among the most successful artists using NFTs for their artwork (Nambiampurath, 2021).

What makes the ownership and trading agreement of NFTs easy and secure is that they are recorded in immutable and transparent smart contracts on a blockchain (Arora, Kumar & others, 2022). Contract terms as lines of code available in the blockchain are automatically activated provided certain conditions obtain (Chirtoaca, Ellul & Azzopardi, 2020). These functional value benefits have facilitated the trading of digital content as the whole process is executed digitally, and hence no paperwork is involved. Besides, human error is minimized decreasing the risk of financial loss on NFT project success (Geroni, 2021). Apart from speed and accuracy, security is enhanced in NFT projects granted that every transaction is recorded on the blockchain under a transparent ledger that is accessible to all participants in real-time and therefore the output cannot be miss-presented for personal advantage (Rawat, 2021). Security in NFT projects can be further enhanced in various ways. For instance, crypto wallet providers like D'CENT have recently introduced hardware wallets with built-in fingerprint scanner to avoid the risk of hackers and secure the transactions of NFTs.

Concerning economic values, NFT creators earn a percentage of the sale price each time the NFT is sold on a marketplace as royalties. The percentage amount is recorded in the smart contract as a condition determined by the creator (Gomez, 2021). The creator of the 'Everydays: The First 5000 Days', for example, receives 10% each time the NFT is traded in the marketplace. Royalties, as passive income for digital content creators, increase the value of the digital content. Compared with physical products that, in general, devalue over time, NFTs have the potential to provide the creator with more earnings in the long-run.

Another use-value of NFTs is the possibility to represent people's social status in the online world and sharing emotional value (Locke, 2021). Users of social media, for example, link their profile pictures to NFTs showing their standing in relation to other users within the network (Lu, 2021). Given the non-fungibility of NFTs, they are used as unique virtual identities registered in a blockchain so that no one else is able to claim the same identity in the virtual world (Clark, 2021). A person that owns an NFT rarer and more unique than the others, can claim a more important social status within the community (Marques, 2021). Mike Tyson bought the Cool Cats NFT for his Twitter profile picture receiving about 9,000 likes and 1,800 retweets (Sniper, 2021). This use-value is core to NFTs as a "signaling" device in the metaverse. Comparable to a Rolex or Porsche in the real world, NFTs allow signaling in Web 3.0.

NFTs also promote social values as they enable the digital content creators to build and grow their community of users that can be leveraged to ensure the success of future projects and developments (Regner, Urbach & Schweizer, 2019). Taking the game industry as an example, the developers release visualizations of the in-game characters in NFT marketplaces before the launch of the game. For instance, Illuvium.io is an open-world role-playing game to be released in 2022 that is already offering its game character NFTs in the marketplace to help the community expand and receives attention.

NFTs can be used for membership access providing a selected group of users with privilege rights. As an example, after the purchase of NFTs, fans are able to interact with their favorite artists through a direct communication channel. Event organizers can use NFTs for registration and identification of attendees. Another case in point is digital passports issued as NFTs to grant citizenship and access to metaverse-like virtual worlds (MetaNFT, 2021). Also, the freemium model can be adopted using NFTs so that basic services are offered to all users for free while premium features are unlocked only for NFT buyers (Crook, 2021). Official, the fashion producer

(theofficialbrand.com) is an example of using NFTs to grant exclusive access to selected physical products and after-sale services (Meiklejohn, 2021). With the success of its NFT business, the company has developed its own cryptocurrency token, called $OFCL.

Finally, NFTs can be attached to physical products to generate secondary revenue streams. This can be done in two ways. First, the digital NFT is created and used for trading the real-world physical asset (such as a portrait painting) so that all the ownership rights can be transferred to the NFT owner (Li & Kassem, 2021). This method is used by custody service providers where the settlement, safekeeping, and reporting of a valuable physical asset is handled through the use of NFTs attached to the asset. Secondly, the NFT can be treated as a separate commodity that can be priced, bought, and sold independently of the transmission of the ownership of the respective physical asset (Lydiate, 2021). In the latter case, the owner of the NFT can be different from the owner of the respective physical asset whilst the two are assumed to be the same in the former. Finally, if the asset is traded successfully, higher royalties are received leading to a cascaded exchange value.

A case in point is the launch of new products where the corresponding NFTs can be offered beforehand so that the buyers will get a limited number of products before the main launch. If the NFT sale gets a quick sell out, the new physical product is more likely to be successful in the market (Online Retail, 2022). Adidas has launched an NFT project, called 'Into the Metaverse' where NFT buyers will be able to get limited-run new product drops. Studying ratings, likes, and dislikes of each NFT, the company gets to know about most desirable design patters for future products in the real world (Kastrenakes, 2021). This use-value has led to the emergence of physical NFTs referring to physical assets with tokenized ownership (Mitchell, 2021). Thus, the ownership of a physical asset can be transferred through the trading of its respective NFT in an NFT marketplace.

Table 1 provides an overview of NFT use-values with relevant examples from real world applications.

Table 1. NFT use-values

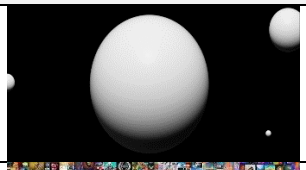
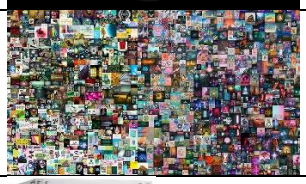
NFT use-values	*Value types*	*Applications*	*Notable examples*	*References*
Certify ownership rights of digital content	Legal and regulatory value	Digital art	Mike Winkelmann, the creator of the Consecutive Days collection	(Nambiampurath, 2021)
Represent people's social status in the online world	Emotional value	Social media	Mike Tyson and Cool Cats NFT	(Sniper, 2021)
Facilitate the trading of digital content with more speed and accuracy	Functional value	Marketplaces	Opensea.io (NFT largest marketplace)	(Howcroft, 2021)
Secure the collecting and trading of digital content	Functional value	Crypto wallet providers	D'CENT (dcentwallet.com)	(Jovanović, 2022)
Provide royalties for trading of digital content	Economic value	Aftermarket trading	Mike Winkelmann receives 10% each time his NFTs are	(Howcroft, 2022)

in the aftermarket			traded in the marketplace.	
Provide membership access to a selected group of users	Functional value	Fashion industry	Official (theofficialbrand.com)	(Meiklejohn, 2021)
Build and grow a virtual community of users	Social value	Gaming industry	Illuvium.io	(Conway, 2022)
Link virtual assets to physical products	Functional and economic value	Launch of new products	Adidas	(Kastrenakes, 2021)

NFTs' Exchange Values

NFT transactions are increasingly growing. According to NonFungible.com, a volume of between 15,000 and 50,000 NFTs are sold per week showing the potential interest of NFTs for investors. What makes NFTs stand out from other assets, apart from their unique use-values, is that they can be exchanged later at a higher value. In Opensea marketplace, the exchange value of an NFT varies from 0.02 ETH (equal to 50 US Dollar) to 5000 ETH (12 million US Dollar) at the time of writing. Table 2 presents a list of NFTs with highest exchange value.

Table 2. NFTs with highest exchange values

NFTs with highest exchange value	*NFT image*	*Current exchange value (US Dollar)*	*Trading channel*
'The Merge' by Murat Pak, known as Pak		91.8m	NFT was sold in an open edition via Nifty Gateway (niftygateway.com)
'Everydays: the First 5000 Days' by Mike Winkelmann, known as Beeple		69.3m	NFT was auctioned by Christie's Auction House (christies.com)
'HUMAN ONE' by Beeple		$30m	NFT was auctioned by Christie's Auction House (christies.com)
'CryptoPunk #7523' by Larva Labs Studio, the creator of the CryptoPunks collection		$11.75m	NFT was sold in Opensea marketplace (opensea.io)

The huge difference between the highest and lowest NFT exchange value raises the question of how the exchange value is determined and why some NFTs come at higher prices than others? Several factors determine the exchange value of an NFT. First, the digital content represented by an NFT distinguishes one from the other. Whether it reflects a digital art or piece of writing, the higher the quality and uniqueness of the content, the higher the exchange value would be (Clark, 2021). If the NFT is attached to something unique - a valuable asset in a metaverse (a 3D virtual shared world), for example, its exchange value can increase dramatically provided the metaverse grows (Dailey, 2021). Another example is an NFT attached to a video game character to be launched in the future. The game's popularity and reputation among users increase the chances that the related NFTs will be exchanged at a profitable value (Rawat, 2021). NFT use cases are important in this regard: An NFT that provides access to information about the sophisticated manufacturing process of a certain product, for example, can be exchanged at a higher value than that of a simple jpeg file.

An NFT is also valued based on its creator/owner so that the more famous and well-known the creator/owner, the more expensive the NFT (Locke, 2021). Therefore, an NFT of a creator who has a history of generating and selling highly-priced NFTs is more likely to be valued and supported. Besides, the buyers might value the community supporting the NFT team of creators. The more engagement that the community members expose in online spaces, such as social media, the more likely that the NFT project receives attention and further support (Regner, Urbach & Schweizer, 2019). Table 3 provides an overview of the main factors influencing an NFT exchange value.

Table 3. Factors influencing NFTs' exchange value

Factors	*Effect*	*Notable examples*	*References*
The digital content's quality	The higher the quality of the content, the higher the exchange value would be	'Everydays: the First 5000 Days' NFT represents an artwork that joins 5000 images taken from Day 1 (1 May 2007) to Day 5000 (7 January 2021) into a single digital collage.	(Valeonti *et al.*, 2021)
The digital content's uniqueness and rarity	The more unique and rare the content, the higher the exchange value would be	'CryptoPunk #7523' NFT is the only character in the CryptoPunks collection (containing 10000 NFTs) that wears a face mask, symbolizing the COVID-19 pandemic.	(Hale, 2021)
NFT's attachment to something valuable	If an NFT is attached to something valuable, its exchange value is likely to be high	Axie #1046 NFT that was sold at 300 ETH (currently 1.1 million USD), is attached to an in-game character in Axie Infinity digital game.	(Dailey, 2021)
NFT's creator/owner	The more famous and well-known the creator/owner, the more expensive the NFT	The creator of the 'HUMAN ONE' NFT was well-known for his previous highly-priced NFT artwork.	(Hale, 2021)
The community supporting the NFT's team of creators	The more engagement that the community members expose, the more likely that	Bored Ape Yacht Club project has an active community of users in social media supporting the release of new NFTs	(Boom, 2022)

	the NFTs gain higher exchange value		

NFT ecosystem

With NFTs' unique use-values and innovative exchange value adding mechanisms, many businesses are encouraged to join the NFT ecosystem that includes stakeholders involved in NFT markets and the relationships developed among them (Conte, 2021). An NFT ecosystem evolves around the trading parties, namely creators, owners, buyers, sellers, and speculators of digital assets which interact with each other through intermediaries (Wilson, Karg & Ghaderi, 2021). The creating parties, who directly benefit from NFTs, are active in certain industries and domains namely, gaming, art and music, sports, collectibles, and metaverse (Regner, Urbach & Schweizer, 2019).

Intermediaries include the organizers of marketplaces that determine the rules and regulations of how NFTs are traded, the providers of infrastructure (blockchain-based platforms), the portfolio of cryptocurrencies, and crypto wallet services (Farrier, 2021). Intermediaries, whether technical intermediaries (such as blockchain providers), or business intermediaries (such as marketplace organizers) determine the conditions under which the main parties can trade NFTs (Regner, Urbach & Schweizer, 2019). For example, NFT marketplace providers regulate the trading terms and conditions under blockchain-based smart contracts to ensure security in value exchange and enhance transparency in transactions (Arora, Kumar & others, 2022). Another intermediary group is the providers of additional services. For example, those who release news and updates on NFT markets supported by analytics and AI technologies (Rodriguez, 2021).

The trading group consisting of creators, buyers, speculators, and the community interact with each other within NFT marketplaces. The community, in particular grows through online presence of users in social media consistent data sharing and inter-user communications. The trading mechanisms however are generated solely by utilizing cryptocurrencies, which are enabled by blockchain technology. Thus, the NFT ecosystem is permeated by blockchain technology and new members, such as crypto wallet generators can join the network providing added-value services to the existing members of the ecosystem. A mapping of NFT ecosystem is presented Figure 2. A clear understanding of the ecosystem helps the newcomers to detect promising opportunities and better decide on entry strategies (Heine, 2020).

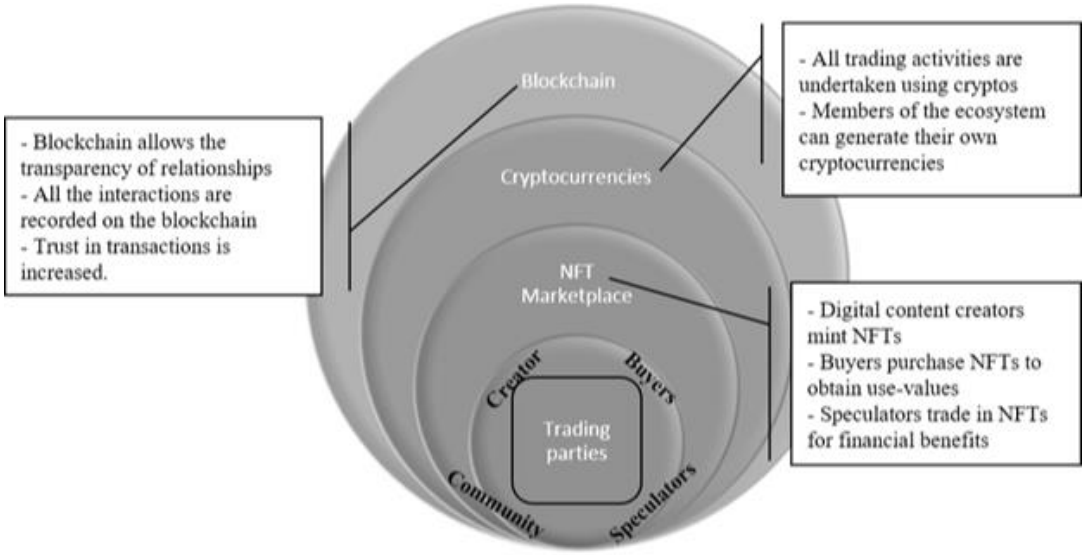


Figure 2. NFT ecosystem including the involved parties and relationship levels

Cascading Business Models

NFTs' unique use-values, their innovative exchange value adding mechanisms, and dynamic ecosystem of involved parties put forward a new type of business model that allows the companies to change the attached exchange value of their offerings at a later stage that is cascading value over time. As mentioned earlier, this process depends on certain factors and conditions such as if the NFT receives attention or the creator gains reputation. It also depends on the size and development of the community.

To illustrate how NFTs allow a new type of business model, we build on Baden-Fuller et al. (2017)'s business model typology as it places a particular focus on provider-consumer relationships beyond the boundaries between the firm and its customers, which makes it ideal to explain NFT business models. Rather than hierarchical upside-down structures, the demand-side and supply-side input-output models are analyzed in the typology to explain how business models differ in the ways the provider interacts with the consumer.

According to Baden-Fuller et al. (2017), there are four important and mutually exclusive types of business models, namely dyadic product, dyadic solutions, triadic matchmaking, and triadic multisided business models. The first pair of business models (dyadic) involves two actors, namely provider, and consumer. The dyadic product business model reflects the traditional seller-buyer scenario where the two actors have limited interaction; the producer supplies the product in the market and the consumer obtains use-values after purchase. The dyadic solution business model includes more active participation of customers within the product development processes. The consumer, here, rather than consuming separately, co-creates value to help the company come up with a solution (Baden-Fuller et al., 2017). The second pair of business models (triadic) puts third parties into the equation. The triadic matchmaking business model centers around matchmakers (i.e., brokerage firms) that create value by reducing consumers' search efforts and increasing producers' market access. The triadic multi-sided business model involves a focal firm that establishes complementarities among multiple unconnected customer groups, namely consumer beneficiaries, and paying-customers. Consumer beneficiaries receive value by using a product or

service that is free or subsidized by the paying-customers and, in turn, the paying-customers benefit from the consumer beneficiaries using the product or service (Baden-Fuller et al., 2017).

Given the possibilities that NFTs offer to cascade value over time, NFT-based business models do not fit into the existing typologies. This new type of business model, which we coin the "Cascading Business Model" enables the firms to expand their value creation and capture scope as the value exchange of their offerings can increase over time. Attaching NFTs to physical products or services, new use-values are generated in the virtual world. Customers can use NFTs to claim ownership of the purchased products or as their virtual identity in social media. Alternatively, the purchased NFT can be treated as an investment asset to be traded later at a higher value. Each trading activity afterward adds value to the creator of the NFT (i.e., the firm) as earning royalties are received. Thus, NFTs provide businesses with a potential source of value that cascades over time if conditions are met. Figure 3 below illustrates the value cascading process in NFT-based business models. As can be seen in the figure, the cascaded value is determined by several key factors. If the NFT and its creator attract attention, if the community behind the NFT expands, and if the asset performs well in the market leading to higher royalties, the exchange value cascades more rapidly.

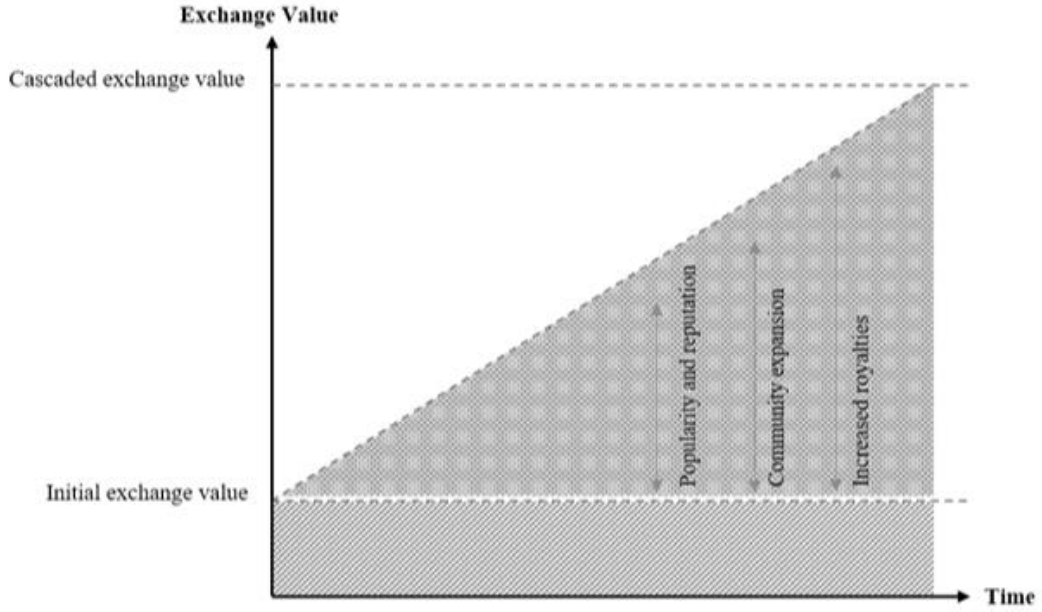


Figure 3. Cascading Value in NFT-based Business Models

The main actors involved in the Cascading Business Model, namely the provider (company), consumers, technical intermediaries, and business intermediaries do not fit into dyadic or triadic business models. Here, the relationship between the provider and its customers is different from that in dyadic models in the sense that the cascaded value (of NFTs) depends on value co-creation activities of both the provider (NFT creator) and customers (NFT buyers). Therefore, unlike the dyadic product business model, customers play a key role in the company's value capture potential. In addition, the interaction between the company and its customers continues to grow after the purchase of the offering (due to the nature of the offering, that is a blockchain-enabled digital asset) different from the dyadic solution business model. Concerning the triadic business models, the multiple groups of intermediaries involved in Cascading Business Models do more than just connect

consumers with suppliers that are the case in triadic matchmaking business models. Moreover, the interactions among different groups of intermediaries in Cascading Business Models (marketplace organizer, infrastructure provider, cryptocurrency suppliers, and crypto wallet services) are more dynamic than the relationship between consumer beneficiaries and paying-customers in triadic multisided business models.

The Cascading Business Model offers different kinds of use and exchange values to the company and its customers than the existing business models. The incorporation of blockchain technologies into customer relationship management leads to major cost savings due to decreased paperwork. Moreover, the increased accuracy and transparency enabled by smart contracts attract more customers into purchasing the company's offerings. No other business model can make consumers as endogenous to the firm as the Cascading Business Model does thanks to specific mechanisms designed for earning royalties. This new type of business model provides the firm and its customers with mutually valuable selling advantages as the market success of a company's offerings adds value to all customers as well. Hence, both the provider and its customers benefit from a profitable sale simultaneously. Under the Cascading Business Model, firms have the chance to develop value propositions characterized with the potential to gain added value over time. This business model also enables the firms' ability to build and nurture virtual communities of users that co-create value within metaverse environments.

Another unique feature of the Cascading Business Model is the possibility to authenticate and authorize access to certain privileges for customers. Unlike the other types of business models where the access is granted via membership plans, the value proposition here is a non-fungible, highly liquid asset holding greater use-value than existing membership schemes. The granted asset in Cascading Business Model can be traded later so that the premium rights can be transferred to the new owner. The current membership plans however are limited to only providing access to basic versions of products or services for free and charge for premium versions with additional functionalities or advanced features (the freemium model). Besides, the membership enrollments come with certain expiry dates whereas the NFT-based asset will be stored in the blockchain permanently.

With existing business models, there is only a limited potential for value capture while the Cascading Business Model opens the possibility to achieve greater value from the same offering over time. This new type of business model provides customers with the opportunity to co-create cascaded value with the company. Thus, there is no clear-cut boundary between the company and its customers as in the case of dyadic or triadic business models. Having the blockchain technology onboard, there are no hierarchies, but rather decentralized systems that promote free flows of information within transparent digital ecosystems.

Based on the above, we present a comparison of the Cascading Business Model with existing dyadic and triadic business model types in Table 4 below.

Table 4. Cascading Business Model Compared with Existing Business Model Types

	Dyadic business models	*Triadic business models*	*Cascading Business Model*
Ecosystem members	Company and customers	Company, customers, and third-parties (matchmakers,	Company, customers, and intermediaries (technical and business)

		customer beneficiaries, and paying-customers)	
Use-values	Consumers obtain value during (with the help of provider) and after the purchase	Consumers obtain value with the help of third-parties	Consumers obtain value by gaining access to specific resources and services
Exchange value	Exchange value does not cascade over time	Exchange value does not cascade over time	Exchange value cascades over time
Value creation	Develop products or services to meet consumer needs	Connect consumers with providers and other ecosystem members	Integrate NFT and block-chain technology into business operations and processes
Value capture	The sale of products or services	Charge commission for facilitating the interaction among ecosystem members	- The sale and trade of digital assets - Earning royalties

Practical Applications

As suggested in this study, NFTs open up promising opportunities for businesses to capture cascaded value from their offerings. In this section, we present two examples to illustrate how value cascades under this new business model. The first example shows a typical application of NFTs in the gaming space where video game companies are investing heavily in NFT-centric games. In NFT games, in-game items such as characters, player avatars, outfits, and weapons are tokenized into NFTs, and players (as NFT owners) can trade them in NFT marketplaces. NFT games have gained wide popularity among players due to their play-to-earn promise allowing users to actually earn money by playing games. Axie Infinity developed by Sky Mavis Studio is a notable example of NFT-based games that is regarded by many as a revolutionized version of Pokémon. The game is inspired by the CryptoKitties game that was one of the earliest projects to take advantage of blockchain technology in the gaming industry. Axie Infinity however offers more entertainment and earning opportunities. Players begin with buying, raising, and even breeding 'Axies' (digital characters resembling Pokémons) and then battle with other players using their army of Axies. The winner of a battle receives SLP cryptos but higher earnings are obtained by trading Axies (as NFTs) in NFT marketplaces. This business model paves the way for game studios to attract more players and capitalize on their engagement to cascade the exchange value of their own cryptocurrency tokens as the game receives popularity and interest among communities of video game players.

The second example illustrates the application of NFTs in the wine industry. The case of NFT wine brands is of particular relevance as it demonstrates how NFTs are increasingly extending beyond digital art, gaming, or music domains. In 2021, the wine marketplace platform, Vinsent (wineries.vinsent.wine) partnered with HelloFam (hellofam.wine), the first NFT Wine Club to combine collectible grape illustrations as NFTs with physical wine collections in the real world. As the first project, the Hello Fam Genesis Vintage 2021 wine collection to be released in Spring 2022 has been tokenized with unique NFTs from HelloFam. As such, the buyer of one HelloFam NFT will receive a 6-bottle case of Genesis Vintage upon release. The project began with a great success of selling 250 wine cases over the first release day of respective NFTs in august 2021 (DeSimone & Jenssen, 2021). Under this business model, customers receive the physical wine after buying the attached NFT. As can be seen in Figure 4, each wine collection is recognized with a unique NFT

registered on a blockchain and the exchange value of the same collection can be cascaded later in sync with the NFT cascaded value. This hints at immense opportunities that NFTs provide to businesses allowing the ability to cascade the physical offerings' exchange value over time.

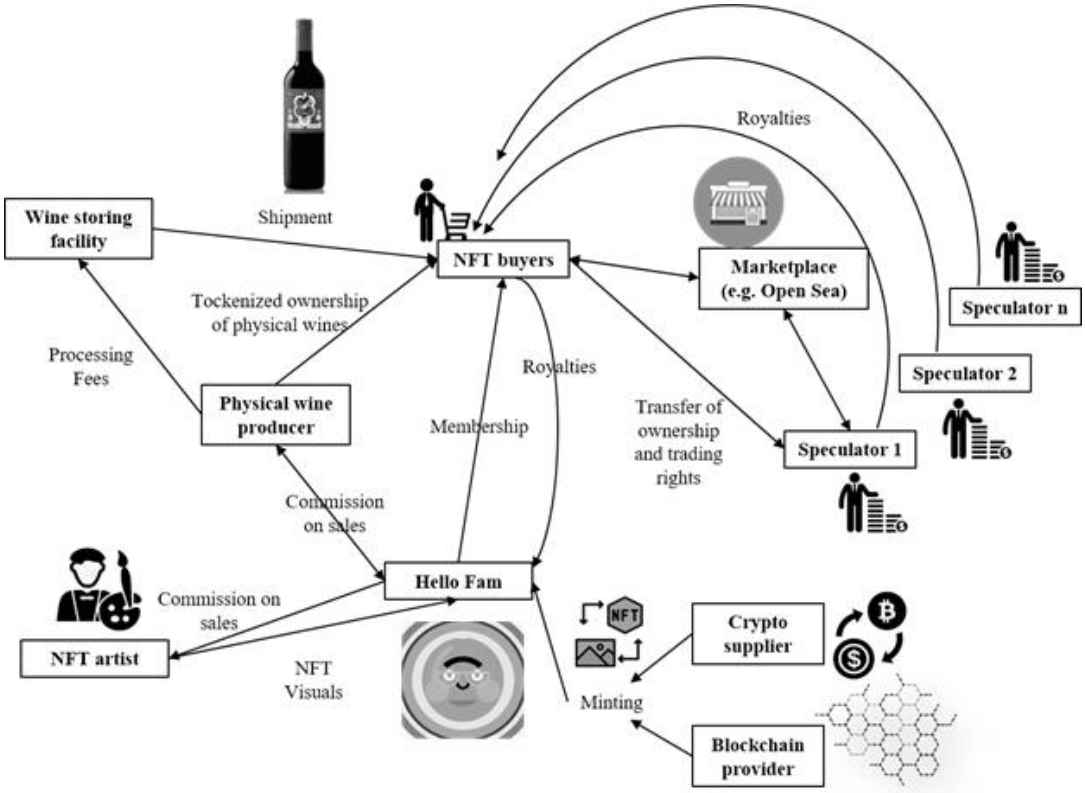


Figure 4. HelloFam Business Model Representation

Discussion and Conclusion

This paper sets out to explore how NFTs are shaping the future of businesses with unique value creation and capture mechanisms. Analyzing theoretical contributions and learning from real-world examples, we arrived at a new business model type, called the Cascading Business Model. We argue that blockchain-enabled NFTs are a potential source of value that cascades over time if conditions are met. The analysis of NFTs' unique use-values, as well as the factors determining their exchange value, led us to argue that the Cascading Business Model differs from existing business model types. We explored the NFT ecosystem identifying the involved parties and their relationships to explore how value is created and captured in the Cascading Business Model.

Our study contributes to the business model literature (Massa, Tucci & Afuah, 2017; Zott, Amit & Massa, 2011; Osterwalder & Pigneur, 2010) by exploring the context of NFTs. We extend the existing business model types (Baden-Fuller et al., 2017) by introducing the Cascading Business Model which provides new dispersed ways of value creation and capture compared to existing business model perspectives that view value and the firms as a 'whole' (Bowman & Ambrosini, 2000). Our affirmations accelerate future research on NFTs within the business/ management discipline. We find NFTs as one-of-a-kind digital assets that can be further realized in strategic management perspectives such as the Resource-Based View. The unique features of NFTs make them a key source of competitive advantage not only because their exchange value can be cascaded

over time, but also they enable imitable, and non-substitutable value creation mechanisms thanks to blockchain technology (Arora, Kumar & others, 2022; Wang et al., 2021; Wilson, Karg & Ghaderi, 2021; Valeonti et al., 2021). Revenue enhancement opportunities provided by NFTs extend the current business model theories beyond the traditional focus on physical value propositions. Additionally, the unique characteristics of NFT ecosystems demonstrate new directions for the development of the Stakeholder Theory where decentralized governance and control structures influence the interconnected relationships between a business and its stakeholders from customers and communities to suppliers and investors (Donaldson & Preston, 1995). The concept of NFTs relates closely to the basic argument of the Stakeholder Theory that a firm should create value for all stakeholders, not just shareholders (Freeman et al., 2010).

Finally, we end the paper by proposing several future research directions. The Cascading Business Model can be further conceptualized and operationalized exploring the constituent building blocks and underlying interdependences. Future research can explore different configuration patterns of the Cascading Business Model elements and how they influence business performance. More research needs to be undertaken to explore the ways NFT-based business models differ from blockchain-based ones and the role of blockchain technologies in the design and implementation of NFT-based business models. Viewing this new business model as an organizational process, future research can look into antecedents as well as consequences of the transition towards NFT business models. How NFTs can trigger new business models in different industries like fashion or real estate remains a topic of research interest. Further, how NFTs and blockchain technology can contribute to sustainable development in social and environmental aspects? How governments and public authorities can benefit from NFTs?

New types of organizations derived from the transition to blockchain-based NFTs can be studied. Decentralized autonomous organizations (DAOs) represent one such organizational form typified by the use of cryptocurrencies, blockchain technology, and NFTs. DAOs operate by a group of stakeholders with no pre-specified hierarchy. The rules of governance are encoded in smart contracts that are stored in a blockchain available to all. This eliminates the need for a central leadership and encourages the stakeholders to participate in the ecosystem more proactively. DAOs challenge traditional views of business management systems such as leadership style, organizational structure, and culture. Here, instead of a board of managers who make the decisions, users interact with each other to define the rules and regulations that determine the future directions of the organization. How this new form of organization shapes the future of businesses remains a question of lively debate.

The study also helps practitioners make sense of NFT-based business models and highlights potential value capture opportunities for different parties involved in NFT ecosystems. The identified use-values of NFTs provide managers with insight into effective sensing of customers' needs. Our affirmations based on real-world examples hint at practical ideas for proactively interacting with customers and engaging them in new product/service development processes. We also highlighted that businesses need to be aware of factors influencing NFTs' exchange value minimizing the risks and barriers of the transition towards this new business model.

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Assessing the impact of patenting activity on business model innovation: the case of the bike industry

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Abstract

The study examines the impact of patenting activity on business model innovation (BMI) from an international perspective. By considering the specific case of the bike industry under a patent-based analysis, the work preliminary contributes to the literature on BMs and their incremental innovation in the R&D management field.

Keywords

Business model innovation, patent-based innovation, R&D management, incremental innovation, bike industry

Main text

1. Introduction

In the past twenty years, business models innovation (BMI) has been a prominent topic in business sciences (Zott et al., 2011; Velu and Jacob, 2016; Wirtz and Daiser, 2018). Within this field, R&D investments and strategies have often emerged as crucial issues, including the roles of Open Innovation and the management of IP. In particular, a long tradition exists in investigating the impact of patents on firms' innovation (Verhoeven et al., 2016; Gans et al., 2017), with specific emphasis on those that operate in an international perspective (Picci, 2010; Alkemade et al., 2015; Fabrizio et al., 2017). Consequently, abundant research regards the definition of the boundaries of what can be defined as a patent-based advantage that is firm-specific, relatively non-tradable, and

capable to reshape a firm's business model generating value over time (Chih-Yi and Bou-Wen, 2021; Harrigan et al., 2017, Markman et al., 2004; Wei et al., 2018).

With regard to what determines an impact on BMI, scholars have analysed several determinants, such as strategic alliances (Chesbrough and Schwartz, 2007; Ritala and Sainio, 2014; Velu, 2015), organizational structures, and culture (Bocken and Geradts, 2020; Hock et al. (2016); Latilla et al., 2021), resources (Bicen and Johnson, 2015; Halme and Korpela, 2014; Mezger, 2014), sustainability (Evans et al., 2017; Hall and Wagner, 2012; Linder and Williander, 2017), and digitalization (Rachinger et al., 2018; Soluk et al., 2021; Tesch and Brillinger, 2017). However, relatively low attention has been paid to the role that patents and IP protection may play in BMI (Slowak and Regenfelder, 2017; Yun et al., 2016; Feng et al., 2021; Holgersson and Granstrand, 2021).

The aim of this work is therefore to provide a contribution to this field. More precisely, as suggested by Wirtz and Daiser (2018), in order to directly address this issue through an exploratory approach and an industry-based case study, we decided to consider the role of patenting activities in BMI for a single industry: i.e., the bike industry. We decided to choose this particular industry because of a number of distinctive characteristics.

First, the bike industry is an extremely consolidated industry, in the sense that it cannot be considered new, but is characterised by intense activity in terms of trademark, design, and patenting (EUIPO, 2019). As a matter of fact, it has been always distinguished by a vivid patenting activity and a strong patent-based international competition from its inception (WIPO, 2021). Second, in recent times, the topic of innovation in the bike industry and BMI have received increasing interest in the academic world, despite being still relatively unexplored (Gao and Li, 2020; Zhao et al., 2020; Turon and Kubik, 2021; Han et al., 2022). Third, the industry has always been characterized by an assiduous innovation purpose, facing new technological trajectories according to the shifting of the technology paradigm under a disruptive and incremental perspective (Ruan et al., 2014; Yun et al., 2021).

Within this framework, our work will try to answer the following research question: *what is the impact of patenting activities on business model innovation in the bike industry, at the international level?*

2. Methodology

According to the framework proposed by Yu et al. (2016) for patent-based industry analysis, we decided to use patent data to discuss BMI and deal with the research question. In particular, we built a dataset, related to the 2002-2020 period, from the Orbit Intelligence database, which combines different data sources. Obtained data belong to IPC classes and sub-classes referring to the bicycle industry, namely B62-H, B62-J, B62-K, B62-L, B62-M, using the keywords "bike*" and "bicycle*" to refine the results. The search algorithm has been defined as follows:

((bike) or (bicycle*))/TI/AB/CLMS/DESC/ODES/OBJ/ADB/ICLM AND (B62H or B62J or B62K or B62L or B62M)/IPC AND (PDA >= 2001)*

We obtained more than 56.000 patents granted in more than 60 countries. We built a data-based count of patent applications for every country we considered, considering for each sub-classes the following variable: number of patent grants, patent applicant name, patent applicant origin country.

According to Katila (2000), there is no one commonly accepted way to measure innovation through patents. However, together with a preliminary analysis on the patenting activities by year, both aggregated and by subclasses, and the analysis of the patent families by players, we considered the citation of patent counts in order to get a measure of the qualitative differences in innovation within the bike industry on an international basis (Albert et al., 1991). Within this framework, if patents belonging to a certain class are cited by other subsequent patents, it means that the innovative purpose of that patent has an impact on subsequent developmental efforts (Trajtenberg, 1990).

3. Results

Starting from a preliminary analysis of the descriptive statistics, we can observe how in the bike industry the number of patents granted in the period 2002-2020 has grown. We moved from an annual average of 1.500 patents granted in the first years of the century to a peak of more than 5.100 patents granted in 2017. Only in recent times the bike industry experienced a contraction. This is a trend which is not in line with the general course of the whole patenting activity on a global basis. In fact, after a contraction in 2019, all over the world, IP protection efforts increased in 2020, pushed by the great Asian economies (WIPO, 2021).

As we can see in Figure 1, the most active countries in terms of patenting activities in the byke industry are China, with more than 11.600 patents granted between 2001 and 2020, followed by the US (6.150), Germany (5.602), Japan (4.659), and Taiwan (4.525). While in the case of the US and Germany, the number of patents has remained stable over the years, there was a relevant growth in China, with a peak of 3.591 patents granted in 2017. This first analysis helps us do define the dimensions and trends of the international competition in a globalized market.

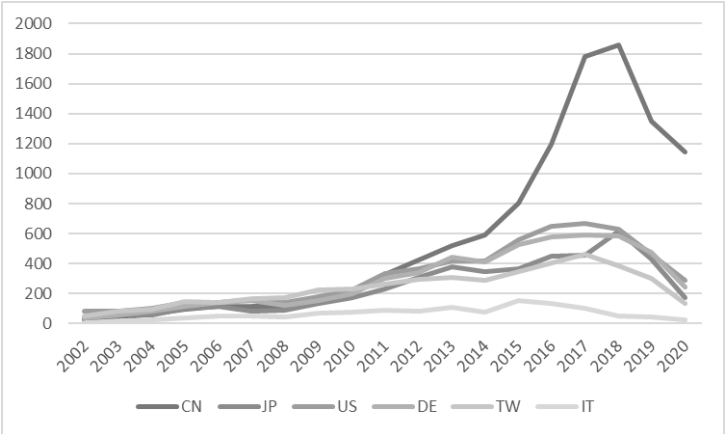

FIGURE 1: BIKE INDUSTRY (2002-2020) – INTERNATIONAL TREND, PATENTS GRANTED BY COUNTRY.

According to the classification proposed in WIPO (2021), we also analysed the IPC subclasses with a stronger propensity to patenting activity. As we can observe in Figure 2, it emerged that the sub-classes with the higher level of patents granted is B62K, which is related to cycles, frames, and similar, with more than 28% of the inventions protected on the total amount considered. Within this IPC sub-class, we found a particular innovating propensity for foldable bikes, frames, and steering devices. Another dynamic sub-class is the one of cycle saddles or seats and related accessories (B62J). Relevant levels of innovation may be found for saddles and their single components (frames, seat posts, hulls), with particular interest for their synergic interactions.

Furthermore, we observed particular relevance for lighting devices as much as complementary accessories for the support of smartphones, maps, water bottles, etc.

In terms of patenting activities, similar outputs may be found in sub-class B62M, where we find electric and pedal-assisted bikes, as much as their batteries, actuators, and transmission systems specially adapted for such cycles. It is interesting to observe how these different trends have changed over time according to the need of the market and the expansion of sub-sectors. It clearly emerges that a key aspect in patenting activities for the bike industry is the diversification and the complementarity around the standard bike frames.

In conclusion, we can consider also sub-class B62H for the 10% of the patents granted and B62L for 5%. The first sub-field includes all those inventions related to the supporting devices as much as the appliance to prevent the theft of bikes. On the other hand, the second sub-field encompasses brakes and braking mechanisms or systems.

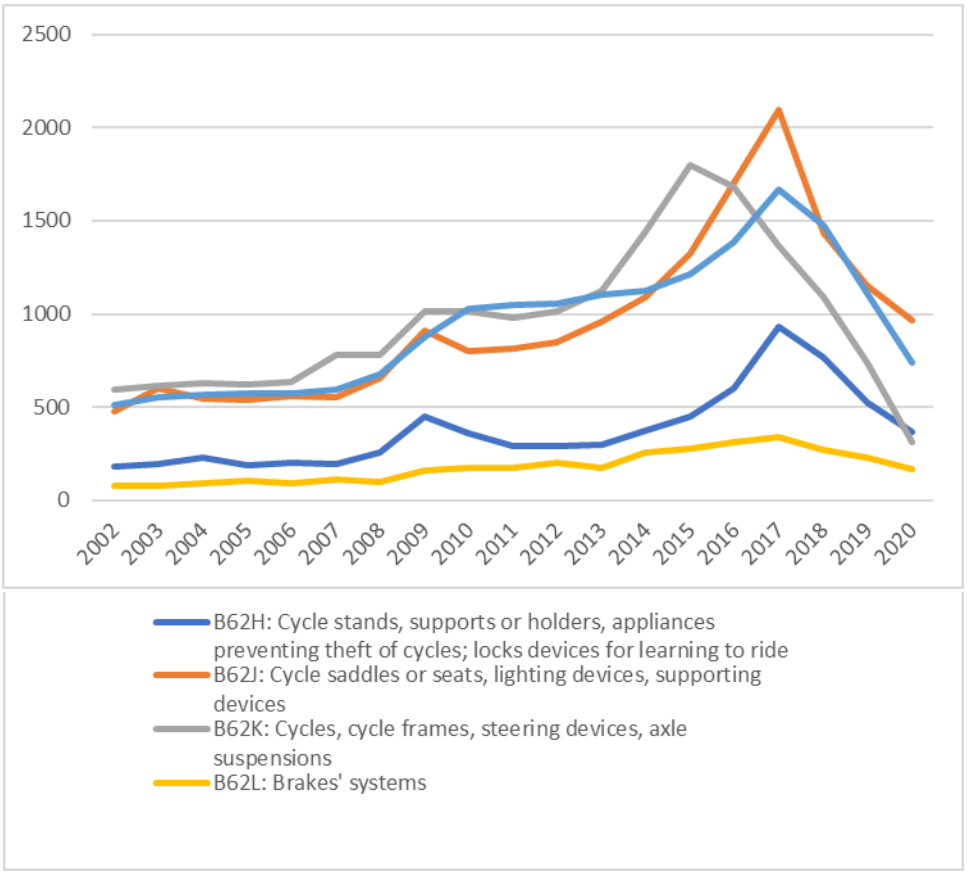

Figure 1: Bike industry (2002-2020) – Patents granted by IPC B62 Sub-classes

Considering the more active firms in terms of patenting activities on a global basis, we can see that the 10 top players own 13% of the overall patents granted in the industry. According to data provided in Figure 3, the most active firm is Shimano, with 2.261 patents granted in the bike industry in the past 20 years, and with a portfolio of more than 7.000 patents. Shimano is followed by Honda Motor (with 1.287 patents granted), Yamaha Motor (574), and Bosch (493). These elements assume particular relevance for our research because within the bike industry we see not only well-known names but also great multinationals that operate in the sector of components and vehicle productions. By looking at their IP portfolio, we can observe that those patents are mainly

linked to the e-bike's sub-sector. In fact, they consider not only traditional fields of application but also batteries, electric motors, and advanced sensors.

Within this framework, the main competitors of Shimano are SRAM (US) with 377 patents granted, and Campagnolo (IT) with 290. The two companies are both producers of bicycles' components that in order to deal with the market need for innovation narrowed the typology of patents granted over the year, specializing themselves in specific sub-sectors of the bike industry. SRAM has readapted its R&D efforts to produce mountain bike components, while Campagnolo specialized in racing bike components. This is a common trend that we observed in several companies all over the world. The international competition in the sector has led the companies to readapt their business models through innovation, specializing themselves in a particular sub-sector of the bike industry.

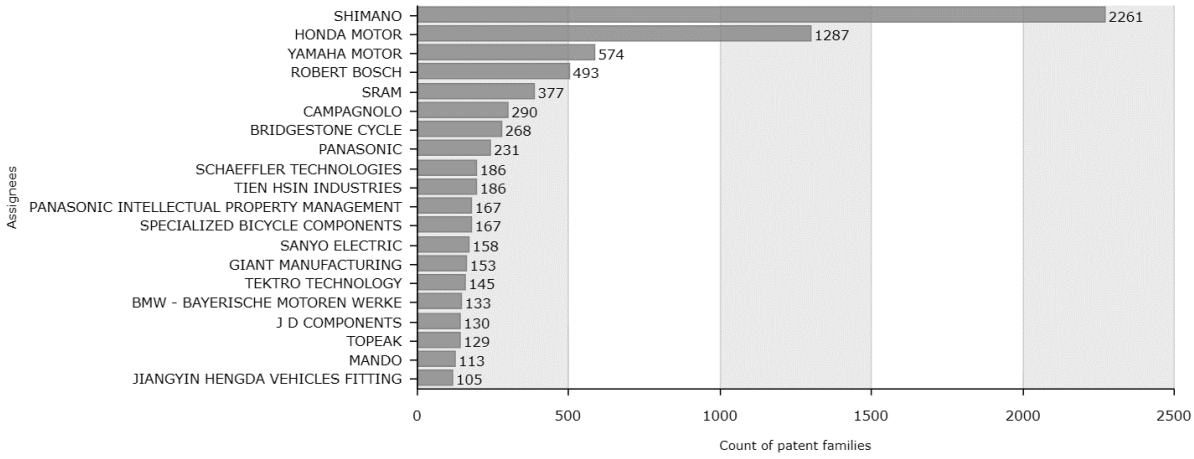

FIGURE 3: BIKE INDUSTRY (2002-2020) – PATENTS GRANTED BY COUNTRY ON THE GLOBAL MARKET

Starting from this preliminary analysis, we will move to focus on a patent citation analysis in order to better deal with the research question. To understand how firms innovate their BMs with patents, we preliminary set up a citation-weighted patent count to distinguish between the different players in the bike industry. As we can see in Figure 4, a strong network emerges among the firms with a high patenting propensity that we discussed in the previous paragraphs and smaller firms that actively cites their inventions in subsequent patents.

On a preliminary focus, there are three may aspects that can be underlined from Figure 4. First, these citations revealed that patenting activities play a key role in the development of subsequent innovations in the bike industry (Han et al., 2020). Second, the patenting activities are not determined only by self-citations but also by cross-citations. In particular, it emerged a high self-citation focus when it comes to considering big industrial players (e.g., Shimano, SRAM, Campagnolo), while it emerges a higher cross-citation focus when we consider smaller firms (Karvonen and Kässi, 2011). Third, according to Wu et al. (2006), we can assume that a similar codified knowledge flow of patent citation goes hand-in-hand with more tacit aspects of knowledge flows, related to a more diffuse interconnection and path-dependency among the assets and the knowledge of the firms.

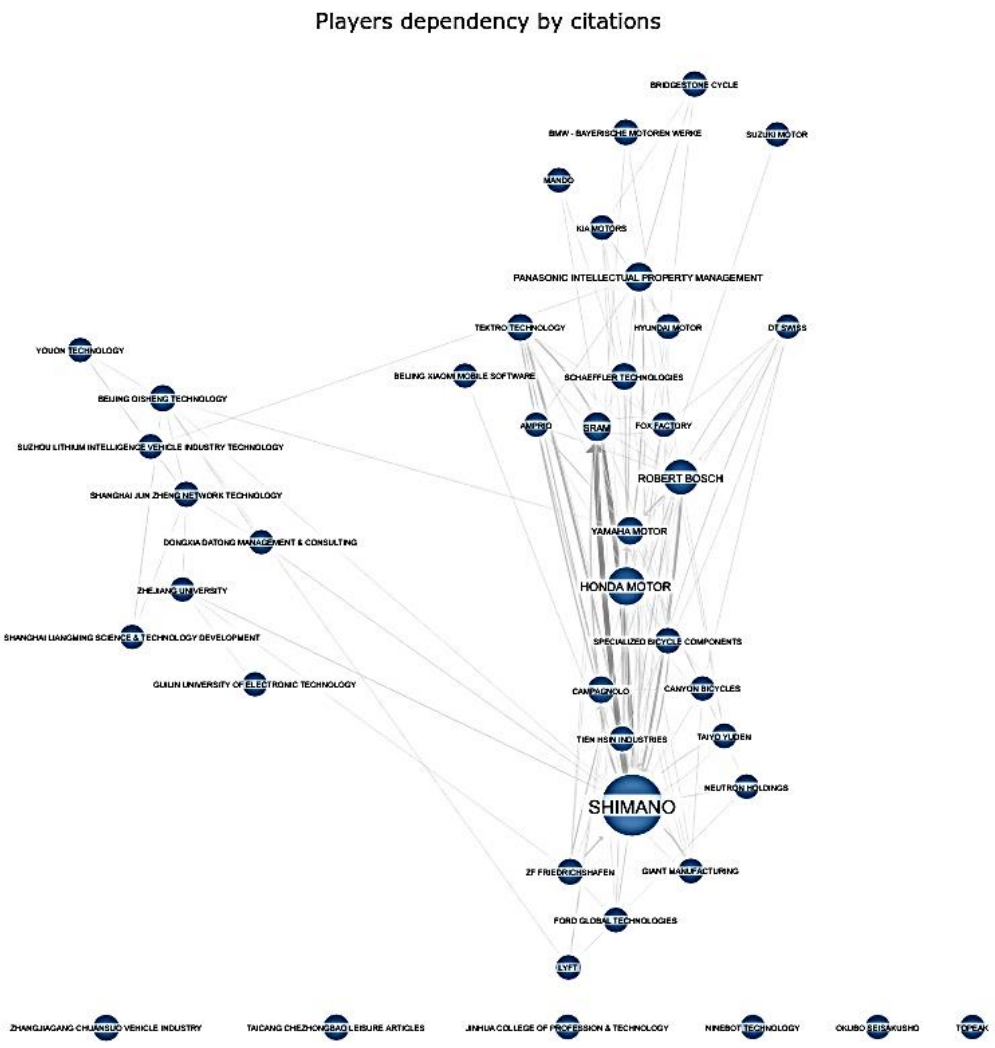

FIGURE 4: BIKE INDUSTRY (2002-2020) – PATENTS' DEPENDENCY BY CITATIONS.

If we consider the bike industry and the patents' dependency among its different players, we can observe what Mitchell (1989) and Katila (2000) defined as a patent-based incremental improvement in which the market leadership is determined by continuous technological innovation and a transition to traditional business models to implemented ones. This perspective directely link the changes in the bike industry to the theory of incremental innovation developed by Ettlie et al. (1984) and to the way in which it shapes the business model theory (Souto, 2015; Tang et al., 2016; Han et al., 2020, Benzidia et al., 2021).

Even if the research process is not concluded yet, there are still some preliminary conclusions that may be underlined.

4. Preliminary conclusions

The preliminary stages of the patent-based analysis on the bike industry led to a few insights to preliminarily address the research question. First of all, with regard to patented inventions, it seems that firms readapted their business model in order to address market trends and to cope with the international competition (Bashir and Verma, 2016; Velu and Jacob, 2016; Wirtz and Daiser, 2018).

In this process, a key role seems to be played by innovation, measured by the patenting activities, the patenting trends, and the patent's cross dependency by citations (Albert et al., 1991; Yu et al., (2016); Trajtenberg, 1990). Within this framework, we observed that patents, and therefore innovation, have an impact on the BM of the firms in the bike industry. In fact, they are able to incrementally transform an industry over time on an international basis, leading firms to change their BM, to deal with new sectors through R&D management, and to incrementally innovate and specialize themselves in specific sub-fields with distinctive patents always more cross-dependent in an international framework. This preliminary investigation will be enriched with further insights from patent citation's analysis in terms of the relationship between the different innovating drives of the firms. An avenue for future research may be related to integrating the analysis with multiple case studies from the bike sector to empirically investigate the impact on BMI.

The work also aims to contribute to the literature on BMI in an international context and R&D Management by combining these two different approaches under the lens of investigation of patents to assess the level of competitive advantage in the firms in the bike industry (Wirtz and Daiser, 2018; Slowak and Regenfelder, 2017; Holgersson and Granstrand, 2021). By integrating these two different frameworks, our research is relevant not only to the academic debate on these topics. In fact, our findings are relevant to business owners and managers with regard to the firm's innovation strategy in the bike industry. A deeper understanding of the relationship between BMI and the patents' role may contribute to a more effective approach in the R&D management activities of the firms. In addition, also in terms of public policies, important implications emerge. Since patenting activities have an impact on BMI and R&D activities, this work can lead policy makers to implement specific actions in order to stimulate this innovative process.

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How Do *Hot-growth* Start-ups (HGSUs) Survive the Liability of Newness?

A Systematic Review and Conceptual Synthesis

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Extended abstract

Introduction and theoretical background

What factors lead *hot-growth* start-ups to overcome infant mortality? Understanding the reasons behind and the consequences of the survival and failure of new ventures has always attracted the interest of both scholars and practitioners in the management, organisation, and entrepreneurship areas due to the huge impact on economics and society (e.g. Aldrich, 2012; Gudmundsson & Lechner, 2013; Josefy, Sirmon, & Carnes, 2017; Makropoulos, Weir, & Zhang, 2020; Soto-Simeone, Sirén, & Antretter, 2020; Wang, 2012). Indeed, as pointed out by a recent report by Startupgenome (2020), 5 out of 10 start-ups fail by the end of their 5th year (9 out of 10 when considering their entire lifespan); yet, this rate has even been exacerbated due to the current COVID-19 pandemic (Korsgaard *et al.*, 2020).

Over time, the literature has been broadly accepting that the high failure rate for new-born firms can be explained through the *liability of newness* hypothesis, which was advanced by the famous American sociologist Arthur Stinchcombe in 1965. In his seminal view, new organisations are more likely to die than established organisations because they lack experience, coordination, customers, and solid trust relationships. Stinchcombe's assumptions, which have opened a new stream of research in management, organisation, and entrepreneurship, have been largely confirmed by past (e.g. Audretsch and Mahmood, 1995) and more recent studies (e.g. Laursen, Masciarelli, & Reichstein, 2016; Zhang & White, 2016; Yang & Aldrich, 2017), resulting in the (current) focus on how to countervail newness (e.g. Bellavitis, Cumming, & Vanacker, 2020; Ko, Wiklund, & Pollack, 2020).

On this premise, to date it also appears a complementary, but no less important, matter of fact that some *new* entrepreneurial species, i.e. gazelles, Unicorns, and Venture Capital (hereafter VC) backed companies (derived from Aldrich & Ruef, 2018), are significantly challenging the common

perceptions traditionally associated with failure and liabilities for new ventures (e.g. Coad & Srhoj, 2020; Mollick, 2020). Indeed, they suffer less acute failure rates than 'traditional' start-ups, around 75% over their life cycle (NVCA, 2020). However, it is also true that when these hot-growth start-ups (HGSUs) fail, they cause even more dramatic effects due to their severe expansion in the first years (see the cases of Aiwujiwu, Quibi, etc.; CB Insights, 2021).

In other words, hot-growth start-ups seemingly represent a new kind of entrepreneurship paradigm, which is constantly attracting attention (e.g. Belenzon, Chatterji, & Daley, 2020; Bermiss *et al.*, 2017; Forti, Munari, & Zhang, 2020; LiPuma, 2012). At the same time, we argue, a knowledge gap currently exists in understanding what specific characteristics facilitate each of these exceptional entrepreneurial species to overcome the typical challenges displaying Stinchcombe's liability of newness. We have, thus, conjectured this review article as a contribution towards filling this gap.

Methodology

We chose the Systematic Literature Review (SLR) method (Tranfield *et al.*, 2003) to search for, synthesise, and interpret the extant literature regarding newness when Unicorns, gazelles, and VC-backed companies are specifically considered. In particular, we implemented the SLR steps and we arrived at a final sample consisting of 70 publications.

We then delved into our 70-article sample by running two thematic analyses based on the following four-stage procedure: *a)* coding, *b)* categorising, *c)* thematising, and *d)* integrating (Mayan, 2016). The first thematic analysis was aimed at distinguishing the three entrepreneurial species according to their characteristics. In particular, we used a *mixed* approach (e.g. Braun & Clarke, 2006). The initial codebook was composed of those characteristics able to attract the interest of financial analysts in following new ventures, thus increasing their hype and capitalisation: *i)* ownership, *ii)* firm size, *iii)* financial return, and *iv)* lines of business. Instead, the "business model" variable, defined as the "the rationale of how an organisation creates, delivers, and captures value" (Osterwalder & Pigneur, 2010; p. 14), emerged inductively.

Subsequently, to identify the determinants of hot-growth start-ups' survival, we specifically performed a second thematic analysis. In this case, we inductively coded the articles in the sample according to the four main problems highlighted by Stinchcombe (1965) and already detailed in our theoretical background: *i)* lack of experience, *ii)* lack of coordination, *iii)* lack of stable ties; and *iv)* precarious trust relationships. Through analysing new ventures' answers to these four problems, we derived the different determinants of hot-growth start-ups' survival. We detail our results in the following section.

Results and Implications

Hot-growth start-ups may flourish with or without the support of private investors. In this vein, it is worth specifying that the supporting roles of crowdfunding, trade credit, or bank finance are not neglected, but, they did not emerge as the main, consistent, and determinant supportive sources for hot-growth start-ups. According to the proposed framework, Unicorns, for example, seem to be extremely dependent on small rounds of initial investments that are then followed by VCs' main financial support. The difference between Unicorns and VC-backed companies lies in the distinct

inner features that Unicorns possess – i.e. a high-scalable business model based on platform technologies and cross-multichannel selling – which allow a different path. From this study's samples, instead, understanding whether gazelles are also mostly an evolution of VC-backed companies appears more controversial.

From what we have explained above, ventures that remain VC-backed companies, without becoming gazelles or Unicorns, are firms that: *i)* did not have the *genetic code* of the latter two entrepreneurial species; or *ii)* they were embedded in an environment limiting their growth (Wright, Pruthi, & Lockett, 2005). For these reasons, VC-backed companies reach a lower market evaluation than gazelles and Unicorns. In particular, if compared to VC-backed companies, gazelles seem more able to gain the favour of the local environment and receive benefits (Acs & Mueller, 2008). This happens thanks to their inner characteristics (such as heterogeneity in terms of the operating industry), which support the creation of job opportunities and healthy economic conditions (Koski & Pajarinen, 2013; Santoleri, 2020). However, when this virtuous relationship with the environment starts failing, and/or investors no longer sustain the gazelles' growth, the latter risk being *selected out* of the industry; obviously, the same can also happen to companies that lose their VC backing (Jiang et al., 2014).

Of course, the withdrawal of investors does not always coincide with the failure of gazelles and VC-backed companies in the liability of adolescence stage; they can overcome this drama. Gazelles and VC-backed companies could be selected out also because of other reasons, such as founder departure, top management team turnover, lack of professionalisation, cultural change, or the shifting use of cultural and formal controls (DeSantola & Gulati, 2017). In contrast, the presence of investors in covering losses and sustaining the scaling up of firms appears vital for Unicorns (Kuratko et al., 2020; Abatecola et al., 2021).

We believe that future research can also benefit from the recent study by González-Uribe and Reyes (2020). According to their results, the formation of VC-backed companies and Unicorns is eased by the presence of different factors, including: *i)* incubators, *ii)* high education/human capital, *iii)* propensity to innovate, *iv)* scientific development and development of property rights legislation, and *v)* ease of doing business and the entrepreneurial culture within countries (see also Martínez‐Fierro et al., 2020). In practice, hot-growth start-ups are seemingly beneficial for entrepreneurial ecosystems, but, at the same time, need fertile ground to flourish in terms of macroeconomic factors. These, in turn, are directly influenced by their outcomes (Aldrich & Ruef, 2018; Bos & Stam, 2014). Therefore, we argue, adopting a co-evolutionary perspective (e.g. Author, 2020; Cafferata, 2016) to study the phenomenon could support a more fine-tuned explanation of how, on the one hand, hot-growth start-ups can come to light and grow, and how, on the other hand, entrepreneurial ecosystems can thrive (Cumming, Werth, & Zhang, 2019; Stam and van de Ven, 2019).

Keywords

Hot-growth start-ups, Unicorns, Gazelles, liability of newness, review.

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Partnership as glue for *People Planet* and *Profit* in an MNEs market entry strategy: the case of solar energy in Ghana

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Extended abstract

In 2015 the United Nations (hereafter: UN) together committed to achieving the Sustainable Development Goals (hereafter: SDGs) by 2030 (UN, 2015). Multinational enterprises (hereafter: MNEs) as powerful entities should take a leading role in achieving the SDGs since they can easily transcend national boundaries, and their resources often exceed those of nation-states (Dicken, 2007; Hoffman, 2018). But why are MNEs not that eager to pay more attention to the people and planet values, as introduced by Eklington (1997)?

Nowadays, firms mainly focus on their financial performance while mitigating their negative social and environmental influence (Hoffman, 2018; Van Zanten & Van Tulder, 2018). These firms generate acceptable economic returns for their investors and simultaneously create valued societal returns to the local community in which they do business (Hart & Milstein, 2003; London, 2008; London & Hart, 2004). It might be much more valuable for firms to pay attention to the SDGs. By letting the people and planet values play a more prominent role in their market entry strategies, it could result in more stable profit expectations not just in the short term but also in the longer term. Sustainability problems, and thus the SDGs, are complex and systematic, meaning that together they constitute a network of interconnected issues (Le Blanc, 2015; Weitz et al., 2018). The complex and interconnected nature of the SDGs asks for an approach that goes beyond "business as usual" (Scheyvens et al., 2016). Individual sectors are not able to solve these problems by themselves. Therefore, companies should strive to form partnerships with local actors from the public sector and civil society sectors (hereafter: multi-sector partnerships). It is thus not sufficient when firms only focus on profit, people, and planet (3P's) from their own perspective, they should also include local actors. Special attention in these partnerships should be paid to those most in need, the most vulnerable and poorest part of the local communities in which firms operate, the so-called base of the pyramid (Hereafter: BoP) (Manta, 2017; Prahalad & Hammond, 2002). In this paper, we want to investigate how companies together with local partners, can include people, planet, and profit in a more interconnected way. These partnerships, as we will show, are critical for achieving the

SDGs by 2030 and through these partnerships MNEs can broaden their role in sustainable development and play a more active role in achieving the SDGs (Kolk, Van Tulder & Kostwinder, 2008; Reed & Reed, 2009; Seitanidi & Crane, 2009). On top of this, MNEs can contribute to a more stable business environment, which will lead to more stable expectations of the profit value. A company should thus focus on four instead of three performance indicators; profit, people, planet, and partnerships (Hereafter: 4P's).

To achieve the SDGs all around the world by 2030, it is important that these goals are also achieved in developing regions like Africa. Due to a shortage of financial resources, it is complicated to achieve the SDGs on this continent; this makes multi-sector partnerships even more important here. Partnerships are the key to achieving the SDGs in Africa (Hoffman, 2018; Odusola, 2017; Van Zanten & Van Tulder, 2018). To optimize impact, countries and companies should focus on the SDG that has the most impact since not all the SDGs can be integrated all at once. According to Odusola (2017), in the case of Africa, this is SDG 7. The aim of SDG 7 is to ensure access to affordable, reliable, sustainable, and modern energy for all (UN, 2022). Especially in developing countries, access to reliable and affordable energy services is fundamental to reduce poverty, increase access to healthcare, increase productivity, enhance competitiveness, and promote economic growth. The African continent has a great potential for renewable energy (Bugaje, 2006). This paper will use Ghana as a case study for investigating the importance of the fourth P. Ghana has one of the highest electricity costs in Sub-Saharan Africa. Nevertheless, Ghana is a very interesting country for MNEs. The country is centrally located, connected to the ocean, corruption is relatively low, and Ghana ranks relatively high on the ease of doing business index (CPI, 2021; World Bank, 2019). Thus, when MNEs decide to do business in Ghana, they are very likely to choose a renewable energy source since this option is not only more reliable but also cheaper than regular electricity (BloombergNEF, 2019). Currently, only 4% of the generated renewable energy in Ghana is solar energy. However, this form of renewable energy is very suitable to use in a company setting. It can be used on a small scale, and Ghana has sufficient sun hours, on average, 5-8 sun hours a day at 1 kW/m2 (Gyamfi, Modjinou, & Djordjevic, 2015). Therefore, within this paper, the importance of the 4th P will be demonstrated by looking at the usage of solar energy by the private sector in Ghana. Furthermore, the possible implications for a MNEs market entry strategy are investigated.

When a MNE adopts solar technology as an energy source, the energy supply generated will be higher than the demand from time to time. A solution can be designed where the excess capacity can be used to create social and environmental value at the BoP. Through this solution, MNEs can alleviate poverty and improve the social well-being of disadvantaged communities in lower income markets by creating solutions that reduce inequalities and empower the base of the pyramid (Kolk, Rivera-Santos, & Rufín, 2014; Prahalad, 2004; Prahalad & Hammond, 2002). According to Broeksma and Pennink (2021), the local context of the BoP and the involvement of the government with MNEs is different in every country. These local differences can only be understood through multi-sector partnerships. It is thus expected that these solutions are only feasible when MNEs participate in multi-sector partnerships and include the fourth P in their market entry strategy.

The design of such a new business model requires research. Literature will be reviewed, and in total, twelve semi-structured interviews will be conducted. Six interviews with MNEs that are currently doing business in Ghana or plan to do so in the near future. Furthermore, three experts on solar energy and three experts on business development in Ghana will be interviewed. Participants will be chosen through a combination of purposeful sampling and convenience sampling. Each

interview will be transcribed and analyzed afterwards. By combining a literature review with interviewing both MNEs and experts, important insight will come to light, which will lead to the development of a new business model where people, planet and profit are included in a more interconnected way through the participation in local partnerships.

Keywords

SDGs, Solar energy, Partnerships, MNEs, New market entry, Value creation, Base of the pyramid

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Track 2.4 - Resilience and Profitability through Sustainability for Financial Intermediaries, Markets and Corporate Finance

Track chairs: *Claudio Giannotti, Giovanni Ferri, Lucia Gibilaro (LUMSA University)*

The rethinking of the business models to take the opportunities enabled by the information technology and the emerging of ESG considerations played a distinctive role in strengthening the resilience of financial intermediaries during the Covid-19 outbreak and they represent the seeds to raise new paths to both enhance profitability and deliver lasting impacts. Following the sustainability driven change, innovative financial products and services are available to satisfy financial needs and organizational structures, processes and systems are revised coherently.

This track explores the factors affecting the resilience and the innovations caused by the digital and green transition in financial intermediation.

Online invoice trading market- A case study driven by Big Data

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Abstract

Digitalization in the financial industry is changing the banking industry by modifying the business environment and favoring the digital combination between borrowers' demand and lenders' offer. As a consequence, the new players hire human resources with advanced IT and AI skills in order to better manage the credit risk assumed.

Focusing on new technology applications to financial services, the paper analyses the fintech industry and points out the difference in the measurement and management of credit risk with respect to traditional lenders. Based on a case study on a leading fintech company in the invoice discounting market, the paper evaluates the opportunities offered by technology for reducing the probability of default and the loss given default and increasing the percentage of forborne loans and the probability to be cured. Results support the hypothesis that digital transformation is a disruptive innovation that will change the banking operation model and will increase the frequency and the quality of the interactions between the employees of the lender and the borrowers in order to manage credit risk exposures. Thus, it emerges that the new challenges in the financial sector concern also the ethical implications of default monitoring and control in the B2B and financial intermediaries relationship, beyond the availability of workforce upskilled in advanced IT and AI tools.

JEL codes: O33, O32, G23, G21

Keywords

Fintech, digitalization, credit risk, supply chain finance, workforce

1. Introduction

In light of the advance of technology, digitalization is rapidly changing the day to day living style of the people. Similarly, digital transformations have also changed the organization design, hiring process and management of the employees (Raathi Meena and Parimanarali, 2020). Digital

transformation is affecting the changing of the business environment which implies the transformation of the banking employment previously determined mostly by regulatory compliance and technology (Carbo-Valverde, 2017). In the financial services industry, workforce management is considered one of the critical success factors (Chhabra and Thangaraj, 2018); it affects the risk adjusted performance through the probability of loss due to the inability of the financial firm to offer the service correctly because of the insufficient availability of skills required, and the risk of revenues, that is the difference between the realized and the revenues the firm would have accrued if the offering of the financial service would be successfully delivered (Lu, Sharma and Squillante, 2014). In light of the digital transformation, the operational workload of employees can be reduced, favoring the focusing on relationships and the appointment of expert employees to more value added activities (Serengil and Ozpinar, 2017). Nonetheless, the type of human capital affects the impact of digital transformation on financial transactions, pointing out that traditional banks workforce is featured by lower capabilities in information based-services (Carbo Valverde and Fernandez, 2020).

The role of the workforce management is particularly relevant in financial relationships with SMEs suffering of a lack of financing resources available for supporting their business: the organizational choices of the financial intermediary affect the acquisition of information (Stein, 2002) and the cognitive constraints and interpretation biases of the employees can determine the overlooking of some information sources over others (Campbel, Loumioti and Wittenberg-Moerman, 2019). At the same time, following the development of the lending offer through platforms enabled by the digital transformation, the demand of services offered by Fintech is growing due to the ability to select borrowers in a timely manner and to offer convenient pricing conditions with respect to traditional lenders due to higher lender customer interactions and the reduction of human errors enabled by the digital technology (Berg, Fuster, Puri 2021). In some geographic areas, fintech firms became the substantial source of credit for small businesses (Federal Reserve, 2019) and such role has increased during the Covid-19 outbreak through both the direct distribution of loans (U.S. Small Business Administration, 2020) and the distribution of loans by traditional banks on behalf of fintech lenders (Federal Reserve, 2020), with evidence that such expansion in small business lending benefits largely those businesses (Barkley and Schweizer, 2021).

The type of loans offered to small business borrowers are frequently asset based lending financial facilities in which the fintech company may reduce the overall risk exposure by using the asset provided as a collateral to seize in the case of default (Everett, 2014). Among asset based lending solutions for SMEs, invoice discounting represents the most important source of short term financing that, on the basis of the quality and the size of the revenues, may give access to the capital markets without the issuing of securities (Zhang et al. 2016). With an estimated global market of e-invoicing reaching €18 bln by 2025, from € 4.3 bln in 2019, (Billentis, 2019), the evolution of the technology aspect, more specifically the fintech becomes critical in such repetitive transactions lead mostly by regulations. The type of loans offered to small business borrowers are frequently asset based lending financial facilities in which the fintech company may reduce the overall risk exposure by using the asset provided as a collateral to seize in the case of default (Everett, 2014).

Empirical works have shown that fintech investments expose investors to more financial risks compared with no-fintech investments, but have higher value adding (Najaf, Schinckus and

Yoong, 2021). Preliminary empirical evidence points out that fintech loans are frequently facing a higher counterparty risk because the customers that look for their financial services are normally those that are already suffering of financial constrains in the standard lending (OECD, 2015), therefore risk management represents a strategic tool in order to make the proper screening and monitoring of the exposures. The lack of past experience that may characterize the new players in the lending industry is an issue for selecting the best customers, even though artificial intelligence can provide new instruments to overcome such limitations. Available empirical evidence on the performance in borrower selection of humans versus machines shows that a combination of machine-generated credit model and human intervention can improve results relative to the machine-generated credit model (Costello, Down and Mehta, 2020).

Our paper considers the database of Marketfinance, a UK company representing one of the leading players in the fintech industry for the financial services offered to SMEs. (Dorfleitner, Rad and Weber, 2017). Collecting information from the loan book, the empirical analysis will evaluate the degree of forbearance in the credit portfolio, measure the probability of default of the portfolio of customers by considering all the borrowers and the assigned trade debtors with the classification by the size of the exposure, the time horizon of the lending solution and the type of invoice discounting solution. The analysis will measure the probability of default, the probability to be cured and the loss given default. The analysis explores the hypothesis that the ability of the workforce in risk management can be empowered by digital transformation applications, by comparing the credit risk parameters between fintech and traditional financial intermediaries in the UK banking system ones.

Results obtained are useful in order to foster the effectiveness of risk management skills in the industry (Giudici, 2018) and to outline the differences in the role of each risk driver with respect to the expected loss (Stiglitz and Weiss, 1981; Dorfleitner et al., 2016; Wei and Lin, 2016). The comparison of the results achieved with the statistics for the traditional lending market allows to highlight the differences in the risk drivers for new players and to support the thesis about the difference in the target customers that will prefer to use the new type of lenders. More generally, results obtained add insight to credit risk management in the field of trade and supply chain finance, covering the post pandemic timeframe also.

The paper is structured as follows: section 2 discusses about the digital transformation in the banking sector and its implication for the customer relationship lending and the risk management process in a contextual framework, and section 3 presents a case study on a leading player in the UK fintech industry. The case study analysis will consider the balance sheet and the loan book and it will provide evidence in the differences in the risk management drivers with respect to standard lenders in the UK industry.

2. Literature review

Digital transformation is disrupting the financial sector (Boot, Hoffmann, Laeven and Ratnovski, 2021) with mixed effects on the internal processes of financial firms involved in lending:digitalisation of front and back office is part of the business model of fintech firms, while banks show a widespread advancement of the digitalisation mainly in the front office (Fitzgerald, Kruschwitz, Bonnet and Welch, 2013). Automation and centralization allow the focalization of

the workforce in the underwriting process with the facilitation of the capacity adjustment (Serengil and Ozpinar, 2017). Fintech loans are frequently facing a higher counterparty risk because the customers are normally those that are already suffering of financial constrains in the standard lending market and so the portfolio of loans is affected by the adverse selection (OECD, 2015). The application of artificial intelligence enhances risk prediction, particularly in loans to small and medium sized enterprises that can be extended also to high risk vendors because of the better prediction of the loss rate by the internal rating systems compared with the credit bureau ratings (Frost, Gambacorta, Huang, Shin, Zbinden, 2019). As a matter of fact, fintech lenders use non- traditional data and sophisticated applications to select borrowers (Valleè and Zeng, 2019), especially for the provision of credit by large technology firms toward also unbanked borrowers (Bank for International Settlements, 2019). Such advantage is motivated by the better prediction of the default rate due not only to the high granularity of the data covering traditional and platform proprietary data, but also it arises from exploiting the network structure between vendors and customers that better describes the firm characteristics and its environment (Gambacorta, Huang, Li, Qiu and Chen, 2020), particularly for entities in smaller cities (Huang, Zhang, Li, Qiu, Sun, Wang and Berger, 2020).

Nonetheless, available empirical evidence shows that the extension of the information sources and the application of new methodologies is not able to replace completely the soft information that loan officers can develop in the financial relationship with the debtor (Berg, Burg, Gombovic et Puri, 2020). Even though at the moment the disentangling between selecting and monitoring of debtors is not trivial, empirical evidence shows that the empowerment of humans determined by the digital disruption impacts credit risk measures. The customers of digital lending platforms are found to be delinquent at a substantial higher rate and they use new funds obtained to support new expenses (Di Maggio and Yao, 2021), drawing concern that fintech companies finance overleveraged borrowers (Wang and Overbey, 2018) replacing former large and out-the market lenders due to the higher efficiency inprocessing soft information (Balyuk, Berger and Hackney, 2020) and that when interest rates are too high the mitigation of adverse selection is weak (Serrano-Cinca, Gutierrez-Neto and Lopez-Palacios, 2015). It is to underline that the empirical evidences for residential mortgage lending are mixed, because fintech debtors are found creditworthy and similar with respect to traditional banks (Buchack, Matvos, Piskorki and Seru, 2018) and riskier borrowers are associated with lower delinquency rates (Fuster, Plosser, Schnabl and Vickery, 2019). Looking at the workout process of distressed exposures, recovery rates show that personal communication and the interactions with the borrowers allows to obtain a better performance than in fully automated procedures (Laudenbach, Pirschel, Siegel, 2021). Moving to exposures toward small and medium businesses, digital platforms cater to high quality, high profitability and low risk firms (Eça, Ferreira, Prado and Rizzo, 2022). Additionally, during the Covid-19, the reduction of fintech loans toward such entities was mainly driven by supply side effects determined more by the financial constraint channel, while le uncertainty channel appears to play a weaker effect (Ben-David, Johnson and Stulz, 2021).

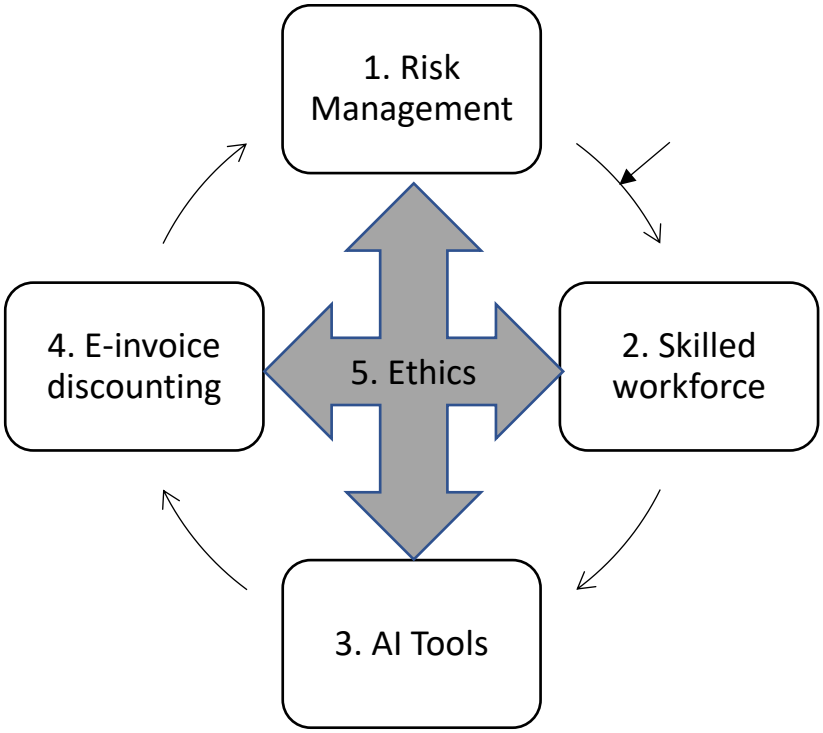
Focusing on online invoice discounting, allowing firms to anticipate the value of trade credits, but also future credits from contracts, licenses, and retailers against the payment of an upfront fee that represents a percentage of the funds obtained, short term probability of default predictions are of existential importance, representing the ability and preparedness of the company/borrower to pay an exact instance in the financial traffic (Leow e Crook, 2014). Through the digital footprints of the borrowers and the retaining of business loans by such platforms

(Claessens, Frost, Turner and Zhu, 2018), the probability of payment of the invoice within a certain period can be obtained by integrating the analysis of the probability of defaults with the analysis of the recurring behavior of the debtors observed during the payment of invoices, distinguishing between individual invoices, counterparties, branches and groups, and evaluating the affinity of the single debtor with respect to them (Perko, 2017). From a methodological point of view, first applications highlight the potential of machine learning techniques for forecasting overdue payments within short-term thresholds supporting an instant lending decision for a modest clear-cut defaulting process (Cohen, Verbeke and Guns, 2021). Finance industry has been utilized already machine learning primarily in credit checking and fraud investigation, while now it is used in loan approval and risk assessment (Goldstein Research, 2017). Moreover, it is not only the robotic process automation leading to workforce cost cut via technology transformation, but also the digitalisation, the optimization of the financial supply chain, the advancement of the blockchain technology, the machine learning based on cognitive robots using learning algorithms, the shift towards cloud and advanced analytics that interfere within the artificial intelligence compound (Billentis, 2019). Frey and Osborne (2013) speculate that due to robotic process automation, by 2035, many jobs in the area of invoice processing will be lost, especially new accounts, clerks, data entry keyers, order clerks, procurement clerks, claims adjusters, examiners and investigators, bookkeeping, accounting clerks, credit authorizers, checkers, billing and posting clerks, surveying and mapping technicians, etc. Such technologies not only reduce human intervention, detect fraud, forecast liquidity, provide dynamic pricing or even produce customer trading partner scoring and customer complaint resolution, but also spur the level of business intelligence and efficiency. Additionally, in B2B networks for the financial supply chain which use big data in e-invoicing market, advanced analytics and cloud based big data grow 4.5 times faster than on-premises solutions. (Billentins, 2019).

Looking at the facility features and the influence on credit risk, the available empirical evidences show that some facility features, namely the interest rate, the duration and the percentage funded have good predictive power of loss events (Dorfleitner, Rad and Weber, 2017). Lastly, economic cycle fluctuations can affect fintech loans as the origination is based on data rather than customer relationships (Financial Stability Board, 2019), even though during the Covid-19 crisis fintech financial services have been disproportionally used in industries and areas severely affected (Erel and Liebersohn, 2020).

If we are to share the interconnecting links in the e-invoicing market, the following diagram may provide some structural answers:

Figure 1. E-Invoice discounting interaction framework.



Source: Authors' elaboration.

Since the outbreak of COVID-19 crisis at planetary level, in a survey study by UNCTAD/DTL/STICT/INF/2020/2 (2020), it seems that this crisis has affected severely the business turnover, employment, the cost structure and the workforce size of many businesses surveyed. For example, about 66% of all respondent businesses saw their costs raising, while 44% of them reported a reduction in their workforce, besides an e-commerce skills inadequate workforce to sustain change in demand, limited enterprise tools and business support services. Despite a necessary rise of the e-commerce worldwide due to COVID-19 for survival and resilience reasons, it emerged that not all types of businesses could adapt, only 18% were expanding their business.

In the E-Invoice discounting interaction framework of Fig. 1. we present under a 5 step interconnection, the benefit in the risk management in readapting the strategy related to a skilled workforce and a reduced e-payment cost, translated into a reduced cost for e-transations and e-invoice discounting (UNCTAD/DTL/STICT/INF/2020/2, (2020), pp.32), as top priorities in each country resilience plan post COVID-19. In order to enhance resilence and recovery plans, e-invoice discounting firms utilised for workforce communication, training yet, also for transaction cost reduction various AI tools that lead to default risk reduction, increase cure rates, while adding efficiency to the value chain process, and provide a more effective risk management, overall.

However, at the same time several serious aspects regarding regulators and policy makers relate to the ethics of utilising future blochchain and other various AI related technologies in improving cost efficiency in e-invoice discounting. For example, Cowton and San-Jose stated: "Delay (or, even worse, default, the possibility of which tends to increase with delay) in paying by customers, especially major ones, can have severe, if not fatal, financial consequences for suppliers, which

in turn has repercussions for their own suppliers and other stakeholders, such as employees." (Cowton and San-Jose 2017, p. 675). From this critical perspective, in Crowe (2020) paper, various ethical matters on trade credit are raised at the essence of invoice financing, among which involve government choices, regulatory sandboxes (live experiments conducted in a controlled environment under a regulator's supervision), and other set of minimum set of ethical standards in fintech and trading. These aspects regard utilizing AI tools in setting up pricing, control and monitoring, default and recovery and conflict resolution.

3. Case study

3.1 Company description

The empirical analysis focuses on Marketfinance, a UK company representing one of the leading players in the fintech industry for the financial services offered to SMEs (Dorfleitner, Rad and Weber, 2017). The platform was founded in 2011, it is headquartered in London, U.K., with 70,633 trades settled, who reached £4bn of cumulative invoices and business loans funded (Marketfinance, 2021) and it is growing over time (Table 1).

Table 1. A comparison of the MarketFinance portfolio with the average UK traditional lenders

	UK market*					MarketFinance		
	Total Loans (mln £)	N°lenders	N° employees	Average loans by lender (mln £)	Average loans per employee	Total loans	N° employees	Average loans per employee
2011	£ 5,021.48	86	1454492	£ 58.39	£ 3,452.39	-	-	-
2012	£ 5,032,34	88	1493568	£ 57,19	£ 3,369.34	£ 45,530.00	-**	-**
2013	£ 5,126,59	137	1428724	£ 37,42	£ 3,588.23	£ 88,787.00	-**	-**
2014	£ 5,140,77	143	1420791	£ 35,95	£ 3,618.24	£ 177,083.00	-**	-**
2015	£ 5,094.31	170	1335923	£ 29,97	£ 3,813.33	£ 276,757.00	62	£ 4,463.82

2016	£ 5,279.55	171	1262425	£ 30,87	£ 4,182.07	£ 469,838.00	89	£ 5,279.08
2017	£ 5,120.78	168	1077715	£ 30,48	£ 4,751.52	£ 569,001.00	77	£ 7,389.62
2018	£ 5,266.92	174	1132086	£ 30,27	£ 4,652.40	£ 740,715.00	80	£ 9,258.94
2019	£ 5,477.65	175	1172971	£ 31,30	£ 4,669.90	£ 31,016,723.00	129	£ 240,439.71
2020	£ 5,659.29	167	1136211	£ 33,89	£ 4,980.85	£ 46,167,917.00	124	£ 372,321.91

Notes:

* The UK market sample considers all the financial institutions in the Bank Focus database provided by Bureau Van Dijk with a fiscal domicile in UK. In the case of institutions that are members of a group only the group balance sheet is considered.

** From 2012 to 2014 MarketFinance was authorized to publish simplified annual reports in which the number of employees is not disclosed.

Source: MarketFinance and Bureau Van Dijk data processed by the authors

Outstanding loans were at the end of the year lower than 50000 £ and they reached more than 46 mln £ at the end of 2020 reaching a size higher than the average of the UK traditional lenders. The number of employees is also grown in the time horizon moving from less than 50 employees during the first three years of activity to 124 in 2020 but thanks to the opportunity offered by the technology the average amount of loan outstanding by each employee is significantly higher than those of other lenders in UK.

Firms are not requested to fund the entire sales ledger, therefore they can subscribe a contract implying the payment of a monthly fee or they can decide to pay each time a percentage of the face value of the invoice. The advantages of the invoice discounting platform, among others are speedy lending, easy interface, real-time support, no hidden costs, flexible terms and strong reputation.

The sample considers the full loan book of Marketfinance over the time period 2011-2021 and descriptive statistics show that the quantitative features of the trades vary inside ample ranges. (Table 2). The growth of the portfolio is costant over the years, out of the 2020 that is coherent with the general sharp decline in fintech lending following the spreading of Covid-19 observed internationally (Dixit, 2021).

Table 2. Vintage and number of loan advances by year

Vintage	Number	Percentage on the totale sample
2011	116	0,16%

2012	590	0,82%
2013	1145	1,60%
2014	2743	3,83%
2015	5819	8,12%
2016	7267	10,14%
2017	7394	10,31%
2018	10294	14,36%
2019	12265	17,11%
2020	11011	15,36%
2021	13046	18,20%

Source: MarketFinance data processed by the authors

For each exposure the platform provides the full loan book with data related to the pricing condition, the contract features and, in the event of default, the losses related to the recovery process. (Table 3).

Table 3. Descriptive statistics

Variable	Mean	Min	Max
Advance Rate (%)	74.79%	0.00%	177.75%
Discount Rate (%)	0.81%	0.18%	3.70%
Annualised Gross Yield (%)	10.69%	2.21%	55.59%
Total Face Value (GBP)	£55,159.93	£ 0	£ 36,792,828.69
Total Gross Advance (GBP)	£35,565.38	£ 0	£ 1,507,253.21
Total Delinquent Outstanding (GBP)	£8099.75	£ 0	£ 523,074.36
Total Crystallized Losses (GBP)	£5899.38	£ 0	£ 488,898.76

Source: MarketFinance data processed by the authors

The average advance rate percentage is around 74.8% and the discount rate may vary from 0.18% up to 3.70%. The cost of borrowing is around 10.7% but for riskier and shorter time horizon loans the interest rate applies may be even higher that 50%. The average face value for loans is quite small and near to 55,000 £ with an average gross advance of more than 35000 £. In the event of default the average amount of exposure at default (around 8100 £) is significantly lower than the average gross advance and the total losses at the end of the recovery process is less than 5900£ with an high variability contract by contract.

3.2 Methodology for credit risk analysis

The analysis of the credit risk management policy is focused on the incidence of the forbearance activity in the portfolio of loans and its effectiveness in reducing the frequency of default and loss given default.

The analysis of the forbearance activity is released by following the EBA guidelines approach (EBA, 2021) as it follows (1):

$$FR_t = \frac{Foreborne_t}{Loans_t} \quad (1)$$

where Forebornet is the number of loans under a forbearance process in year t and Loanst is the number of loans outstanding at year t. As benchmarking the value of the foreberance ratio is compared with the average benchmark at country level in order to underline differences in the management policy of defaulted entities.

In order to assess default risk in fintech payments, which mainly includes unlisted entities, following Carey and Hrycay (2001) the quantification of the probability of default is developed using the actuarial-based method as it follows (2):

$$PD_t = \frac{Default_t}{Loans_t} \quad (2)$$

where Defaultt is the value of defaulted borrowers in year t and Loanst is the outstanding amount of all the loans at the end of year t. As benchmarking the value of the PD is compared with the average benchmark at country level in order to underline differences in the management policy of defaulted entities.

To ensure risk measurement consistency in slow payment habits characterizing some sectors and regions, default rates must be modified to favor an appropriate interpretation of technical defaults, that is, exposures that, after being classified in default because of qualified past dues, reenter performing status and/or are terminated without any loss (Calabrese and Zenga, 2010). Empirical evidence shows that cash flow performance and residual credit capacity are not predictors of distress but can accelerate or delay distress in the presence of structural factors (De Leonardis and Rocci 2014). Following Lohman and Ohlinger (2021) the probability to be cured is (3):

$$P(CR_t) = \frac{N° \; credits \; fully \; refunded_t}{N° \; defaulted \; loans_t} \quad (3)$$

where n° of credit full refunded is the number of exposures in arrears refunded in year t and Advance amountt is the total advanced amount of trades in year t.

Once default occurs, the trade credit financier must evaluate the loss that can manifest based on the amount of the exposure that will be lost by, because the study of debt recovery processes, even in more developed financial markets, usually highlights a success rate below the amount of the initial exposure (Covitz and Han 2004). In order to explore the risk of loss more than the risk of default, following Dorfleitner, Rad and Weber (2017) we measure the Loss Given Default as it follows (4):

$$LGD_t = \frac{Crystalized\ Loss_t}{Advance\ amount_t} \quad (4)$$

where Crystalized Loss is the amount of losses in year t and Advance amountt is the total advanced amount of trades in year t. As benchmarking the value of the LGD is compared with the average benchmark at country level in order to underline differences in the management policy of defaulted entities.

In order to identify the profile of the defaulted entities among the fintech customers, we computed the PD, the probability to be cured, and LGD for portfolios classified on the basis of: the vintage, the time to expiration, the size of the exposure and the type of invoice discounting solution selected by the assignor.

3.3 Results

Excluding the first three years of activity in which the platform had a limited number of defaults to be managed, the forbearance activity is affecting at least 80 credit exposures by year and it represents from the 0.80% to the 2.92% of the overall loans. The forbearance ratio of the fintech company is higher than the average value in UK independently with respect to the year selected and the gap reach a maximum of 1.38% in 2016 (Table 4).

Table 4. Forbearance ratio analysis (FR)

Year	MarketFinance		UK market
	N° Forborne	Forbearance ratio	Forbearance ratio
2011	0	0.00%	-
2012	42	6.79%	-
2013	33	2.72%	-
2014	87	2.92%	-
2015	120	1.92%	1.85%
2016	228	2.81%	1.43%
2017	156	1.90%	1.13%
2018	180	1.62%	0.93%

2019	168	1.28%	0.85%
2020	225	1.84%	0.87%
2021	98	0.80%	-

Notes: The EBA survey collected information about the forbearance activity in UK only for the time period starting from 2015 up to the Brexit.
Source: MarketFinance and EBA data processed by the authors

The analysis of the probability of default for the portfolio under management shows PD values that are below 2% in the years considered excluding the 2012. The comparison of the risk proxies with respect to the average UK market shows a lower incidence of defaults for the full sample with a gap that varies from 0.39% in 2016 to 1.41% in 2020 and the gap is even higher if the risk proxy is compared to the PD for SMEs in UK that represents the main type of target customer for MarketFinance (Table 5). The evidences suggest that the selection procedure of counterparties is risk effective and that fintech debtors are not riskier in repaying trade debts with respect to the average UK market (Ben-David, Johnson and Stulz, 2021).

Table 5. Probability of default analysis (PD)

Year	MarketFinance	UK all firms	UK SMEs
2011	0.00%	-	-
2012	5.98%	-	-
2013	0.60%	-	-
2014	1.52%	-	-
2015	0.60%	-	-
2016	0.81%	1.22%	2.17%
2017	0.30%	1.03%	2.07%
2018	0.28%	1.20%	2.68%
2019	0.17%	1.22%	2.26%
2020	0.19%	1.60%	2.40%
2021	0.05%	1.11%	3.37%

Notes: The EBA survey collected information about the forbearance activity in UK only from 2015.
Source: MarketFinance and EBA data processed by the authors.

Once the default happened the cure ratio analysis shows that some of the exposures allow to recover the in bonis status by refunding the amount not paid and especially in the last two years of the time period analysed the probability to be cured increased significantly showing a better capability of the platform to manage defaulted exposures on the base of the knowledge of the customers developed by humans with the support of artificial intelligence (Table 6).

Table 6. Probability to be cured analysis (P(CR))

Year	Cured	Defaults	P(CR)

2011	0	0	-
2012	0	42	0.00%
2013	0	12	0.00%
2014	0	83	0.00%
2015	0	75	0.00%
2016	0	184	0.00%
2017	0	107	0.00%
2018	3	149	2.01%
2019	0	127	0.00%
2020	10	176	5.68%
2021	51	55	92.73%

Source: MarketFinance data processed by the authors.

In the event of default the recovery process performs better with respect to the average of the UK market and the gap is significant even when only SMEs are considered. Independently with respect to the year selected the loss given default is always lower than 30% and since 2017 the value is also decreasing over time (Table 7). The evidences contribute to support the higher effectiveness of the workout process of fintech lenders compared with the overall system.

Table 7. Analysis of the Loss Given Default (LGD)

Year	MarketFinance	UK overall market	UK SMEs
2011	8.50%	-	-
2012	15.37%	-	-
2013	18.05%	-	-
2014	8.99%	-	-
2015	17.44%	-	-
2016	19.21%	34.87%	29.77%
2017	29.20%	34.21%	27.93%
2018	25.23%	36.34%	30.19%
2019	13.82%	34.83%	27.66%
2020	6.77%	35.08%	27.73%
2021	0.00%	34.47%	30.67%

Notes: The EBA survey collected information about the forbearance activity in UK only from 2016.
Source: MarketFinance and EBA data processed by the authors.

The analysis of PD, P(CR) and LGD shows that the risk drivers vary in the sample with respect to the segmentation variables selected (Table 8).

Table 8. Analysis of PD, P(CR) and LGD for sub-portfolios

Vintage	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
PD	5.17%	6.10%	1.75%	3.28%	1.87%	2.17%	1.84%	1.24%	1.18%	1.21%	0.38%
P(CR)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.34%	0.69%	11.28%	91.84%
LGD	8.50%	15.37%	18.05%	8.99%	17.44%	19.21%	29.20%	25.23%	13.82%	6.77%	0.00%

TTE (days)	Expired	Up to 30 days	31-60 days	61-90 days	91-120 days	121-150 days	151-180 days	Over 180 days
PD	0.00%	1.33%	1.32%	1.58%	3.27%	2.89%	4.12%	5.34%
P(CR)	-	4.51%	6.07%	9.45%	2.88%	0.00%	0.00%	0.00%
LGD	17.20%	17.16%	14.45%	15.95%	18.45%	26.96%	27.19%	17.20%

Amount (£)	£<200000	200001<£<400000	400001<£<600000	600001<£<800000	800001<£<1000000	£>1000000
PD	1.42%	0.86%	1.46%	0.00%	3.57%	0.00%
P(CR)	6.02%	20.00%	66.67%	-	0.00%	-
LGD	16.55%	24.38%	27.82%	-	0.00%	-

Type	Licencing Fee	Multi Debtor	Purchase Order	Standard	Whole Ledger
PD	1.43%	2.18%	20.62%	1.62%	0.09%
P(CR)	0.00%	2.70%	0.00%	6.90%	0.00%
LGD	12.96%	10.61%	28.86%	17.08%	1.40%

Source: MarketFinance data processed by the authors

PD has diminished over time, particularly in the last 3 years showing that the growth of the platform does not represent an issue (Wang and Overbey, 2018) because it does not target riskier payers (Eça, Ferreira, Prado and Rizzo, 2021); additionally, the Covid-19 crisis plays an irrelevant impact on PD in a general stressed credit cycle (Altman, 2020). Coherently, with risk assumptions on credit risk, PD increases with time to expiration (Fons, 1994) and with the size of the exposure (Lopez, 2004). Looking at the type of the exposure, the wider and deeper information set available for the whole ledger contracts is associated with lower default probabilities, while previous empirical evidence shows the sensitivity of LGD (Gibilaro, 2019).

Looking at CR, data show a strong increase during last two years, with almost total debtors are cured in 2021: this evidence suggests that the Covid-19 crisis determined liquidity issues for trade debtors, but they were addressed promptly with the consequence that overdue exposures did not determined losses, confirming the risk mitigation of such exposures (Zhang, Baeck, Ziegler, Bone and Garvey, 2016). The analysis of the time to expiration shows that after 90 days the probability of the exposure to be cured turns to be irrelevant, while smaller size exposures show a higher probability to be cured and standard contracts show a higher attitude to return to the be performing compared with the other types featured by modest or irrelevant probability to be cured.

The LGD analysis shows a remarkable increase of the parameter during the central years of the timeframe considered, even though the Covid-19 crisis does not increase the impact on the recovery procedures, given the increase of the probability to be cure for the same years. The longer is the time to expiration, the higher will be the LGD. The importance of the risk parameter decreases with the size of the exposure, while purchase orders are featured by the highest LGD level among the trades due to the uncertainty in future cash flows with respect to other types of products.

4. Final remarks

Fintech invoice discounting has grown rapidly during last years, by extending the range of customers and types of services provided. Nonetheless, it appears that such growth has not impacted the credit risk of the portfolio, particularly in comparison with the overall banking system. Along all the credit risk measures considered (FB, PD and LGD), the analysed case study shows that the empowerment of the workforce with digital technology is associated with less risk in fintech lending with respect to the overall banking system with enduring effects. Additionally, looking at the disentangled credit risk parameters, segmented results are consistent with the overall market about the size of the exposure, the time horizon and the type of invoice discounting.

Results obtained are useful for developing risk management skills in the fintech industry in order to outline the differences in the role of each risk driver with respect to the expected loss. Additionally, the comparison of the results achieved with the statistics for the traditional lending market will also allow to highlight the differences in the risk drivers for new players and to support the thesis about the difference in the target customers that will prefer to use the new type of lenders.

Policy implications can be derived from the results obtained because during the Covid-19 crisis fintech financial services have been disproportionally used in industries and areas severely affected (Erel and Liebersohn, 2020).

What regards the sudden digital integration need, nowadays even more accelerated due to the Covid-19 crisis, it requires careful approach on building regulatory sandboxes that offer innovators the chance to understand customers' expectations in the financial sector, specifically in the payments area. Such regulatory sandboxes, will help participants collect valuable input on designs, strategy, processes and ethical aspects related to safer products. (Crowe, 2020).

To achieve such results under optimum conditions, a specific educational training to SMEs suppliers and their human capital on their strategies for digital integration can take place from a bottom up approach via expert regulators and governments. Such skills training becomes of relative urgency in the financial and trading sector, since one day soon, all the data from trading activities worldwide will be analyzed by artificial intelligence in real time. Thus, when safeguarding financial stability through internal control mechanisms, in order to build a secure digital network, governments need to start from the bottom up with the small businesses' financial sustainability.

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Political Connection of Directors and Environment Social Governance Report in Sustaining the Business Model: The Case of Italy

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Abstract

Our paper aims to confirm the role of board political connection in sustaining the business model via environment, social and government report in Italy. Using multiple regressions to analyze the sample of Italian listed companies, we found that politician director play a positive role in building a sustainable business model.

Keywords

Business model, Board of directors, Corporate governance, Corporate social responsibility, Political connection

Introduction

Board of directors play an important role in sustaining and developing a company's business model (Page & Spira, 2016). One way to well perform this task is maintaining key relationship with investor and stakeholders by presentation and disclosure. In this paper, we examine the association of board of directors' political capital in sustaining the business model via the disclosure of ESG report in Italian context.

Corporate social responsibility (CSR) is widely believed as a strategic management in business, which demonstrated as a remarkable part on firm sustainable growth (Carroll, 1999; Frias-Aceituno et al., 2013). Nowadays, to quantify CSR, company usually disclosure non-financial reports such as integrated report, sustainability report, the Universal Standards - Global Report Initiative (GRI) or

the Environmental, Social, and Corporate Governance standard (ESG) etc., among which, the ESG standard has been becoming a key indicator in evaluating the non-financial performance and also a mean to integrate the ethics into core business model.
Directors with political background or connection is known as influencers or key oppinion leaders in society (Ramón-Llorens et al., 2019). The resource dependence theory suggests that directors, with their human and social capital, could contribute valuable advices for firms' strategies and operation through lens of politician; increase firm credibility by their reputation and legitimacy. They also help firms reach "VIP" via their networks to realize the business purposes such as financial support, access to resources or relevant information (Ramón-Llorens et al., 2019). Moreover, politicians understand very well government expectation about social contribution from firm so that they will promote CSR activities to help firm gain the priority and benefit (Fernández-Gago et al., 2018). By promoting CSR, political connected directors directly contribute to sustaining the business model.

Our paper uses multiple regression analysis to explain the association between the environment social government report and board political connection in Italy. We found that Italian firms with politicians on board have higher level quality of ESG report than the counterparts. This output confirms the positive and crucial role of directors in building and sustaining the business model of firm by encouraging ESG report.

Literature review and hypothesis development

ESG report is said to be a mean to integrate the ethics into core business model (Maniora, 2017). Young and Reeves (2020) demonstrate that ESG reports are useful to reimaging business model for sustainability and reshape the business ecosystem by encourage the social responsibility of firm. By the environmental and societal information showed in ESG reports, we can evaluate how company sustain the business model.
In recent literature stream, ESG reports is affected by many factors. One of the most influential factors is board of director (Olthuis & van den Oever, 2020; Ramón-Llorens et al., 2019; Muttakin et al., 2018). Fernández-Gago et al. (2018) analyze listed firms in Spanish suggest that independent directors with political backgrounds have positive impact on disclosing CSR report base on GRI guidelines. In the same vein, Bianchi et al. (2019) utilizes the legitimacy approach to indicate that managers of a company with political background/ connection tend to support to disclose higher level of CSR information than non-connected managers.
The review of literature presented above shows plenty of evidences about the association of political connected board and ESG reports and the positive significant role of this report in sustaining the business model. Our paper, therefore, develop the hypothesis that political connected directors have positive and significant role towards the sustainable business model by encouraging the disclosure of ESG reports.

Methodology

Sample and data:

We identify the sample by comprising Italian listed firms from 2010 to 2019. Our sample is drawn from several sources including Bloomberg database, Commissione Nazionale per le Societa e la Borsa (CONSOB), company websites, Italian Chamber of Deputies and Italian Department of Affairs Internal and Territorial.

***Dependent variable*:**

Corporate social responsibility of Italian firms is represented by ESG disclosure score, provided by Bloomberg database. ESG disclosure score is based on three extents of company report including environment, social and governance disclosures. Companies that do not disclose anything will show NA in the data panel. The score ranges from 0.1 in minimum to 100 points in maximum, is tailored by industry or sector, and weighted in terms of its importance (Giannarakis et al., 2014).

Main Independent variables:

In the scope of our paper, we only take into consideration the official political connection and exclude the informal ones, for instance, family or social relationship (Hillman, 2005).

***Control variables**:* following prior literature, we include several sets of controls. Data for those control variables were taken from Bloomberg data base during the period of 2010-2019.

Board characteristics variables

Board gender is represented by the percentage of women directors on board (Setó-Pamies, 2015; McGuinness et al., 2017; Cucari et al., 2018).

Board independent is calculated by the percentage of independent board members as reported by the company.

Board size is measured by the total number of board members at the end of the fiscal year.

In addition, we consider other two characteristics of board: **CSR committee** as a dummy variable, equal to 1 if the company has CSR committee and 0 otherwise (Eberhardt-Toth, 2017; Biswas et al. 2018; Salvioni & Gennari, 2020); **CEO duality** which is assigned the value of 1 if the CEO of the company is also the chair, otherwise it is 0 (Haniffa & Cooke, 2002; J. Li et al., 2008; Prado-Lorenzo & Garcia-Sanchez, 2010; Amran et al., 2014).

Firm performance variables

We include **firm size**, which is proxy by the logarithm of lag of total assets (Martínez-Ferrero et al., 2015; Ramón-Llorens et al., 2019) due to the fact that small and large firms are different in terms of visibility, resource access and operating scale (Udayasankar, 2008) which may lead to dissimilar in CSR approach.

Financial performance or profitability is computed based on the lag of return on assets (ROA) (J. Zhang et al., 2016; Ortiz-de-Mandojana et al., 2016).

Firm leverage (LEV) - total debt over assets is an important control variable (Michelon & Parbonetti, 2012; Katmon et al., 2019). We control for firm LEV by lag of total debt over assets in our model.

Econometric approach

We applied the random effects (RE) and fixed effects (FE) models to analyze the panel data of Italian listed firms. An important assumption in selecting between RE and FE models is whether unobserved effects (firm fixed effects) and independent variables are correlated. In fact, our dependent variable, ESG disclosure, encourage Italian firms to disclose, which can lead to sample selection bias. If we apply RE or FE models for estimating ESG disclosure directly, can be inappropriate. We hence performed the two-step Heckman model to rule out the potential sample selection bias (Heckman, 1979). In the first step, we used a probit model to determine the likelihood of an Italian firm disclosing ESG based on political connections, industries and control variables. We predicted the inverse Mills' ratio the first stage, then plugging it into the second stage to control for sample selection bias (Certo et al., 2016; Wooldridge, 2010). We used RE and FE models in the second step to control for both unobserved effects and sample selection bias. We performed Hausman (1978)'s test to decide results from RE or FE estimation should be selected.

Regression results

Table 1 Descriptive statistics of variables

	VIF	mean	sd	min	max
ESG disclosure		40.70	17.74	3.51	76.75
PoliconD	1.18	0.19	0.40	0.00	1.00
PoliconPer		2.24	5.23	0.00	40.00
Board size	1.68	12.36	3.71	5.00	26.00
Board independent	1.55	53.08	16.82	0.00	100.00
CSR committee	1.52	0.25	0.43	0.00	1.00
Board gender	2.87	22.15	13.84	0.00	55.56
CEO duality	1.32	0.15	0.35	0.00	1.00
Firm size	3.14	8.96	1.86	5.14	13.74
Financial performance	1.54	2.68	9.60	-51.01	199.33
Firm leverage	1.49	28.75	16.93	0.00	183.29

Note: N = 704

Table 1 presents the descriptive statistics of main variables used in our models. The results show that the ESG score of Italian firms, on average, is 40.70 in our sample. Having political connections on BODs in Italian firms is around 19 percent. Table 1 also reports the variance inflation factors (VIF) to check the multicollinearity. All VIF values are less than 5, our model thus has no problem

with multicollinearity. Table 2 presents the correlation coefficients of the main variables. The correlation coefficients of political variables are positive as our expectation.

Models 1 and 5, and 2 and 6 in Table 3 show the baseline results from estimating the RE, and FE models, respectively. Models 3, 4, 7 and 8 present the results of the second-stage Heckman selection model. Models 1 – 4 in Table 3 present the results of political connections that was dummy variable, PoliconD, while models 5 – 8 present the results of political connections that was the percentage of all directors on board who had current or former politicians, PoliconPer. The estimated coefficients of inverse Mills' Ratio are statistical significance in all the second-stage Heckman selection models (Models 3, 4, 7 and 8) that indicates the present of sample selection bias. Moreover, the second-stage regressions estimated by using RE and FE models to control for unobserved effects. Hausman tests are statistical significance ($chi2(16) = 29.64$, p-value < 0.05 and $chi2(16) = 35.16$, p-value < 0.01) showing that the preferred models are FE and we thus use the results of models 4 and 8 to interpret.

The results from both model 4 and model 8 show that firms whose directors have had political connections ($\beta = 4.789$, p-value < 0.01 for PoliconD variable and $\beta = 0.356$, p-value < 0.01 for PoliconPer variable) have positive impacts on EGS disclosure of Italian listed firms.

As for other board characteristics, we find that the percentage of independent direction on board is positively associated with ESG disclosure ($\beta = 0.126$, p-value < 0.01 for both model 4 and model 8) while board size, having CSR committee, board gender and CEO duality have no impact on ESG disclosure. In terms of the firm performance variables, we find evidence that firm size and financial performance influence on ESG disclosure. Finally, we find no evidence of the relationship firm leverage and ESG disclosure.

Table 2 Correlation matrix

	1	2	3	4	5	6	7	8	9	10	11
1.ESG disclosure	1.00										
2.PoliconD	0.10*	1.00									
3.policonPer	0.06	0.88***	1.00								
4.Board size	0.09*	0.07	0.00	1.00							
5.Board independent	0.34***	0.08*	0.14***	0.09*	1.00						
6.CSR committee	0.42***	0.08*	0.03	0.04	0.20***	1.00					
7.Board gender	0.29***	-0.09*	-0.12**	-0.11**	0.19***	0.36***	1.00				
8.CEO duality	-0.17***	-0.04	0.03	-0.17***	-0.19***	-0.17***	-0.13***	1.00			
9.Firm size	0.41***	0.16***	0.10**	0.45***	0.36***	0.26***	0.09*	-0.31***	1.00		
10.Financial performance	-0.09*	-0.04	-0.03	-0.10**	-0.01	-0.02	0.06	0.14***	-0.19***	1.00	
11.Firm leverage	0.12**	0.07	0.07	0.05	0.17***	0.03	-0.03	-0.10**	0.14***	-0.25***	1.00

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3 Regression results of political connections on ESG disclosure score

	(1) RE	(2) FE	(3) RE-Heckman	(4) FE-Heckman	(5) RE	(6) FE	(7) RE-Heckman	(8) FE-Heckman
PoliconD	3.623***	4.442***	3.592***	4.789***				
	(1.373)	(1.437)	(1.370)	(1.435)				
PoliconPer					0.236*	0.333**	0.231*	0.356***
					(0.122)	(0.132)	(0.122)	(0.130)
Board size	0.268	0.055	0.399	0.226	0.278	0.069	0.410*	0.232
	(0.240)	(0.273)	(0.247)	(0.280)	(0.241)	(0.274)	(0.247)	(0.281)
Board independent	0.124***	0.139***	0.111***	0.126***	0.123***	0.139***	0.111***	0.126***
	(0.039)	(0.041)	(0.039)	(0.041)	(0.039)	(0.042)	(0.039)	(0.042)
CSR committee	1.104	0.532	1.257	0.874	1.201	0.657	1.355	0.992
	(1.275)	(1.317)	(1.274)	(1.316)	(1.279)	(1.321)	(1.278)	(1.322)
Board gender	-0.036	-0.047	-0.039	-0.051	-0.038	-0.051	-0.041	-0.056
	(0.051)	(0.052)	(0.051)	(0.051)	(0.051)	(0.052)	(0.051)	(0.052)
CEO duality	0.863	2.518	0.184	1.755	0.851	2.659	0.165	1.943
	(1.958)	(2.196)	(1.975)	(2.204)	(1.964)	(2.206)	(1.981)	(2.215)
Firm size	6.219***	10.534***	8.339***	16.818***	6.283***	10.569***	8.394***	16.549***

	(0.923)	(2.003)	(1.398)	(3.197)	(0.924)	(2.010)	(1.398)	(3.208)
Financial performance	0.007	-0.009	0.159	0.278*	0.011	-0.006	0.162	0.267*
	(0.108)	(0.113)	(0.131)	(0.160)	(0.109)	(0.113)	(0.132)	(0.161)
Firm leverage	-0.003	-0.018	-0.033	-0.108	-0.008	-0.026	-0.038	-0.112
	(0.064)	(0.077)	(0.065)	(0.085)	(0.064)	(0.077)	(0.065)	(0.085)
Mills' ratio			7.381**	14.223**			7.369**	13.531**
			(3.632)	(5.662)			(3.637)	(5.676)
_cons	-32.965***	-67.892***	-55.435***	-129.836***	-32.418***	-67.821***	-54.821***	-126.740***
	(9.748)	(18.130)	(14.723)	(30.544)	(9.760)	(18.196)	(14.731)	(30.632)
Hausman test				29.64**				35.16***
Industry fixed	YES	NO	YES	NO	YES	NO	YES	NO
Year fixed	YES	YES	YES	YES	YES	YES	YES	YES
N	526	526	526	526	526	526	526	526
R^2	0.502	0.508	0.504	0.515	0.499	0.505	0.500	0.511

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0$.

Discussion of the results and conclusions

The important of corporate governance, specifically role of directors to the company's business model has been acknowledged. However, less is done about directors' political resources and business model. In this study, we use multiple regressions to investigate if having politicians on board could affect the sustainable business model via ESG report in Italy listed companies. The result shows that Italian listed companies with political connections on board present higher level of ESG report than their counterparts. This finding supports our hypothesis that directors play an active role in building an effective and sustainable business model via the ESG reports.

In Italy, politics has much effect on business that it may influence the way company build business model (Romolini et al., 2014). The issue of bureaucracy and corruption is the reason companies wish to have relationship with politicians via their executives to meddle in policy decisions and gain private benefit (Romolini et al., 2014). Italian firms with political connection are said to run their business easier and have greater market power than the ones without (Bellavite Pellegrini & Pellegrini, 2013). Politician directors who understand government expectation about social contribution from firm will promote CSR activities to help firm gain the priority and benefit (Fernández-Gago et al., 2018). Such that, they contribute also to sustaining the business model.

Our study is useful to corporate governance, CSR and politics in Italy. In line with the resource dependence theory, we affirm the role of director political capital to corporate governance. Italian politician directors who are responsible for overseeing management control system (Merchant & Van der Stede, 2007) will promote the disclosure of non-financial report (e.g. ESG report) and by that to contribute to sustaining the business model of company.

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Does ESG Impact Really Enhance Portfolio Profitability?

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Abstract

Over the last few decades, a growing attention to the Social Responsibility topic has affected financial markets and institutional authorities. Indeed, recent environmental, social and financial crises have inevitably led regulators and investors to take into account the sustainable investing issue. However, the question of how Environmental, Social and Governance (ESG) criteria impact financial portfolio performances is still open. In this work, we examine a multi-objective optimization model for portfolio selection, where we add to the classical Mean-Variance analysis a third non-financial goal represented by the ESG scores. The resulting optimization problem, formulated as a convex Quadratic Programming, consists in minimizing the portfolio variance with parametric lower bounds on the levels of the portfolio expected return and ESG. We provide here an extensive empirical analysis on five datasets involving real-world capital market indexes from major stock markets. Our empirical findings typically reveal the presence of two behavioral patterns for the 16 Mean-Variance-ESG portfolios analyzed. Indeed, over the last fifteen years we can distinguish two non-overlapping time windows on which the inclusion of portfolio ESG targets leads to different regimes in terms of portfolio profitability. Furthermore, on the most recent time window, we observe that, for the US markets, imposing a high ESG target tends to select portfolios that show better financial performances than other strategies, whereas for the European markets the ESG constraint does not seem to improve the portfolio profitability.

Track 2.5 - Sustainable Business models: Create and Capture Value through Frugal Innovation

Track Chairs: *Alessia Pisoni (Insubria University), Francesca Ciulli (Tilburg University), Laura Michelini (LUMSA University), Hareem Arshad (University of Stuttgart)*

Frugal innovation (FI) is increasingly attracting the interest of scholars for its potential to serve customers living in resource-constrained environment, but could also be applied in the advanced economies by significantly reducing the use of resources.

The track aims to explore the link between FI and sustainable business model and how to create and capture value through FI especially in the digital and technology field.

Design-thinking & Frugality; A workshop routine to capture the value of innovations for SMEs

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Abstract

This full paper works towards merging 'frugality' and 'design thinking' into a simplified framework for a workshop routine as a stepping stone for SMEs in developed countries to create and capture value of frugal innovations. Innovations which are born out of the notion that we can do more with less, or for less. This framework is aimed at reaching a specific group of SMEs, in this paper called the peloton of SMEs, a large group of SMEs which generally have lower growth ambitions and growth potential in comparison to the frontrunners. This group is often overlooked by (regional) governmental innovation programmes due to a primary focus on the same industry's frontrunners.

The framework was first tested with students, discussed with experts and eventually tested with SMEs from the Agribusiness sector in the Netherlands. Frugal Elements added to the design thinking process are; (a.) a Frugal Lens (b.) Frugal Business Model Patterns for BMI (c.) Frugal leadership development (d.) Frugal Validation of the solution (e.) Frugal Intervention (limited time, limited theory, vertical learning community, practical tools).
Although the first Pilot has been a succes in terms of helping participating SMEs to create innovations, more research is necessary for the design of a final framework which is expected to contribute to the frameworks that are currently available to SMEs in frugal and sustainable business modelling.

Keywords

Frugal Innovation, Design Thinking, Busines Model Innovation, SMEs

Introduction

Frugal innovations for recovery

This decade began with the arrival of a pandemic that has had a damaging effect on people and organizations, both in economic and social terms. According to Schumpeterian theories

(Schumpeter, 1942; Korringa et al., 2016), sustainable economic growth can be aided by the introduction of successful new products, services and processes. It is the innovative entrepreneur who is the prime mover in this process (Spulber, 2014). In parallel to the pandemic there is maybe an even bigger crisis evolving; a sustainability crisis that also needs to be tackled. Increasing sustainability pressures warrant a better understanding of the impact of companies' BMI through a more comprehensive analysis of innovation and its consequences (Snihur & Bocken, 2022). Although organizations with environmentally friendly resources and capabilities have an advantage over their competitors(Iqbal & Ahmad, 2021), for SMEs creating sustainable value it is not the first priority. Continuation and survival, especially in times of crises, are key (Pisoni et al., 2018). In this paper, we examine the concept of frugality to assist SMEs in the creation of new products, services, processes and subsequently new business models (BMs) for creating the necessary financial value for recovery but also allowing for continued progress towards sustainability.

Purpose of the research

This research aims to contribute to the few tools or frameworks that are currently available to SMEs in sustainable business modelling (Geissdoerfer et al., 2016). Innovation in the development of sustainable business models has become a hot topic but is affected by a high failure rate due to a lack of reliable and efficient methods (He & Ortiz, 2021). According to Bocken, research indicates that tools or frameworks that fit needs and expectations are scarce or may be too complex and demanding in terms of time commitment (Bocken et al, 2019). Simplicity, as opposed to complex and demanding, is core to frugality. As frugal innovations have shown great success in driving inclusive growth by overcoming challenges like poverty and inequality, it is also expected to have high potential in advanced or developed countries driving sustainable growth of businesses without damaging the planet (Agarwal & Brem, 2017).
The purpose of this research is to explore whether the concept of frugality can be a transformed into a simple, easy to apply framework, in this case a workshop routine. A workshop routine is a set of consecutive workshops with a specific configuration, which has the potential to support SMEs in developed countries in creating and capturing value of frugal innovations, and possibly drive sustainable outcomes. This workshop routine should assist SMEs in finding new solutions or innovations.

Literature; reconciling concepts

This section highlights the theoretical background by drawing on two concepts: frugality and design thinking. This is followed by an explanation of the research gap and the resulting need for the presented study.

Frugality

According to the dictionary, the word "frugal" means "economical in use, or spending", "requiring little expense or few resources" or "living without waste". The notion of 'frugal innovation (FI)' was first introduced in the context of emerging markets, giving non-affluent customers opportunities to consume affordable products and services suited to their needs (Weyrauch & Herstatt, 2017). The

value provided with FI started as inherently social because the goal was to give the poor access to products and services to empower them. However, the discourse on FI has been extended towards developed countries focusing on using less resources (Tiwari & Bergmann, 2018). The challenge for frugal innovation is to introduce something new whilst saving resources (Pisoni et al., 2018). That new solution can be a product, service, process, or even a new business model (Hossain, 2018).
Frugal innovation can be considered as an outcome but also as a process or a mindset (Pisoni et al., 2018). Frugality, or working with a frugal mindset could therefore mean using resources to their full potential. This paper applies this mindset in developing a framework for a workshop routine that opens up a path in creating new products, services, processes and subsequently new Business Models (BMs) that provide significant value while minimizing the use of resources such as energy, capital and time (Hossain, 2018; Radjou & Prabhu, 2015). Frugal innovation presents a promising way to tackle some of today's pressing societal problems with new business models (Hossain, 2021). Although Frugal innovations do not all have an inherent sustainability impact (Rosca, 2017). The notion of frugality could also provide a new perspective on how to deal with the traditional trade-off between people and planet that is apparent in the body of literature on developing sustainable BMs (Arnold, 2018). Using this lens, we hope to show that frugality provides a promising perspective to make the transition to more sustainable BMs. In short, frugality could be explained as 'doing more with less' (Radjou & Prabhu, 2015).
In this paper, we will apply this mindset in developing BMs. Sustainable BMs require intentional design if they are to deliver aspired sustainability impacts (Bocken et al., 2019). One reason for Business Model Innovation (BMI) failure is a lack of supporting frameworks and tools (Weking et al., 2018), this is where Business Model Patterns (BMPs) come into play. BMPs could be used as an effective tool to capture and organise the knowledge about the creation of sustainable BMs and to creatively develop or adapt BMs by recombining existing patterns (Lüdeke-Freund et al., 2018). It is about making solutions that have been successful in the past in different industries or contexts, accessible to others (Amshoff et al., 2015). Recently, nine specific Frugal Business Model Patterns have been identified (Kraaij & Limonard 2021). These Patterns describe ways to create economic, social and ecological value by applying a frugal mindset. An example of a Frugal Pattern is to 'Diminish resources' (or Simplify), meaning stripping the product or service to the core by removing or reducing features, resources, required activities and/or waste streams.

Design Thinking

As stated by Brown (2008), design thinking is a means to provide innovative solutions for complex problems for organizations. At its core, design thinking is a human-centred approach for innovation by co-creation, inspired by the way designers tend to think and act (Klenner et al., 2021; Brown, 2008). It is a method for generating (innovative) solutions for wicked problems by deliberately incorporating the concerns, interests and values of humans into the design process (Brown, 2009; Meinel & Leifer, 2011).
Design thinking has moved beyond its original implementation in new product development and has been successfully applied in an ever-wider spectrum of areas, such as sustainable BMI (Geissdoerfer et al,. 2016). The design thinking process is deliberately iterative and aims to rapidly develop and test multiple, possible solutions to arrive at an optimal one (Geissdoerfer et al., 2016; Brown, 2008). To make this process more accessible and explicit, easily understandable and applicable in businesses, the British Design Council developed a graphical based diagram, describing the divergent and convergent stages of the design process (Designcouncil, 2018). This Double

Diamond design process model consists of four quarters; 'Gaining insights, discover, be curious', 'Define the core challenge (= problem definition)', 'Potential solutions', 'Solutions that work & receive feedback' and is the base of the proposed preliminary framework for a workshop routine.

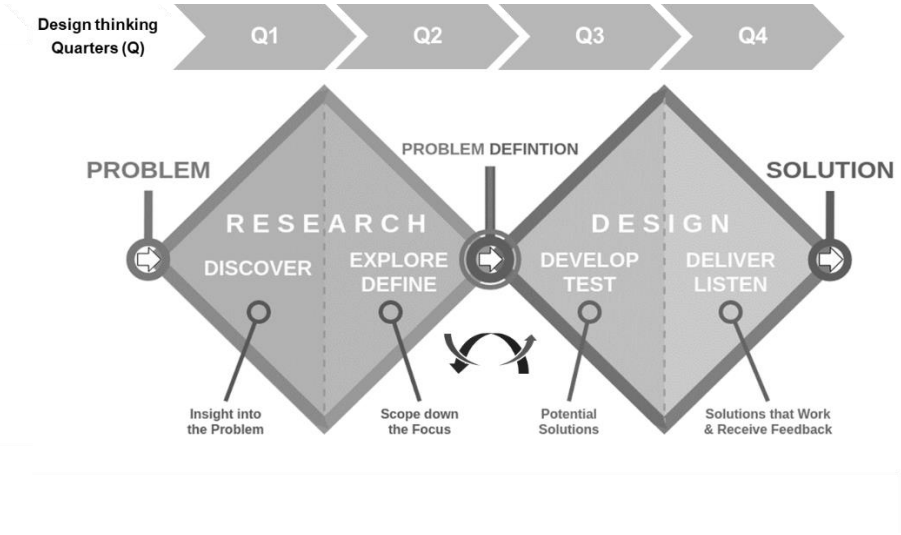

Figure 2 Design Thinking Process - Double Diamond (Designcouncil, 2018).

The first quarter of the Double Diamond represents the initial divergent part of the project in which the designer is searching for brand new opportunities, trends, markets, information and insights. The second quarter, which ends the first Diamond, marks the Definition stage, a filter where the first insights are reviewed, selected and discarded.

The third quarter of the Double Diamond signifies the period of Development. It covers the initial development of project ideas, in which the designer must engage with the wider context of the identified opportunity. We find ourselves again in a period of divergency. Solutions are developed, iterated and tested under the use of dedicated tools such as brainstorming, prototypes and experimentation combined with financial validation. In the last, fourth quarter of the Double Diamond, the final concept is taken through final testing, production and launch (Designcouncil, 2018).

The need for merging Frugality & Design Thinking for SMEs

In a recent literature review by Pisoni et al (2018), the foundations on frugal innovation were laid for subsequent works, by identifying gaps in the current knowledge and by recommending new directions for future research. We aim to address the gap of a frugal approach to innovation in SMEs in developed countries.

Design thinking, with its broad and generic applicability, has proven to provide an effective way for organizations to create (product, service, process, and business modelling innovation (Hossain, 2018) solutions for problems. At the same time, design thinking could also be resource-intensive, requiring special workspaces and consuming a considerable amount of time (Bocken et al., 2019). Resources are scarce for SMEs and startups. Such enterprises often start with the means at their disposal, and not by considering those they could acquire in the future (Ghorberl et al., 2021).

Frugality, or working with a frugal mindset, is proven successful in using limited resources to their full potential. It helps enterprises to do more with less, or for less. Frugal innovations are by

definition non-complex and are created by entrepreneurs who do not aim at a high (financial) growth potential.

Is a clever combination of Design Thinking and Frugality beneficial? Can we make design thinking more accessible and valuable by means of adding frugality? Design Thinking is a proven concept and a good base for the creation of innovations. By first identifying and then adding specific frugal elements to the design thinking process, means and resources can be reduced, synthesizing the best of both worlds. By merging 'design thinking' and 'frugality' into a workshop routine, a specific group of SMEs can be challenged to capture and create value. Therefore, the main research question that this study addresses is: "How can frugal elements enhance the design thinking process, to support SMEs in creating, commercializing, diffusing frugal products, services and/or processes?"

Method

Framework for a Design Thinking workshop routine with Frugal Elements

To address the research question, we have developed a framework to find solutions for SMEs by adding frugality to the design thinking process. This method section explains the step-by-step development procedure for creating such a framework. Figure 2 provides an overview of the research methods used in this study, which is structured in four phases: (1) Discovery, (2) Conceptualization, (3) Effectiveness & Improvement and (4) Continuous improvement. An introduction of the implemented approaches for each phase is followed by an explanation of the respective methods and a description of the result(s) per phase.

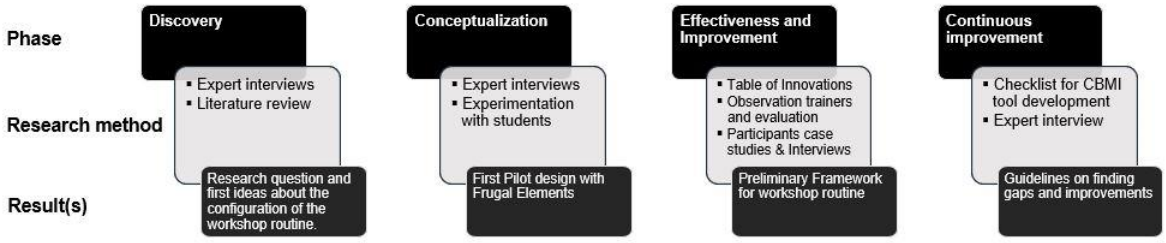

Figure 3 Overview of Phases, Research methods and Result(s)

Phase 1; Discovery

The first phase was about discovering the idea's origin and necessity for creating such a framework for a workshop routine. The main research method employed in this phase was semi-structured interviews with three experts on Frugal Innovation, Design Thinking and Innovation Management. Additionally, literature studies on the relevant concepts were reviewed. The interview with the academic researcher on Frugal Innovation, focussed on the idea's origin and stakeholders. This interviewee also has expertise on Design Thinking. The second expert, also an academic researcher, has a PhD in Innovation Management and is an experienced trainer. The third expert has developed

considerable knowledge on Design Thinking as an SME management consultant and trainer. During all these interviews, special focus was given on the specific needs of the target group, the SMEs.

The literature review started by screening journal articles on Frugal Innovation and Design Thinking. These literature sources were identified in the Web of Science database by using the search terms 'frugal innovation', 'literature review' and 'design thinking'.

Results from expert interviews and literature reviews yielded a research question, relevant assumptions and first ideas about configuration of the workshop routine.

Phase 2; Conceptualization

Phase 2 focused on designing the first framework for the workshop routine to use in subsequent testing during the next phase. The conceptualization was based on two different methods: a round of iterative expert interviews and experimentation of frugal elements within student projects.

Firstly, a round of iterative expert interviews was conducted to conceptualize a workshop routine based on the framework drafted in the preceding exploration phase. The same experts, as mentioned in the previous phase, were interviewed, and asked to provide input on the different building blocks necessary to create the First Test Pilot configuration of the workshop routine. Again, specific attention was given to the needs of the target groups, the SMEs. Possibilities of Design Thinking were discussed, and how frugal elements could be added to the Design Thinking process.

Secondly, frugal elements were conceptualized and tested in an educational environment. Each year the Institute International Centre for Frugal Innovation organizes a unique, educational program for third year bachelor students from Leiden University, TU Delft and Erasmus University Rotterdam - the minor Frugal Innovation for Sustainable Global Development (ICFI, 2022). In this program, participating students have the opportunity to work with students from other universities and disciplines, allowing them to step outside of their monodisciplinary frame of reference centered around the concept of Frugal Innovation. In this Minor, students are asked to create financially viable enterprises that commercially achieve the goals of a selected NGO. For this, frugal elements were added to the program.

Based on the results of the expert interviews and the experimentation, the authors developed an initial framework for a workshop routine, suitable for a first Pilot in the next phase.

Phase 3; Effectiveness and Improvement

The third phase comprised the testing of the developed framework for the workshop routine. The framework was evaluated for gaps and improvement possibilities. Such improvements were subsequently incorporated. The main method employed in this phase was testing the concepts by conducting a pilot workshop with SME participants (entrepreneurs and their employees), facilitated by one of the authors and a fellow lecturer who is also an interviewed expert. During, and after the workshops, data was gathered in four different ways: by observation of the lecturers, a participant questionnaire, an overview of participants and innovations and two/three short case studies on the innovations of the participants.

Firstly, the workshop routine was analyzed afterwards by the lecturers through observing the participants. The lecturers filled out a prepared data sheet with improvement questions identical

to the ones in the participant questionnaires and discussed the effectiveness and improvements for the workshop routine.

Secondly, questionnaires were handed out to the participants after the presentations at the end of the workshop routine, requesting them to evaluate each part of the routine on a five-point Likert-type scale ranging from 'very bad' to 'very good' to identify strengths and improvement possibilities. After the workshop, three selected participants were interviewed and asked about their innovation based on the returned questionnaires. These entrepreneurs were selected from the participants' list based on their willingness to be interviewed and full participation in the workshop routine. A feedback session was held where improvement suggestions and other items important to the participants were discussed to obtain additional information on the workshop routine design.

Thirdly, an overview of the participants' innovations was created to determine the effectiveness of the pilot in the form of a table of all the solutions of innovations that were created during the workshop routine. The innovations were coded to see whether the Innovation is Frugal, Sustainable or Social in nature and if sales were realized two months after finalizing the workshop routine.

Fourthly, The same three participants who were initially interviewed were also interviewed four months after finalizing the workshop routine. Their innovation itself, linking to the workshop routine and possible success of the innovation were briefly discussed together with their assessment on the effectiveness and improvement of the workshop routine. Special attention was given to the frugal elements in relation to the innovations or solutions from the workshops.

From the previous steps, conclusions could be drawn on the effectiveness and possible gaps and improvements. Based on these finding an improved and semi-final framework for a workshop routine could be presented.

Phase 4; Continuous improvement

This fourth and final phase is aimed at future iterations. We have only tested the workshop once with actual practitioners. Further iterative development, including multiple tests with users, is also an important element in design research (Lofthouse, 2006). The workshop routine needs to be further evaluated for effectiveness, benefits, gaps and further improvement possibilities. Data on gaps and such improvements need to be systematically collected and need to be subsequently incorporated in the design of the framework. This cycle needs to be repeated until no further major improvements can be identified. Due to time constraints on what post-workshop feedback can be reasonably expected from the participating SMEs, the evaluation needs to be focused on the most important items. Seeking guidelines, the checklist for Circular BMI tool development was used (Bocken et al., 2019), this checklist was discussed with one of the interviewed experts. The checklist defines 10 criteria that are aimed at guiding future research (and practice) contributions in "sustainability-oriented innovation" and is specifically aimed at sustainability tool developers.

Results

This section presents the findings per phase while creating the framework for the workshop routine. It illustrates the idea's origin and endorses its necessity, the conceptualization of the workshop

routine, evaluation by the participants and lecturers on the first pilot, with suggestion for continuous improvements.

Phase 1; Discovery

The idea to create a framework for a workshop routine with frugal elements originated from a dialogue between a policy maker of a regional governmental agency in the province South-Holland, the Netherlands, and one of the foremost specialists in Frugal Innovation. The policy maker was introduced to the concept of Frugal Innovation and the idea was discussed whether Frugal Innovation, which is usually associated with developing countries (Pisoni et al., 2018), could also be used in a developed context to 'persuade' SMEs to innovate. More specifically, SMEs that were currently not reached by different innovation programs and policies run by the regional governmental agency.

This group of SMEs could be described as the non-gazelles. Not the frontrunners (gazelles), but the followers. In analogy with cycling, this is the group behind the frontrunners. The so-called peloton, who often do not have a high, financial growth ambition and are usually not high-tech oriented, but crucial to the frontrunners' success and often large in size / numbers. This group has been proven difficult to reach because they believe that innovation programs are not suited for them due to the return on investment. However, this peloton of SMEs is very important in economic terms and the necessity for cashing in on this idea was demonstrated.

To overcome this problem and lower the threshold for this group of SMEs in participating in innovation programs run by the regional government, the idea was born to introduce Frugal Innovation to a workshop routine for SMEs on 'How to innovate'. Frugal innovations are by definition non-complex and are created by entrepreneurs who do not aim at a high (financial) growth potential.

The three experts were interviewed and it was mutually decided that the workshop routine should be based on the Design Thinking process, more specifically the Double Diamond, since this concept has a proven record in creating innovation (Brown, 2008). The expert on Innovation Management recommended that the workshop routine could be based on the notion of adding frugal elements to the Design Thinking process. Adding frugal elements could even be interpreted as a process innovation itself. The frugal elements could be conceptualized and be experimented with, to see what works best. Additionally, relevant assumptions provided by all three experts can be found in the table below.

Frugal Innovation expert	Design Thinking & SME expert	Innovation expert
Frugal Innovation is a useful concept for the creation of innovation in the context of the developed world.	This kind of entrepreneurs prefer to talk to other entrepreneurs instead of listening to theoretical lecturers/ academics.	Don't use the word Frugal Innovation in the beginning but use the word "Smart Innovation" and clarify the meaning later in workshops
Participants should be owners or higher management.	Time is the most scarce resource for entrepreneurs. Limit time on theory but use the time for active engaging in discussion between entrepreneurs. Maximum 4 workshops.	One or two participants per SME depending on management situation
Participants should all be working in the same sector but should not be direct competitors.		Timing; Two weeks between each workshops. Max 4 workshops.

Table 1 Assumptions relevant for the workshop routine

These findings were connected with the literature review, especially the directions for future research (Pisoni et al., 2018). Based on these findings and the literature review, the presented research question ("How can frugal elements enhance the design thinking process, to support SMEs in creating, commercializing and diffusing frugal products, services and/or processes?") was confirmed.

Phase 2; Conceptualization

Based on these preliminary findings, a first framework for the workshop routine was designed. With the Double Diamond as a starting point, each quarter (four in total) represents one session, with two weeks between sessions. During the sessions the participants are able to diverge and converge by discussing with other participants on what the actual problem is from a customer's perspective, and later on what possible solutions could be.

During the first quarter, the participants gain insights on trends within the industry and they visualize their own Business Model using the Business Model Canvas (Osterwalder & Pigneur, 2009) or Business Model Template (Jonker & Faber, 2021). By empathizing with customers the participants are able to re-define and/or clarify a business related problem in the second quarter. The participants brainstorm about potential solutions during the third quarter and try to create a problem-solution fit while having dialogues with fellow participants. These dialogues could be referred to as a first 'sanity'-check. Finally, in the fourth quarter solutions or created innovations are presented to the group and feedback can be gathered from fellow participants and lecturers.

The process described above can be defined as a regular Design Thinking process for SMEs. However, the uniqueness of this workshop routine lies in the addition of specific frugal elements. In discussions with the experts three elements have been defined:

- Frugal Lens
- Frugal Business Model Patterns
- Frugal Intervention

In the first quarter of the Double Diamond, participants are introduced to the Frugal Lens, a different perspective on innovation. The expert on Frugal Innovation stated that innovation is usually seen as high-tech solutions, created by high-tech companies, for customers who are able to afford such solutions. But that does not necessarily needs to be true. Why not offer simplified solutions by regular companies for customers who cannot afford top quality products? Innovations born out of the notion that we can do more with less, or for the less. This lens can be applied in innovating both internal processes, products, or services. Rethinking innovation this way can create new solutions that are otherwise overlooked.
During the second and third quarter of the Double Diamond, participants are familiarized with Business Model Innovation by introducing successful Frugal Innovations and Frugal Business Model Patterns in their industry. These examples and patterns can be used by the participants to creatively develop, or adapt their current Business Model Canvas by re-using successful solutions or recombining with other solutions. It also helps the participants with the diffusion and

commercialization strategies of innovations. Using Frugal Business Model Patterns was tested successfully in student projects.

The Frugal Intervention takes place during all quarters of the workshop routine. Meaning minimising resources as much as possible, because they can be scarce, while creating innovations and meeting the SMEs needs. This was realized by: a) limiting the time necessary to participate in this workshop routine; b) limiting the amount of time spent on explaining theoretical frameworks by maximising action-based learning; and c) inviting industry likeminded participants to accelerate the learning process by not losing any time on discussing industry differences.

In Figure 3, the graphical representation of the first framework for the workshop routine is being illustrated, based on the combination of the Double Diamond (Designcouncil, 2018) and the defined Frugal elements.

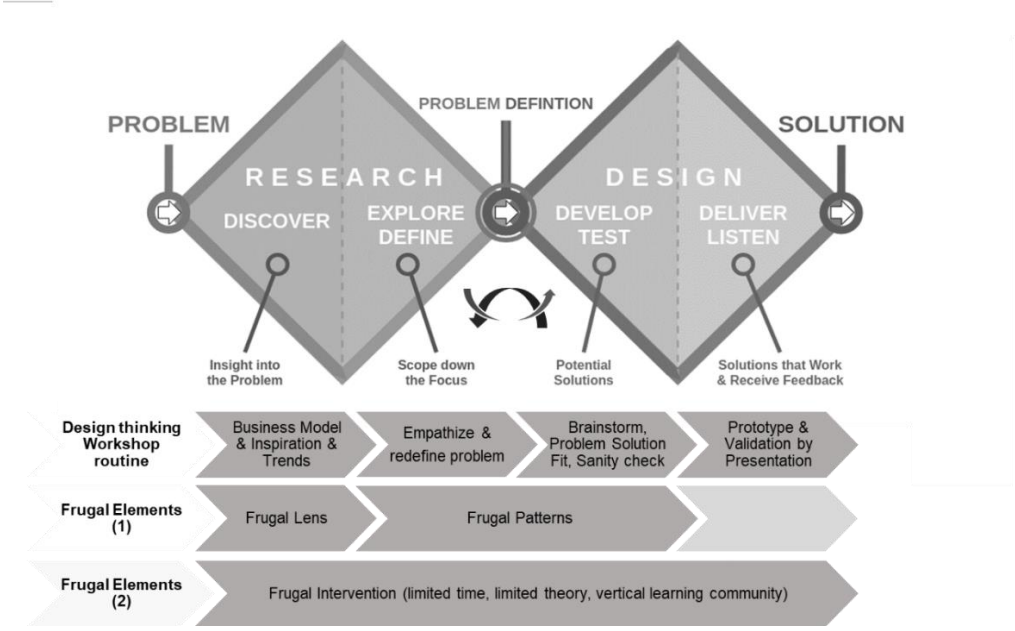

Figure 4 First framework for the workshop routine.

Phase 3; Effectiveness and Improvement

Participants for testing the first framework for the workshop routine were recruited through local agribusiness associations and Social media. As expected, it wasn't easy to persuade participants to this free-of-charge workshop routine and several stakeholders used their professional network to directly invite entrepreneurs. Frequently heard reasons for not participating were: 'I don't have enough time', 'Innovation programs are not for my kind of company' and 'I do not need help from government to run my business'. To reach a minimum amount of 10 participants, two members of the same SME could partake, under the condition that both members had a senior position in the business. The first framework for the workshop routine was tested in one trial run with 10 participants, representing seven SMEs from the Agribusiness industry in the Westland region in the Netherlands. This pilot took place in the Summer of 2021 at the Erasmus university campus in Rotterdam.

In the Table below you will find a participants' overview, including the created innovations and categorisation of these innovation based on frugality, sustainability, and realised sales:

SME	Function	Innovation	Product /Process?	Frugal?	Sustainable/ Social?	Realized Sales?	Inter-view
Solar energy solutions for growers	Owner	**Frugalize solar heat battery** for low-tech greenhouses based on the already developed heat battery that focused on high tech growers.	Product	Frugal	Social & Sustainable	No, in development	Yes
	Manager						
Producer of organic substrates	Owner	Unique **colorful socks** produced from fishing nets taken from the bottom of the sea.	Product	No	Sustainable	No	
Chrysanthemum grower	Owner	**Christmas chrysanthemums (1).**	Product	Frugal features	Sustainable	Yes	Yes
	Owner	**Simplified processes** (2) in the greenhouse.	Process	Frugal features	Neither	N.a.	
Exporter of fruit and vegetables	Owner	**Frugal Order Picking System.** Simplified warehouse procedures based on human experience instead of complex ICT solutions.	Process	Frugal features	Social	N.a.	
	Manager						
Wholesaler in Lilies	Owner	Unique **ceramic vases** as a co-sale to existing customers.	Product	No	Neither	Yes	
Fern grower	Owner	**Baby Ferns:** Blue fern cuttings in a box for end-consumers.	Product	Frugal features	Sustainable	Yes	Yes
Technical Services for Agribusiness	Manager	**Mechanical Trip Sweeper.** Instead of using chemical the Trip bugs will be swept up by a moving piece of cloth	Product	Frugal features	Sustainable	No	

Table 2 List of innovations and categorizations from the Pilot workshop

All participating SMEs who started the workshops presented a product (5), process (1) or product combined with a process innovation (1) in the final quarter. Three of those product innovations have already been commercialized. Moreover, out of the eight innovations in total, six had either frugal features (e.g. simplifying processes in the organization without using ICT solutions) and six were social or sustainable to a certain degree. These results exceeded the expectations of the stakeholders.

Immediately after finalizing the workshop routine evaluation forms were handed out to the participants. In the Table below the results are presented:

		Yes	%	No	%
1	This training has inspired me to come up with new solutions for my company?	**8**	*100%*	**0**	*0%*
2	This training has helped me grow my business?	**8**	*100%*	**0**	*0%*
3	I have become better at innovating thanks to this course?	**6**	*75%*	**2**	*25%*
4	Frugal innovation' is relevant for entrepreneurs in general?	**8**	*100%*	**0**	*0%*
5	I now have a good idea of what 'frugal innovation' means?	**8**	*100%*	**0**	*0%*
6	Frugal innovation' is relevant for me as an entrepreneur?	**8**	*100%*	**0**	*0%*
7	I am now better able to come up with ideas/solutions which are more Frugal?	**7**	*88%*	**1**	*13%*
8	Have I already applied the lessons of 'frugal innovation' within my company?	**4**	*50%*	**4**	*50%*
9	Will I continue to use the 'smart, sober and simple' principle of 'frugal innovation' in my work?	**8**	*100%*	**0**	*0%*
10	I would also recommend this training to other entrepreneurs?	**7**	*88%*	**1**	*13%*
11	I found it valuable to follow this course with fellow entrepreneurs?	**8**	*100%*	**0**	*0%*
12	I felt comfortable sharing experiences with fellow entrepreneurs during program?	**8**	*100%*	**0**	*0%*

Table 3 Participants Evaluation

Due to the limited number of SMEs participating in this first pilot it is presumptuous to draw any conclusions on the workshop's routine effectiveness from these answers. However, the answers implicate that: a) the workshop routine helped the participants to innovate and they became better at innovating; b) Frugal Innovation is a relevant concept for the participants; and c) the participants would recommend this free-of-charge workshop routine to others.

Taking a closer look at three participants who were interviewed and asked about their innovation in relation to the workshop routine, led to the following statements about the effectiveness of the workshop routine and improvements:

Questions	Participant 1	Participant 2	Participant 3
What was the innovation(s) that you have created during the workshops period?	*Two innovations. First we simplified working routines in the greenhouse and second "Christmas Chrysanthemums". In the winter, the chrysanthemum greenhouses are empty because wholesalers are convinced that Chrysanthemums are not in demand in winter. By offering chrysanthemums in sustainable Christmas packaging, we convinced wholesalers and end-customer otherwise.*	*I came up with a product called 'Baby Ferns'. This is nice little box with blue fern cuttings with all the right ingredients and a step-by-step instruction. The cuttings are leftovers. My expertise on growing Ferns is put into that box. Through this box we can directly reach end-customers and become less dependent on wholesalers.*	*In the workshop we discussed changing our current product (Solar heat battery for greenhouses) into a bootstrapped version, a frugal solar heat battery designed for low-tech greenhouses. With this adapted product, our customer base might change from 400 high tech growers in the Netherlands to possibly millions based around the equator.*
Would the innovations be created without the workshop?	*No, both innovations, process and product are a direct result of the workshop.*	*No, the workshop were essential. In my company it is difficult to discuss innovations with my subordinates.*	*No, I would not. The workshop opened our mind so that innovating is not necessarily about increasing complexity.*
What is your take on the assumptions on which the workshops are build?	*I endorse all assumptions but I would like to add that we would not have participated if a direct competitor would have joined.*	*All the assumptions are correct in my opinion.*	*I agree with all however I would like entrepreneurs from other sectors to be invited as well to enhance cross-sector innovation.*
What is your take on the effectiveness improvement of the workshop routine?	*The strength of the workshop lies in discussion between entrepreneurs within the sector and questions from the coaches. We have repeated the workshop in our organizations with employees. We are a family business; it helped the owners to agree on strategy and leadership style*	*The biggest learning lesson was that by mapping my BM and BM from other participants and BMs of successful innovators you can see where you can innovate.. Frugal Innovation gave me the insight that you can innovate on something that is already in the organization, in our case left-over cuttings.*	*Empathizing with customers and examples of Frugal BM Patterns inspired us to "Simplify" our product. By offering the frugal version to Bottom of the Pyramid growers we created a possible new market of millions and can contribute to food security (SDG2).*
What would you add or delete from the Course?	*Additional Tooling that we can re-use within the company.*	*Every participant should be asked to come up with a Frugal Innovation for one of the other SMEs. This increases one's ability to innovate, might present you with an interesting innovation but also strengthens the vertical learning community.*	*Further validation of the proposed solution as homework for the last session. Both financial validation and customers or colleagues' validation. More attention for multiple value creation. Also, more Tooling that we can re-use for future innovations.*

Table 4 Case studies / Interviews with three participants

The case studies / interviews confirm that the participants experienced the workshop routine beneficial in the creation of a relevant innovation. Also, the assumptions on which the workshop routine were based and learning how to innovate were being confirmed by the participants. Some even re-did the workshops within their own company to extend the effect of the workshop routine. Some ideas for improvement were proposed by the participants. Suggestions were: Allocating more time to validation of the proposed innovation e.g. financial validation; additional tooling which is transferable to other innovations; extra attention to multiple value creation and increasing the ability to innovate by innovating for others as well.

When comparing observations of both lecturers during and after finalizing the workshop routine, both lecturers agreed that the pilot has been a success in terms of creating innovations in a relatively short period of time. However, there is still room for incremental improvements. Some ideas for improvement according to the lecturers are:

- The workshop increased the agility of the SMEs to innovate during changing conditions. The SMEs have superior knowledge of their own processes and markets. The workshop helps participants to look beyond their markets / industry;
- In addition to the Frugal lens a "multiple value-lens" could be added to the first session, in order to increase the likelihood of innovations being either social or sustainable. An entrepreneur's main focus is financial, but this could be extended. This can replace general clips on innovation outside the industry which did not resonate well with the participants;
- When two participants from the same SME join the workshops this leads to an unexpected by-product. The creation of a new innovation resulted not only in an innovation but also in the development of a shared view on leadership within the SME. Innovating is also deciding on how to approach future challenges. The workshop triggered vital discussions. Pairs should be stimulated to join the workshop and the leadership development should be a part of the workshop routine.
- Allocating enough time before the last session in order to create a prototype and financial validation of the innovation, and prompting participants to present such findings in the final session. The session can be combined with feedback from other participants.
- The trainers' role for this target group (the peloton of SMEs) should be primarily facilitating dialogue between participants, limit theoretical frameworks, simply explain the tools and maximise action learning, but also ask critical questions regarding the innovations. The perspective of somebody not working in the sector was much appreciated by the participants.

The gathered data on the effectiveness and improvements resulted in an improved framework design of the workshop routine with incremental changes based on the input from the participants and the lecturers. The incremental changes are in black.

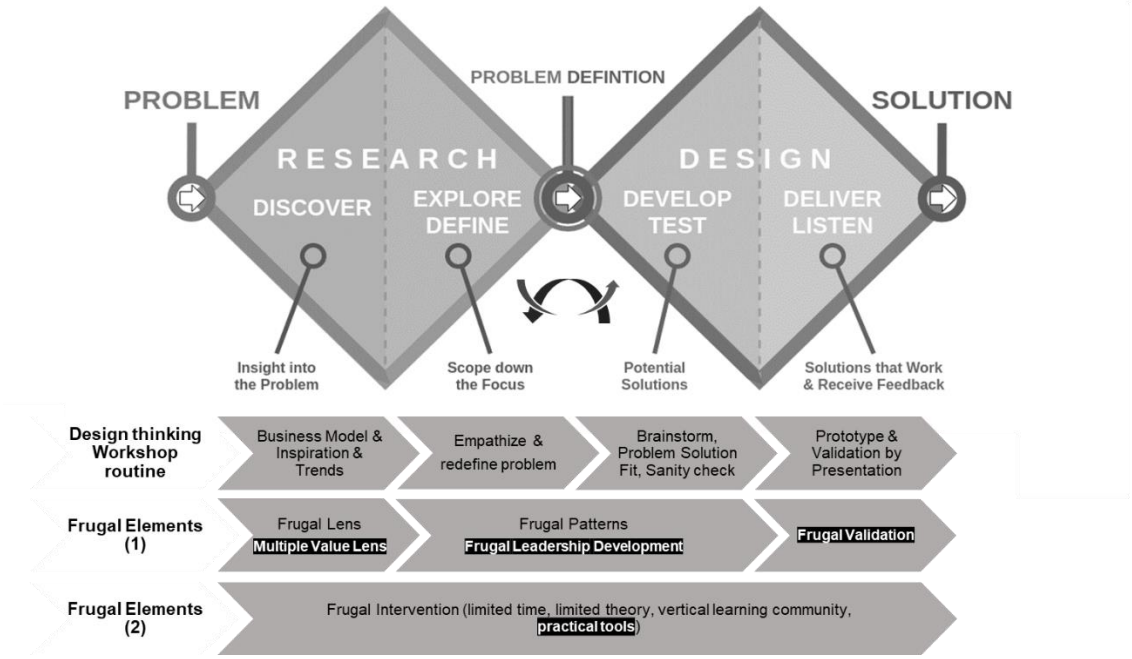

Figure 4 Adapted workshop routine after feedback from participants and trainers

Four items were added to the routine. At the start of the workshops attention should be given that the goal of the workshop is value creation, creation of value for customers and employees, financial value for continuity but also value for the planet as a whole. This may lead to even more sustainable innovations. As a by-product, pairs from SMEs experienced growth in common understanding of future strategy and leadership within the SME. This should be addressed explicitly at the start, and before the workshops. The proposed solutions should be validated better but in a time efficient (Frugal) way. Finally, participants requested additional, practical tools (e.g. financial validation) for implementation after the workshop. These improvements should help SMEs to increase their innovation ability beyond the innovation created during the workshops.

Phase 4; Continuous improvement

This framework for a workshop routine is a work in progress. Only one pilot has been completed with actual practitioners. When writing this paper, already other workshop routines for SMEs operating in other industries besides the Agribusiness industry have been pre-discussed with different policymakers of the regional governmental agency. After each future iteration, the framework for the workshop routine needs to be evaluated using observations, discussions and questionnaires. This, in order to determine benefits, remaining gaps and possible improvements.

However, to be considered ‘validated in practice’, the framework for the workshop routine must be empirically tested and needs to be documented in a future publication. When applying Bocken’s checkbox for Circular BMI tool development Bocken et al., 2019a) not all criteria have been met.

Criterion	Result	Remark
The workshop routine is purpose-made for sustainable BMI?	Yes/No	Indirect
The workshop routine is rigorously developed—from both literature and practice insights?	Yes	
The workshop routine is iteratively developed and tested with potential users?	Yes/No	Only one Pilot
The workshop routine integrates relevant knowledge from different disciplines?	Yes	DT & FI
The final workshop routine version has then been used by practitioners, preferably multiple times and an evaluation of this process is done to assess workshop routine usefulness?	No	Final version not available
Evaluation of this process is done to assess workshop routine use and usefulness?	Yes/No	More iterations are necessary
The workshop routine provides a transparent procedure and guidance on how others can use the Workshop routine?	No	Not available yet
Sustainability objectives and impact are firmly integrated into the workshop routine?	No	Could be improved
The workshop routine is simple and not too time-consuming?	Yes	Frugal Intervention
The workshop routine inspires or triggers (business) change?	Yes	
The workshop routine is adaptable to different (business) contexts?	Yes	

Table 5 Checklist for CBMI tool development (Bocken et al., 2019a)

This needs to be accomplished in the coming period with a special focus on gathering data for improvements in future iterations and increasing the sustainability impact. The latter could be attained, according to one of the interviewed participants, by extending the focus on multiple value validation, exceeding the financial value.

Discussion and preliminary conclusions

The concluding section of this paper summarises the key findings and addresses the key research question – how frugal elements could enhance the design thinking process, to support SMEs in creating, commercializing and diffusing frugal products, services and/or processes – by developing a framework for a workshop routine. This is followed by limitations & recommendations for future research directions. Subsequently, a final important implication of this research is discussed.

Key findings & policy implications

The common thread when developing this framework for a workshop routine was doing more with less. By adding frugal elements to the design thinking process, a workshop routine was created. The workshop routine should result in the creation and commercialization of several innovations/solutions for a specific group of SMEs. This specific group of SMEs, the 'peloton' are normally hesitant towards innovation programmes, often overlooked due to the governments primary focus on the industry's frontrunners.

In a pilot, this peloton of SMEs was challenged to capture and create value with frugal innovations in their products, services and/or processes, and improve their overall sustainable business modelling process. The Pilot was successful in the creation of products, process or business model innovations. 75% of the innovations can be classified as sustainable or social. All participants perceived the workshop as successful in assisting them to innovate. Adding frugal elements

resonated well with this target group. Valuable feedback from the participants was gathered to further improve the effectiveness of the workshop routine.

The key research question of this paper has been answered by developing a framework for a workshop routine based on the Double Diamond process, describing the divergent and convergent stages of the design process (Designcouncil, 2018) and the following Frugal elements:

- Frugal Lens with a focus on (multiple) value creation
- Frugal Business Model Patterns
- Frugal Leadership Development
- Frugal Validation
- Frugal Intervention (limited time, limited theory, vertical learning community, practical tools)

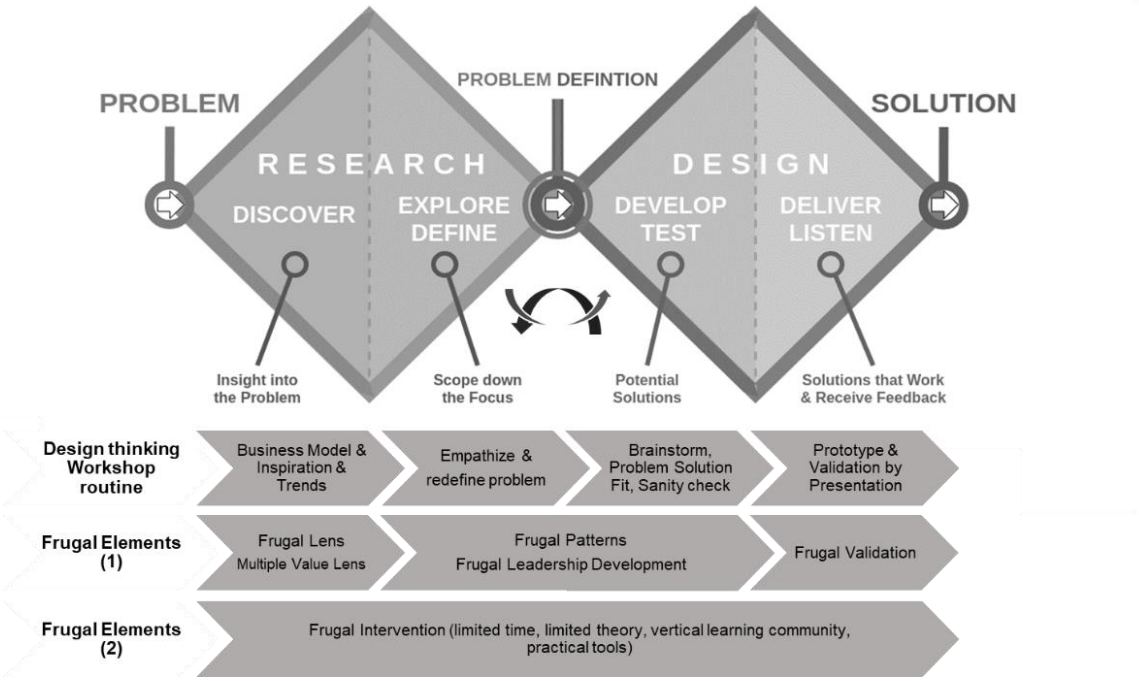

Figure 5 resulting preliminary workshop design

Although design thinking has already been successfully applied to such fields as product innovation and business model innovation(Geissdoerfer et al,. 2016), the present study was, as far as we know, the first attempt to make the design thinking process itself frugal. By 'Frugalising' the design thinking process with its focus on simplicity and limited resources, the specific target group of SMEs might be willing to invest some of their precious resource time to innovate. And policy makers might start to pay extra attention to this, in economic terms, interesting group, next to the industry's frontrunners. This particular focus might indirectly create innovations that are sustainable although this was not be the primary focus of the SMEs at the start as was shown in the Pilot.

Limitations & recommendations

Although the pilot could be considered a success based on the amount of product/process innovations that have been created by the participating SMEs and already partially commercialized, future iterations are necessary to reach a fully developed framework for the workshop routine. Therefore, a recommendation would be to execute several more pilots over the coming years, in order to enable these future iterations and validation of the framework in practice. Only then, the framework for the workshop routine can be empirically tested and documented in a future publication.

To further accelerate such future iterations and validation, another recommendation would be to develop transparent procedures and guidance on how to facilitate the workshop routine. Recruiting and educating a group of trainers, next to the current two trainers, is meant to minimise the risk of research stagnation and increase independency. Special focus on SMEs should be taken into consideration while recruiting and educating these trainers.

Applying the framework for the workshop routine in different industries might also result in different combinations of frugal elements, with different successful or less successful outcomes. Based on one pilot it is not possible to draw any conclusions regarding the success rate in different industries. Therefore, a final recommendation would be to run pilots for pelotons of SMEs operating in different industries.

Further implications

For SMEs creating sustainable value is not on the forefront of their mind. Continuation, especially in times of crises, is foremost (Pisoni et al., 2018). Therefore, sustainability objectives were not explicitly incorporated into the design of the framework for the workshop routine. It was assumed that it might avoid SMEs from not participating in the workshop.

Although, sustainability had not been included as a topic, it was still surprising to discover that six out of the eight innovations created during the pilot showed sustainable or social features. These results implicate there is a need to further understand the link between the frugal elements and sustainable outcomes.

Also sustainability could be addressed more prominently during the workshop routine. One of the interviewees even suggested to increase the scope of value creation to the SDGs. This could be done by quantifying the financial, social or sustainable impact of the created innovations. Adding practical tooling – based on the 17 Sustainable Development Goals of the United Nations (Kraaij & Poldner, 2021)– will make it possible to simultaneously measure the social and sustainable impact of frugal innovations (Pisoni et al., 2018) and persuade this group of SMEs that it is worthwhile to put sustainability in the forefront of their mind.

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Joint project partnerships between sustainable entrepreneurs and higher education institutions: A critical analysis

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Abstract

Corresponding to surging policymaking and public interests in sustainable entrepreneurship and innovation as well as the role of Higher Education Institutions in fostering them, the current research offers a critical perspective on joint project partnerships between universities and sustainable entrepreneurs. Through a networks approach, the problematic areas of joint project partnerships are identified and analysed through a two-stage research process including a survey and a series of in-depth interviews.

Keyword

sustainable entrepreneurship, university-enterprise partnerships, critical analysis, networks

Introduction and scope of the study

For decades before and after the conceptualisation of Sustainable Development by the World Commission on Environment and Development (WCED, 1987) and later the ratification of the Kyoto Protocol (1997), a climate change paradox endured. Developing countries (e.g., from central Africa) which contributed less towards climate change were experiencing the consequences (i.e., extreme weather phenomena) most intensely. Conversely, the northern hemisphere, a major contributor to climate crisis through the industrial revolution, was experiencing less environmental externalities linked to it. Today, while ramifications of anthropogenic climate crises are increasingly evident in developed countries (e.g., wildfires in the US, Canada and Australia, summer flooding in northern Europe, extreme temperatures and wildfires in southern Europe and North America), the transition towards sustainable development has been set as the current century's ultimate challenge. It lead policymakers to set ambitious plans, such as the United Nation's 2030 Agenda (UN, 2015). Sustainable entrepreneurship and innovation were acknowledged as a cornerstone in the process of transition to a sustainable world.

The origins of sustainable entrepreneurship as a field of practice trace back to the 1960s and the peace movement which inspired the rise of early entrepreneurs with sustainable goals (Schaltegger & Wagner, 2008). The movement's culture and philosophy along early entrepreneurial role models influenced the mindset and emergence of contemporary sustainable entrepreneurs (Outsios and Kittler, 2018). As a research field, sustainable entrepreneurship emerged in the management science during the 1990s with sporadic seminal works in the form of conceptual and theoretical contributions (e.g. Blue, 1990; Bennet, 1991; Berle, 1991; Hart & Milstein, 1999). Although significant research breakthroughs have been achieved in the field of entrepreneurship research, sustainable entrepreneurship research only recently has started to make significant contributions to theory and practice.

On a regional and policymaking level, the European Union (EU), through its parliament and executive institution (the European Commission), set out the "2030 Climate Target Plan" for the immediate, significant reduction of greenhouses gases and carbon neutrality by 2050 (European Commission, 2019). To achieve this complex and challenging goal, the European Commission invests important economic resources on sustainable entrepreneurship and innovation across industries. While to date research in the area has been significantly underfunded and scarce, the emergence and growth of sustainable entrepreneurs flourished. One key area of public, policymaking interest and EU investments is joint project partnerships between sustainable enterprises and Higher Education Institutions (HEIs). Knowledge transfer and the opportunity to generate, test, commercialise and scale up sustainable innovations have created a proactive framework for the partnerships.

The current study draws upon research advancements in network perspectives in entrepreneurship research (e.g. Theodoraki *et al.*, 2018) and contributes to the expanding debate on the context of sustainable entrepreneurship. The study analyses critically the joint project partnerships between HEIs and sustainable entrepreneurs. For research purposes the definition suggested by Dean and McMullen (2007) is adopted and environmental entrepreneurs are considered a subset of a broader sustainable entrepreneurs' group. Environmental entrepreneurs are defined as actors who enter "the process of discovering, evaluating, and exploiting economic opportunities that are present in environmentally relevant market failures" (Dean & McMullen, 2007:58). The following sections focus on the analysis of existing research on the topic (section 2), the study's research approach (section 3). Finally, section 4 is dedicated to the anticipated findings and the contribution to theory and implications for practice.

Background and current knowledge on the subject

HEIs and especially universities, are strongly encouraged (e.g., financial incentives, stronger research profile, commercial overreach) by policymakers and research to explore and identify opportunities to engage with existing or emerging sustainable entrepreneurs (Fichter & Tiemann, 2018). Potential emerging, existing or latent sustainable entrepreneurs are equally encouraged (e.g., financial incentives, access to knowledge) to enter joint partnerships with HEIs in research and development of new innovative ideas, products and services (Volkmann *et al.*, 2021). The scope is to create a thriving environment to design, develop, implement and commercialise sustainable innovation projects. The market and literature are dominated by successful stories from across sectors. Nevertheless, research in the area of partnership between HEIs and sustainable entrepreneurs lacks critical perspectives. To date research focused mainly on amplifying the

positive side of those partnerships, while knowledge on the characteristics and quality of those interactions remains fragmented (Gast *et al.*, 2017).

The study corresponds to recent calls for further research on sustainable entrepreneurial context, with a specific focus on the role of universities in fostering sustainable entrepreneurship (Gast *et al.*, 2017; Pinna, 2021). Extant literature acknowledges in financial institutions, HEIs, customers, suppliers, policymakers and other sources of cultural and the economic value the contextual elements of sustainable entrepreneurial networks (Welter, 2011; Pankov *et al*., 2021). Universities play an important role in fostering sustainable entrepreneurship (Hayter 2016; Theodoraki *et al*., 2018).

Neumeyer and Santos (2018) underline the need for further research on HEIs as components of sustainable entrepreneurship ecosystems. A remaining less explored area of network research in sustainable entrepreneurship is the investigation of the interaction between actors and specifically universities and sustainable entrepreneurs in joint partnerships. A systematic evaluation of existing knowledge on the subject including systematic queries on four major data bases, (i) the Web of Science, (ii) Science Direct, (iii) Emerald and (iv) Ingenta with all possible combinations of relevant keywords has resulted to the identification of only two relevant research articles. The identified relevant studies include research by Nave and Franco (2019) and a study by Sáez-Martínez *et al.* (2019). Both studies make significant theoretical contribution to university-firm cooperation literature in sustainable entrepreneurship. Yet questions regarding problematic areas remain unaddressed.

The role of networks and sustainable entrepreneurial ecosystems has in the past been amplified (Cohen, 2006). More recent studies identify the evolving role of universities in sustainable entrepreneurship (Theodoraki, 2016; Gast *et al.*, 2017; Munoz and Cohen, 2018). Problems and obstacles (e.g., general management disagreements, disputes over management of funds and intellectual property rights) between sustainable entrepreneurs and Higher Education Institutions have been documented. The area lacks a critical perspective on the interactions between universities and sustainable entrepreneurs. The current study addresses the relevant knowledge gap by focusing on the analysis of problematic areas in joint project partnerships between sustainable entrepreneurs and universities.

Research Approach

The current research project seeks *to critically analyse the joint project partnerships between sustainable entrepreneurs and Higher Education Institutions*. It focuses on the context of sustainable entrepreneurial activity and specifically the dynamic of partnerships between environmental entrepreneurs and universities. The critical realist epistemological assumptions which guide the current research stem from the nature of the subject (the partnerships) and the topic (the problems) under research. Blundell (2007) argued of the advantages critical realist approaches confer to entrepreneurship research (Mole & Mole, 2010 Matthyssens *et al*., 2013). The subfield of sustainable entrepreneurship to date lacks critical perspectives, which combined with the use of a mixed methods research approach enable to develop a more realistic view of the topic under research (Molina-Azorín *et al.*, 2012).

The research focuses on environmental entrepreneurs in Belgium, a country context which offers significant advantages from a research, policymakers and practitioners' standpoints. Belgium is located at the heart (geographically and institutionally) of the EU. The country's strong (founders of European Union and basis of the European Commission and European Parliament) links to the European Institutions has enabled to develop a thriving environment for sustainable entrepreneurs, who benefit from the proximity to the EU institutions in gaining financial and other forms of support. In many sectors Belgium is a pioneer in the implementation of European legislation. An inclusive approach will be adopted by incorporating in the sample environmental entrepreneurs who emerged independently, or as spin-offs, through incubators, or accelerators. The main inclusion criteria are (a) to be environmental entrepreneurs and (b) to participate in a joint project with a university.

For the study's primary data collection and analysis purposes a mixed methods research strategy will be employed. Specifically, the systematic review of knowledge in the topic enabled to develop a fifteen question survey with the scope to assess the satisfaction levels of sustainable entrepreneurs in specific areas of joint projects with universities. Findings will be used to develop questions for a series of semi-structured in-depth interviews. Statistical analysis (i.e. liner regression) will be used to analyse the data collected from the survey. Qualitative thematic analysis will be used to analyse and identify themes on problems and areas for improvement during project collaborations as well as other interesting but currently unidentified yet themes.

Data analyses will also help highlight common patterns as well as differences in the experiences of those collaborations among participants. Overall, the principles of rigour and trustworthiness transcend the project which has been designed, is being developed, and will be completed around the universal research criteria of external and internal validity, reliability, and objectivity (Saunders *et al.*, 2003; (Bryman & Bell, 2011). A detailed plan of specific actions for each criterion of research verification is under constant development.

Anticipated Findings Contribution to Theory and Implications for Practice

The study contributes to theory development in sustainable entrepreneurship research, by shedding light on problematic areas in joint project partnerships between environmental entrepreneurs and universities. By doing so, it contributes further to the emerging ecosystems literature in entrepreneurship research by offering data and analysis from the subset of environmental entrepreneurs, a group currently overlooked by the research stream.

The present climate crisis amplifies the topic's timeliness, while sustainable entrepreneurship and innovation became key parts in sustainable development. The project focuses on a critical population, sustainable entrepreneurs, identified as change agents in the process of transition towards a sustainable economy. The study's findings will confer significant implications for practice and specifically for practitioners (i.e., environmental entrepreneurs and universities), policymakers and educators. The findings will offer a framework and guide for policymakers and practitioners to increase the efficiency and effectiveness of future joint project partnerships. This will enable to decrease the risk of failure in future projects. Environmental entrepreneurs can use the study's findings as a guide for anticipated risks and issues before entering the process of joint project

partnerships and prepare adequately in order to overcome them. The findings will also inform educators of potential issues relevant to joint project partnerships and of ways to improve their education and training curricula on specific areas.

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A Sufficiency Business Database as a Tool to Drive Sustainable Business Models

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Extended abstract

Humanity has already crossed five of the nine planetary boundaries (Persson et al., 2022; Steffen et al., 2015): we have seen a sharp decline in biodiversity and an increase in greenhouse gas emissions, destroying the ecosystems we rely on. There is a clear need to realign systems of production and consumption into sustainable pathways. While parts of humanity are struggling to meet basic needs, affluent parts of societies are overconsuming resources. The concept of sufficiency advocates a levelling of consumption towards sustainable levels to reduce resource use and stay within planetary boundaries while meeting human needs for all (Spangenberg & Lorek, 2019). Sufficiency is about fulfilling human needs, now and into the future, with a minimal input of resources (Alexander, 2012). As such, it is closely related to the concept of frugal innovation, which partly focuses on sustainable consumption (Pisoni, Michelini & Martignoni, 2018). While frugal innovation differs from sufficiency in some respects (e.g., a stronger focus on production), both fields acknowledge the need to limit and decrease resource consumption (Prabhu, 2017). Research has highlighted the need to integrate sufficiency into frugal innovation (Albert, 2019) and pointed to the potential of frugal innovation in driving sufficiency-enabling business models (Bocken & Short, 2016). We argue that the concept of sufficiency will be needed to shift the focus in business towards a different view on consumption, ultimately towards consuming less.

Business model innovation for sufficiency deserves more attention to ensure that business models implemented with the aim of sustainability indeed support reduced resource use rather than intensifying the problem. With research increasingly recognizing the need for sufficiency to be built into the circular economy (Velenturf & Purnell, 2021), and research on sufficiency growing (Sandberg, 2021), there is potential for researchers to guide the transformation of business models into full sustainability. Tools are used in sustainable business model innovation to "support understanding, assessment, creativity and/or change on particular practices" (Velter, Bitzer & Bocken, 2021: p. 3). They can help in the design of business models and take different forms, such as the Business Model Canvas (Osterwalder, 2010), archetypes or typologies (e.g., Bocken et al., 2014; Luedeke-Freund et al., 2019). Another tool for sustainable business innovation are databases; for instance, to collate business model patterns (Remane et al., 2017) or circular practitioners and their experimentation practices (Circular X, 2022). While tools and databases for sustainable

business models are growing in number (Geissdoerfer, Vladimirova & Evans, 2018; Pieroni, McAloone & Pigosso, 2019), there is a distinct lack of tools on sufficiency. This database is aimed at filling the gap: By providing real-world examples of businesses that support sufficient consumption through their communication and actions, the database highlights the viability of sufficiency-oriented strategies. Companies can learn from practice and be inspired to adjust their own business model. Following the idea of open science, this public database is also meant to increase the visibility of sufficiency action already happening at the business level and provide an informational resource for research, policy makers and the general public.

The sufficiency business database tool is built on original research by Niessen and Bocken (2021). In their paper, the authors identified sufficiency-enabling business practitioners through a 3-step research process. First, they reviewed literature on sufficiency business strategies, then they completed an online keyword search for companies communicating about sufficiency. The results were then complemented with expert recommendations of businesses that support sufficiency. The review in Niessen and Bocken (2021) resulted in an analysis of sufficiency strategies for 105 businesses and an assessment of the viability, desirability, feasibility and sustainability of Business for Sufficiency strategies.

This research expanded the existing list of 105 companies through further recommendations by experts and by reviewing online lists of sustainable companies. Following Niessen and Bocken (2021), businesses were selected if they actively communicate to consumers about the need to change consumption patterns (e.g., recognizing resource constraints / overconsumption; suggesting slow consumption / consuming less). After screening, another 45 sufficiency-enabling businesses were added to the database. All 150 companies were reviewed again to identify and summarise their business model characteristics (value proposition, creation and delivery, capture) (Bocken, 2015), add exemplary sufficiency statements, map the Business for Sufficiency strategies applied (based on Niessen & Bocken, 2021), and include the company's purpose and specific governance status (e.g., B-Corporation certified, social enterprise). Data was collected from the

Figure 5 EXTRACT FROM SUFFICIENCY BUSINESS DATABASE (OWN SOURCE)

companies' public communications (e.g., website, LinkedIn profile) and gaps were filled with publicly available data (e.g., national company registries, Crunchbase financial data). Throughout the review process, over 1,200 documents were coded in Atlas.ti to populate the initial Google Sheet-based database with relevant information (see excerpt in Figure 1). After the database was populated, each company in the database was contacted in January 2022 to review their entry and add any missing information. Company feedback from 42 businesses was integrated and the database is intended for further expansion with new cases.

The database will be continuously improved based on company feedback and new business cases. To make it an attractive tool for business, policy makers, researchers and the general public, it will be redesigned to include search functions and enable easy comparability. This will ideally be piloted

	A	G	H	I	J	K
1	**Business**	**BFS strategies**	**Value proposition** **1. Product / service** **2. Customer segments & relationships** **3. Value for customer, society & environment**	**Value creation** **4. Activities** **5. Resources** **6. Distribution channels** **7. Partners & suppliers** **8. Technology & product features**	**Value capture** **9. Cost structure & revenue streams** **10. Value capture for key actors (incl. environment & society)** **11. Growth strategy /ethos**	**Purpose**
136	Vitsœ	Design Green alternative Moderating sales Question consumption Awareness-raising Life extension service Support for repair	1. Product: Modular, adaptable furniture; Service: Repair and set-up 2. Customer globally; premium pricing 3. Low-impact, long-life furniture	4. Producing and selling furniture; Installing, moving and repair service 5. ? 6. Shops in UK, Germany, US; own website 7. Most suppliers within 2hrs drive from headquarters (514) 8. Modular design created by Dieter Rams	9. Product sales and service fees (both at cost price) 10. Low-impact, long-life products 11. Growth (interview)	[T]o allow more people to live better with less that lasts longer. (514)
		Personalised production Support for repair Awareness-raising	1. Products: Children's bicycles and toys; Service: Platform for	4. Producing and sellilng children's toys; Providing resale platform and repair instructions	9. Product sales	We are on an anti-consumption, circular business mission to crea

with users (e.g., researchers or businesses) to ensure they can access the relevant information easily and preclude the database not being used as a tool (Bocken et al., 2019).

Some limitations to this research should be highlighted. First, businesses were identified as sufficiency-supporting based on their own communication only. Companies were added if they advocated changed consumption behaviour but the actual impact of their sufficiency strategies could not be established in this research. Patagonia's 2011 'Don't buy this jacket' marketing campaign, for instance, led to increased sales (Meltzer, 2017). Understanding the impact of sufficiency-supporting companies on consumption has been identified as a barrier by previous research (Bocken et al., 2018; Niessen & Bocken, 2021). Second, of the sixteen Business for Sufficiency strategies previously identified in Niessen and Bocken (2021), businesses in the database most commonly implemented the strategies *Green alternative* (providing more environmentally-friendly products / services), *Awareness-raising* (of consumption impacts, e.g., through social media) and *Design* (for longevity, reparability, etc.). More radical strategies such as *Question consumption* (openly questioning if something should be bought, e.g., on Black Friday) or *Moderating sales* (foregoing discounts and price reductions) were the exception. This might be due to the pressure to be profitable and the need to grow sales to satisfy stakeholders. Alternatively, companies might simply not be aware of these sufficiency strategies or perceive them as 'anti-business'. Future research could investigate the impact of sufficiency businesses on their customers' consumption as well as how business sufficiency strategies relate to issues such as business governance, ownership, or finance (Kelly, 2012).

To conclude, this database of sufficiency companies was created as a tool to support sustainable business models, to raise awareness among policy makers and the general public, and to support further research into the topic. Sufficient consumption is a requirement for remaining within the planetary boundaries while meeting current and future needs of humans. Sufficiency-enabling business models can support the development of more sustainable consumption patterns, and, paired with concepts like frugal innovation in production, can greatly reduce resource use and its associated negative impacts.

Keywords

Sufficiency, Sustainable consumption, Sustainable business models, Database, Business model tools

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Types of innovation strategy and implementation of various circular economy practices: findings from an empirical exploration

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Abstract

This paper goes beyond the literature that argues for environmental innovation as an essential driver of the transition to a Circular Economy (CE). We do so by examining whether firms deploying specific innovation strategies are better placed to adopt this transition. We distinguish four basic Schumpeterian innovation strategies (product, process, single, complex innovation strategy) and three others (frugal, organizational, Business model innovation). Regarding the transition to the CE, we measure this movement by examining the adoption by the firms of five categories of circular practices in the Flash Eurobarometer survey, which have been used extensively in empirical studies. From the estimations of multivariate probit models, we find that having a product innovator strategy does not have much influence on the adoption of CE practices, while a process innovation strategy has slightly stronger impact. The most influential strategies are complex innovation and frugal innovation. Business Model innovation has an effect on the implementation of two among the five CE practices examined in this study. Overall, our study reveals the specific types of innovation strategies that are more impactful regarding the transition to the CE.

Keywords

Circular economy, Innovation, Business Model, Chemistry sector

Digital technologies and frugality to tackle educational challenges at the Bottom of the Pyramid (BoP)

Evidence from the OLPC case study

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Abstract

International organizations are continuously stressing the importance of social inclusion in education for children at the Bottom of the Pyramid (BoP). Over the last few years, these organizations have revealed promising hope on the impact of digital technologies (the so-called ICT4E) in overcoming disparities around the world, especially when referring to inequalities in improving education opportunities. However, the process to achieve a successful implementation and diffusion of ICT4E appears to be a complex issue. Literature investigating ICT4E is scattered among different field of research (mainly social science and humanities, engineering, but also management and economics) and there is not a clear-cut picture on the specific factors that may affect the successful implementation of these technologies. We chose a single case study to investigate the proposed issue and contribute to the debate around "digital technologies for teaching and learning" at the BoP. The One Laptop per Child (OLPC) project was chosen for its unique characteristics of frugality, because of the proven potentials of frugal innovations to tackle resource constraints at the BoP. OLPC was conceived and developed at the MIT Media Lab and launched in 2005 with the aim to provide underprivileged primary school students with low-cost, low-power, durable and rugged laptop PCs. This case study reveals interesting results about the evolution of the project over the years and shows the factors that positively or negatively affected the overall project implementation, along with the main challenges to be faced while implementing digital technologies for teaching and learning at the BoP.

Track 2.6 - Sustainable Development, reporting and digital transformation

Track Chairs: *Anna Minà (LUMSA University) Gennaro Iasevoli (LUMSA University)*

Analyzing Business Model Components for a Care Platform: A Human-Centered Design Approach

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Abstract

Digitization and sustainability require new business models and problem-solving strategies concerning accompanying challenges. The development of new business models and the adaptation to new customer expectations could be a solution for growing challenges as well as a means to position digital services on the market. The human-centered design approach is applied to analyze several aspects of a successful business model in regards to a care platform. This makes it possible to examine new customer needs concerning care products and services. Therefore, following this approach, relevant business model structures of Osterwalder and Pigneur's Business Model Canvas with regard to a care platform were analyzed. The paper shows relevant insights regarding possible customer groups, channels to address customers, the value proposition, and financing approaches for a care platform.

Keywords

Human-Centered-Design Approach, Care Platform, Business Models

1 Introduction

Digitization offers many opportunities for companies and projects and allows new forms of digital services to be created (Marquardt, 2017). Concerning areas like Internet of Things (IoT) and Ambient Assisted Living (AAL), new products and services emerge constantly, indicating a high level of innovation. On the other hand, this also means that the development of new business models and value propositions

is crucial (Ju, Kim & Ahn, 2016; O´Neill & Realinho, 2015). Despite the advantages, this also challenges companies, as the new markets are dynamic and changing rapidly. Additionally, competition in this area is high and new customer needs make a fast development of new services and business models necessary (Marquardt, Olaru & Ceausu, 2017). The main expectation of customers is a high quality of new services. Therefore, these services must positively influence customers' satisfaction and experience (Marquardt, Olaru & Ceausu, 2017). To establish digital services and products successfully and sustainably on the market, innovative business models are relevant.

However, not only in business model literature these opportunities and challenges become relevant. In the context of sustainability, and especially within social sustainability discussion, new business models – e.g. circular business models – are a new focus of research (Walker, Opferkuch, Roos Lindgreen, Simboli, Vermeulen & Raggi, 2021). Although social aspects, such as those addressed by a care platform, are considered highly relevant by companies, in practice there are still problems implementing social dimensions within circular business models – among others. Reasons for this are sought in their complexity and a lack of practical standards (Walker, Opferkuch, Roos Lindgreen, Simboli, Vermeulen & Raggi, 2021).

To examine new business models within a socially sustainable context of a care platform, the human-centered design approach is applied to capture the needs and wishes of stakeholders included in the development process of a care platform. This is currently the case in the joint project Smart Care Service[17]. In the project, a digital care platform that offers digital health and care services and products, therefore enabling people with assistant needs a flexible booking of tailor-made care services, is developed. With this kind of new digital service, the shortage of skilled workers can be tackled. In this paper, the aim is to apply the human-centered design approach to analyze certain structures of the Business Model Canvas by (Osterwalder & Pigneur, 2010) in regards to a care platform.

2 Human-Centered-Design Approach

The Human-Centered Design Approach ist typically used to align user and stakeholder requirements for a product or service with the technical framework. The aim is to improve the development process of products and services and to prevent failures before the release of these services (Bleja, Krüger & Grossmann, 2022a; Bleja, Neumann, Krüger & Grossmann, 2022b; Tosi, 2020). The definition of human-centered design in ISO standard 9241-210 (2019) is that it presents "an approach to system design and [a] development that aims to make interactive systems user-friendly by focusing on the system's use and applying knowledge and techniques from the fields of human factors/ergonomics and usability" (ISO 9241-210, 2019).

The concept similar to the human-centered design approach is the user-centered design approach. Contrary to the human-centered design approach, users are not the only ones who are involved in the development processes. Other stakeholders who come into contact with the product or service can also be involved. In the case of a care platform, providers of products and services as well as, for example, health insurance companies, counseling centers, and other stakeholders can also be included. (Bleja, Neumann, Krüger & Grossmann, 2022b; ISO 9241-210, 2019).

[17] The Smart Care Service project is funded by the EU and the state of North Rhine-Westphalia (EFRE.NRW) as part of the European funding program for regional development.

The human-centered design approach is mainly used in project management where user acceptance and usability are among the key aspects of the project's sustainable success (Bleja, Krüger & Grossmann, 2022a). The human-centered design approach differs from a reactive approach by focussing on the possible target group of products and services and designing their services to them. It is important to strive for a deeper understanding of these groups of people and their specific needs. Therefore, the product or service is to be developed interactively with possible future target groups and their perceived needs and demands. With this, the added value of a product or service can be emphasized within the process (Bleja, Neumann, Krüger & Grossmann, 2022b; Staheli *et al.*, 2016).

The procedure of a human-centered design approach follows six principles. First, the development focusses on central stakeholders and the environment (Principle 1). For this purpose, these stakeholders are involved throughout the development phases (Principle 2). The design should be managed and optimized periodically (Principle 3). It is an interactive design process in which feedback loops, for example, are incorporated, since users often cannot formulate from the beginning how they specifically expect the result to be in the future (Principle 4). The design of the overall user experience should be addressed next to usability considerations (Principle 5). It is recommendable to gather a multidisciplinary project team to focus on multiple perspectives (Principle 6) (Bleja, Neumann, Krüger & Grossmann, 2022b; ISO 9241-210, 2019).

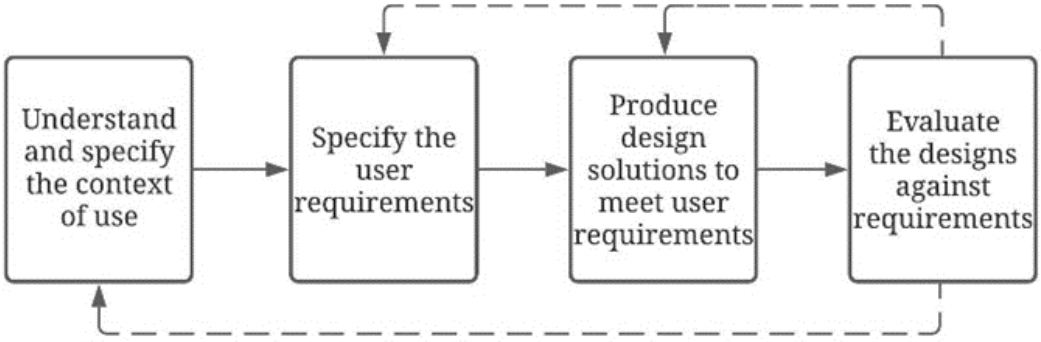

Figure 1: Human-Centered-Design Approach (Bleja, Krüger & Grossmann, 2022a; Bleja, Neumann, Krüger & Grossmann, 2022b; ISO 9241-210, 2019).

There are four basic phases to the process as well, with the design of each phase matching a specific use or need. The first step is to analyze the context of use by collecting information about the needs of potential users and stakeholders. In this phase, information about the potential targe group is collected, needs are identified and the environment of implementation is analyzed. This can be done methodically, for example, by analyzing competitors and the target group, developing personas, and interviewing potential users (Bleja, Neumann, Krüger & Grossmann, 2022b). The following second step is to define the requirements for the product or service to be developed. Consequently, a first design or concept is created. Methodically, this can happen through visualisations, mock-ups, or a prototype that the target group evaluates. The following evaluation examines the extent to which the specifications have been covered and can be implemented in the second step. In an evaluation, it is also advisable to determine whether new requirements still need to be included and supplemented. For this, it is recommended to initiate group discussions or focus groups in which the target group discusses and evaluates prototypes

to support project teams in adapting concepts interactively and iteratively if necessary (Bleja, Neumann, Krüger & Grossmann, 2022b; ISO 9241-210, 2019; Staheli *et al.*, 2016).

The following section presents the methods that have been used to date as part of the human-centered development of a care platform regarding business models. These methods include qualitative and quantitative research such as competitor analysis, expert interviews, and a survey – following a mixed-methods approach (Bleja, Neumann, Krüger & Grossmann, 2022b).

2.1 Competitor Analysis

In the project, potential competitors of a care platform were identified and analyzed. The target of the analysis was to create an overview of which services already on the market exist in the area of care platforms. Furthermore, strengths and weaknesses of competitor platforms were compared, as well as their value propositions to users (Aragonés-Beltrán, García-Melón & Montesinos-Valera, 2017). To accomplish the aims a benchmark analysis according to Fleisher and Bensoussan (Fleisher & Bensoussan, 2015) was carried out methodologically. For this, twelve – German – care platforms were analysed and selected based on their popularity. The platforms entered the market in the span of 2010 and 2015. The platforms were analyzed based on a criteria catalogue created in advance which consists of more than 50 criteria from six topic areas in total, also focusing on business models. Specifically, different areas, such as the value proposition, the target groups, the channels selected for addressing customers, and the financing measures of the selected platforms were of interest. The data retrieved of the individual care platform was from their websites and other publications, such as press articles, reports or social media presences (Bleja, Krüger & Grossmann, 2022a; Bleja, Neumann, Krüger & Grossmann, 2022b; Nohl, 2017).

2.2 Qualitative Analysis

In the next step of the human-centered design approach, qualitative expert interviews were conducted based on the results of the competitor analysis. For this, service providers were interviewed. In expert interviews, it is possible to identify the stakeholders' perceived wishes and needs as well as solution-strategies. Especially important was identifying what added value the platform must offer compared to existing solutions for people with assistance needs and how the wishes of relatives and service providers can be considered as well. This affects not only the development phase of the care platform but also the choice of business model (Bleja, Neumann, Krüger & Grossmann, 2022b).

In conclusion, qualitative guideline-based expert interviews were conducted. In comparison to standardized or problem-centered interviews, expert interviews offer more openness, so that interviewees are encouraged to express their perspectives and contribute their ideas and expertise. In qualitative social science research, there are several different forms of guideline based interviews, many using the guide as a data collection tool and orientation. Based on the research project and the objectives it pursues, expert interviews were selected as the most appropriate method to achieve the research aims. The primary focus is not on the interviewees themselves, but on the experts representing their respective work backgrounds and expertise , e.g., as care providers, care consultants, providers of care, or care product supplier. (Bleja, Neumann, Krüger & Grossmann, 2022b; Nohl, 2017).

The methodology for the guideline-based expert interviews was developed using the SSP principle of guideline development described by Helfferich (Helfferich, 2011, 2019). Following the development of the guideline, it was tested based on preliminary interviews with service providers. Within these preliminary tests, the guideline was further adapted and developed. The final guide consists of eight categories with a total of 32 questions (Bleja, Neumann, Krüger & Grossmann, 2022b).

The experts were selected to reflect the heterogeneity and complexity of the research field. Selective sampling was used rather than theoretical sampling given the limited duration of the research project. For this purpose, criteria were defined in advance as to which experts should be interviewed. Criteria included the following considerations: It was important that the experts were to come from as diverse a range of thematic areas as possible to include different viewpoints on the development of a care platform, and additionally be in contact with the target group, for example through a work-context. The interviews were mainly conducted in person at the experts' offices. The interviews were recorded using a Dictaphone and with the consent of the experts. A data protection declaration based on the EU General Data Protection Regulation (EU-GDPR) was prepared for this purpose. In the end, 15 experts were interviewed (Bleja, Neumann, Krüger & Grossmann, 2022b). The experts represented the fields of nursing and social counseling, health and long-term care insurance, housing counseling, welfare associations, financial service providers, senior citizens' representatives, and mail-order pharmacies and lasted between 45 and 90 minutes (Bleja, Wiewelhove, Kruger & Grossmann, 2021b, 2021a). Afterwards, the interviews were analyzed technically using the software MAXQDA and the content analysis of Gläser and Laudel (Bleja, Neumann, Krüger & Grossmann, 2022b; Gläser & Laudel, 2010).

2.3 Quantitative Analysis

A quantitative survey of seniors and persons with assistant needs was conducted as qualitative surveys were not possible due to Covid restrictions. The survey was conducted with seniors over 50 years of age and in cooperation with the German Seniors' League. The German Seniors' League is a platform for elderly people to get information about various topics concerning higher age.

The aim of the survey was to better understand the seniors that are potential future users of a care platform. For this, it was relevant to get to know their needs and specific wishes concerning elderly care and health care. With this knowledge, the platform can be developed in more concrete detail and adapted if necessary. Furthermore, channels to address future users could be identified through surveys (Bleja, Neumann, Krüger & Grossmann, 2022b).

Topic-specific questions (a total of 20 questions) concerning health/ elderly care and assistance, digital consultations, and financing/ funding possibilities, as well as information channels were the keystones of the survey. The target-group of the survey were older people with assistant needs that use the internet in their daily lives. For this, and due to Covid restrictions, the survey was conducted virtually on the German Seniors' League website (Bleja, Neumann, Krüger & Grossmann, 2022b).

In the end, 466 users were surveyed. Overall, 38.6% of these were male and 29.8% were female. 320 persons - i.e. a total of 68.7% - answered the question about age. A majority of the respondents were 71-80 years of age (38.8%). In addition, 26.3% were over 80 years of age or between 61-70 years of age (25.6%). Regarding their living situation, 63.9% reported being married and living in households of two (64.3%) (Bleja, Neumann, Krüger & Grossmann, 2022b).

3 Business Models

Business models serve as a tool to capture all relevant aspects that are important for the product or service to be marketed (Wirtz, Pistoia, Ullrich & Göttel, 2016). Even though there are several differing definitions of business models (Geissdoerfer, Vladimirova & Evans, 2018), business model structures, e.g. the Business Model Canvas (Osterwalder & Pigneur, 2010) or different descriptions of business models by – among others – Björkdahl (Björkdahl, 2009), Chesbrough (Chesbrough, 2010), Teece (Teece, 2010) and Zott and Amit (Zott & Amit, 2010), there are certain elements that unite these different understandings. These elements include customers, financing models, channels and the value proposition. As these elements are among the key-stones of a business model, they will be examined in more detail below (Bleja, Neumann, Krüger & Grossmann, 2022b).

3.1 Customers

The analysis of existing care platforms has shown that they primarily target the customer group of relatives. Accordingly, the recipients of the services and products to be booked on the care platforms, are mostly not addressed as customers. Instead, the care platforms studied in Germany primarily target the children of persons with assistance needs as customers. However, during the qualitative expert interviews, the care advisors reported that the partners of persons with assistance needs often visit a counseling center or make use of counselling services as a first step. The results of the quantitative survey show that regardless of their age group, people with assistant needs who are active on the internet present potential future users for a digital care platform. These persons tend to use online services both for themselves and for relatives and also want to inform themselves about care topics mainly on the internet (Bleja, Neumann, Krüger & Grossmann, 2022b).

Based on the analyses and the findings of the current report of the Initiative D21 – indicating a rise in Internet competence of the elderly – the wishes of the included target group can be considered for the development of a care platform (Initiative D21 e. V., 2022). This could be a unique selling point of the care platform compared to existing care platforms and increase the acceptance of a care platform (Bleja, Neumann, Krüger & Grossmann, 2022b).

To describe the potential customer groups for a care platform, personas were developed. Each persona represents a potential user of a care platform. By describing personas, the business model can be better targeted on future users of a platform (Blaschke, Cigaina, Riss & Shoshan, 2017). To develop the personas, a scenario analysis was first carried out. The aim of this was to identify potential customer groups for a care platform (Bleja, Engelmann, Wiewelhove & Grossmann, 2021). The basic scenarios were derived empirically using data from the Socio-Economic Panel (SOEP, 2019). To create the scenarios, a two-step cluster analysis was selected as the most suitable method for the subject of the study (Bleja, Engelmann, Wiewelhove & Grossmann, 2021). This makes it possible to process very large amounts of data and different measurement and scale levels. In addition, in contrast to the hierarchical cluster method, it has the advantage that the corresponding classification algorithm can be predefined and the number of clusters does not have to be specified (Dolnicar, Grün & Leisch, 2018; Meyers, Gamst & Guarino, 2013). Building on the basic scenarios, the personas were described. In addition to broad literature research, the results of the qualitative expert interviews were used for this. In detail, the personas are five potential users of a care platform who have assistance needs themselves and three

users who use the platform for a family member in need of assistance, i.e. a partner or a parent. The personas differ in demographic characteristics such as gender, age, marital status, education level, and net income, but also their respective affinity for technology and internet use. The personas with assistance needs also differ in the extent of their limitations, their housing situation, and their social relationships. This results in different intentions for platform use. This ranges, for example, from booking services and products to make everyday life easier, to care, to provide security in old age and relieve the burden on caring relatives, to reducing loneliness and promoting the exchange of people with similar illnesses, limitations, or hobbies. The personas make it clear how diverse the intentions of potential users can be with regard to a care platform. This also affects the other areas of the business model, such as the value proposition, the channels of approach, and the customer relationship. The personas make the targeted group even more tangible (Blaschke, Cigaina, Riss & Shoshan, 2017; Pruitt & Grudin, 2003). This makes the development of a care platform and a suitable business model more targeted and user-friendly right from the start.

3.2 Channels

The findings of the competitor analysis of different care platforms revealed that the platforms are advertised primarily by newspaper articles and television appearances. A total of 83% of the platforms use social media platforms as a channel. The usage of the platform through an app is currently offered by a quarter of the surveyed platforms (Bleja, Neumann, Krüger & Grossmann, 2022b).

As a result of the qualitative analysis, it emerged that word-of-mouth is a key factor and the most important channel for a care platform. The way this could be done is by spreading relevant information about the platform to senior groups, senior representatives, associations, clubs, health insurance companies, or private reference groups. Furthermore, articles in local, free newspapers, or national newspapers and magazines are a sufficient way to address the target group. Television and internet channels are suitable for addressing the target groups, such as Facebook, Instagram, Youtube, and online advertising networks for Internet advertising. Mailing campaigns could also generate a certain amount of reach. According to the respondents, the platform must be quickly suggested via online search engines, such as Google. For further inquiries, a telephone number and e-mail address must be easily found on the platform's website (Bleja, Neumann, Krüger & Grossmann, 2022b).

In the quantitative survey conducted with the German Senior Citizens' League, participants were asked, which information channels they use to stay informed about current health and care offerings. This showed that 57.5% of respondents use the Internet as a source of information. This is followed by care services and friends and family, each with 36.5%. Professionall offerings, such as care support points (24.2%), the home environment (11.6%), and the medical supply store (11.2%) are used as information channels by some of the respondents. Subsequently, the respondents rated the aforementioned information channels according to their significance. This revealed that 57.3 % of all participants and 34.5 % of those aged 80 and over considered the Internet to be the primary source of information. This aligns with the findings of the Digital Index stating that older people become more internet-affine (Initiative D21 e. V., 2022). Family and friends, on the other hand, were rated as the most significant information channel by 30.1 % of respondents. The survey also allowed participants to indicate other information channels via a free-text field. Here, especially the following channels stand out: primary care

physicians, pharmacies, municipalities, television reports, free pharmacy magazines, colleagues, the community, and health insurance companies (Bleja, Neumann, Krüger & Grossmann, 2022b).

Specifically in the area of the high-age people, the study is not representative. This is also illustrated by the German Digital Index 2020/21, pointing out that 72% of the over-65's are so-called "offliners" and thus do not actively use the Internet (Initiative D21 e. V., 2022). However, the target group of survey participants were primarily internet affine older people who are possible future users of the care platform and not the whole population. Therefore, the survey was also conducted online (Bleja, Neumann, Krüger & Grossmann, 2022b).

3.3 Value Proposition

The value proposition is at the center of a business model and one of the most crucial parts when developing new business models. It is a reflection of the value or added value that customers achieve by purchasing a product or receiving a service (ISO 9241-210, 2019). The aim is to explore why prospective customers use the care platform from their perspective and how this consideration can be considered in development processes.

The competitive analysis identified lacking areas of currently consisting platforms, such as advice on AAL systems, addressing older target groups, and app usage. This is also mirrored in the further analyses. In qualitative analysis, respondents described those platforms as "inadequate". In the quantitative survey many respondents were not aware of any care platforms that meet their expectations (Bleja, Neumann, Krüger & Grossmann, 2022b).

The surveyed providers anticipate that a platform will add value for them primarily by simplifying organizational, bureaucratic, and billing work, enabling formalities and applications to be processed quickly and transparently, and cooperating with other service providers in the case of care shortages due to illness. Potential users hope a care platform would make it easier for them to get access tailor-made information and care services. They expect a platform that helps them decide for a product or care service. In addition, the platform should promote opportunities for exchange and communication with people nearby or with similar assistance or care needs (Bleja, Neumann, Krüger & Grossmann, 2022b; Zolnowski & Böhmann, 2013)

Concluding the findings, the added value for customers is a basis for financing models and approaches for a care platform. The more value the care platform generates for providers and users, the more are they willing to pay for these services (van Hoof, Kazak, Perek-Białas & Peek, 2018)(Bleja, Neumann, Krüger & Grossmann, 2022b).

3.4 Financing Models

For the analysis of financing models, qualitative expert interviews are consulted once more. The interviewees of the qualitative analysis believed that the prices for persons with assistance needs as well as their relatives should be kept as low as possible. At best, the platform should even be free to use. The result is also reflected in the analysis of other care platforms, which are all free of charge for users. Some respondents to the qualitative research also stated that it was common for service providers to pay a

small annual fee depending on, for example, annual turnover. In addition, commission models could be considered as financing models.

Other financing options addressed during the interviews included public funding, subsidies from private or statutory insurers (long-term care, pension, and accident insurance), the digitization fund of the statutory health insurance, and financing via advertisements. In terms of advertising, however, some of the interviewees advised not to place too much advertising so as not to raise any doubts about the independence of the platform. Interestingly, experts assess the financing of a care platform as the most challenging – yet most important – aspect.

Based on literature analysis, a variety of other financing options for a care platform could be identified in addition to the financing options already mentioned for the platform via commercial advertising (e.g., in the form of banner ads) and via contributions from users (subscriptions) or providers (offer fees, brokerage, and sales provision). For example, it could also be suitable for a care platform to use a so-called freemium model (Grothus, Thesing & Feldmann, 2021a; Li, Nan & Li, 2020). In this case, the basic version of the platform is offered to users free of charge so that they can try it out first. If needed, users can additionally subscribe to a paid premium version, which provides them with further benefits. In addition, revenue could be generated through the collection and processing of user data by using it internally or passing it on to third parties (leverage customer data) (Grothus, Thesing & Feldmann, 2021a). However, financing the platform by selling data was considered critical by the interviewees in the qualitative analysis conducted.

Pay-per-use models could also be considered for the use of certain services by users, such as consulting, or by providers, such as customer data management. Accordingly, payment would be based on the pure duration of use of certain services (Wirtz & Ullrich, 2008; Grothus, Thesing & Feldmann, 2021a).

In addition, financing through donations, subsidies from health and long-term care insurers, and local authorities could be considered. In this context, social impact bonds could also be conceivable as financing models. Social impact bonds are cooperative ventures in which one or more social service providers, charitable foundations, or private investors and the state participate. The target group, the goal, the key success criteria and the financial framework are contractually defined in advance. In the first step, the investors or foundations provide financing. If the agreed targets are achieved, the state assumes the costs and, if applicable, also a target achievement premium payment (Fölster, 2017; Hulse, Atun, McPake & Lee, 2021; Katz, Brisbois, Zerger & Hwang, 2018; Wilson, Silva & Ricardson, 2015).

In addition to grants and donations, crowdfunding is also an option for developing and building the platform (Wirtz & Ullrich, 2008; Grothus, Thesing & Feldmann, 2021a). For example, the platform Recare, which is also active in the healthcare sector, secured part of its funding via crowdfunding (Thieme Verlag, 2021). In crowdfunding, a product or project is financed by a large number of investors. If a predefined budget is achieved, then the project is realized (Wirtz & Ullrich, 2008; Grothus, Thesing & Feldmann, 2021a).

Grothus, Thesing and Feldmann, conclude that innovative business models are often characterized by a combination of different financing and revenue models (Grothus, Thesing & Feldmann, 2021b). Therefore, financing models are crucial for a business model but also a main challenge and concern (Bleja, Wiewelhove, Kruger & Grossmann, 2021b).

This is, among other things, because many apps and websites are for free (Scherenberg, 2015). Accordingly, the willingness to spend money on this is low. In addition, the demand for care services in Germany is higher than the supply (Jacobs, Kuhlmey, Greß, Klauber & Schwinger, 2021). This means, service providers are not forced to present themselves on care platforms as they have enough patients and are less willing to spend money for a presence on an online platform. Consequently, the willingness of providers of products and services to spend money for a presence on an online platform is also rather low. This makes it crucial to identify their added value concerning a care platform. Only if the users and providers have visible added value through the platform does this have a positive effect on their willingness to pay.

4 Conclusion

A competitor analysis, as well as expert interviews, a survey, and a scenario analysis, were conducted within the framework of the human-centered design approach. A human-centered design approach was chosen to determine the added value (new digital services and products) received by a care platform. For this, people with assistant needs, their relatives, and care service providers were the main target group of the human-centered design approach.

This paper analyzed selected business model structures following the Business Model Canvas by Osterwalder and Pigneur. Structures, such as the value proposition, channels, and customer relationship were analyzed with the human-centered design approach in mind.

In conclusion, people with assistant needs and their relatives as well as care service providers assess a care platform as useful and facilitating everyday life. Questions on how to finance care services through a care platform are important for potential users and a future challenge for platform providers. It is recommended to combine different financing options to sustainably implement a care platform on the market. With the help of the developed personas, potential customer groups and their lifeworlds and needs could be described.

However, not only were the customer relationships and channels relevant for successful implementation in the market. The development of new business models creates an opportunity for customer inclusion and new measurements that prevent people with assistant needs from being undersupplied. The inclusion of customers is possible and advisable within the human-centered design approach, thus contributing to diverse care offerings and an increase in life quality.

Current research includes an even more intense application of the human-centered design approach. People with assistant needs and their relatives will evaluate a mock-up of a care platform within workshops. The focus group method centralizing on the needs and impressions of the target group to further develop a socially sustainable care platform will be applied. In addition, the human-centered design approach is used to determine concerns regarding data security issues with the help of expert interviews. For this, data protection officers are consulted to develop a human-centered data usage concept.

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Digital ecological business models of enterprises created by energy clusters

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Abstract

The overlapping economic, social, ecological, health and military crises create new spaces for scientific research that can be applied in practice. This applies in particular to the mechanisms of strategic management, together with the construction of sophisticated business models. Their modern design is shaped from this cognitive perspective, with the use of layered, step and area-based design. The crucial problem addressed in the article concerns the construction of an optimal configuration of digital ecological business models created by developed energy clusters which support the positive impact on dynamic climate change. The aim of the article is to present assumptions for the effective and efficient management of digital ecological business models created by energy clusters to create positive climate change. The scope of the article concerns research into the place and role of energy clusters as a platform for building effective and efficient digital ecological business models which shape the positive impact on climate change. The research subject is focused on identifying core factors, layers and logic for designing digital ecological business models, together with their appropriate network configuration to ensure a positive impact on climate change. The article uses qualitative research by means of comparative analysis and network analysis to determine the factors, layers and logic of digital business models. Another result of the article is the strategic recommendations and scientific postulates used to apply the solutions adopted in the publication.

Keywords

Digital ecological business models, energy clusters, climate change, network analyses.

Introduction

The ongoing negative dynamics of climate change have triggered the strong need for a change in the core priorities of the global economy. An important re-evaluation of the principles and logic of understanding and running a business towards a society-friendly business and its changing needs is

required. The current possibilities of operating in a safe and healthy environment are increasingly limited. This results, inter alia, from overlapping economic, social, ecological, health and military crises, which need to be managed in a systemic way and for which new business models have to be created (Ritter & Pedersen, 2020a; Seetharaman, 2020). From this cognitive perspective, a new, appropriate approach to constructing business models (Teece, 2017) is at the forefront as a core ontological entity that determines the mechanisms of strategic management of enterprises with a strong focus on scalable sustainable business models open to a wide range of stakeholders who operate in the real and virtual economy (Jabłoński, 2016). This refers to the entire life cycle adopted for business models (Jabłoński & Jabłoński, 2016). This also requires other assumptions and paradigm changes. A different value proposition and a different income generation logic using optimal resources, together with their appropriate allocation, should constitute new assumptions for determining the logic of the proper configuration of business models of enterprises. A crucial factor nowadays is the skillful achievement of a compromise of companies' economic, social and environmental effects through digital business models (Jabłoński & Jabłoński, 2020). At the same time, the multidimensional digital transformation in various areas of social activity has opened up new spaces for the development of digital business models and the monetization thereof (Jabłoński & Jabłoński, 2021). In this context, opportunities have also emerged for an open organizational and technological struggle against strong climate change affecting numerous areas of human existence (Hewitt & Stone, 2021). This requires the definition and categorization of a whole range of climate improvement services (Alexander & Dessai, 2019). It is important to implement them by means of business models (Larosa & Mysiak, 2020). This has led to a clear need, in many cases, to build digital innovation-based ecological business models (Bocken & Geradts, 2020). The platform for their development can be energy clusters based on the network paradigm as network structures for the construction of a modern energy economy based on the use of green energy production technologies and resource efficiency. Network analysis and network dynamics generate an optimal network effect, the source of which is the collection of multiple data inspired by the creation of many business models in the network (Scott, 2012). In this context, a close link between climate improvement services and services for the construction of new energy resources emerges (Fell, 2017). The energy cluster is based on the generation of various types of energy, which is the foundation of its business activity and a further starting point for the remaining activity in the economic field, i.e. energy distribution or trading. It should be noted that energy clusters are mainly initiatives with limited territorial scope; therefore, the basic strategic objectives of the clusters are defined on the basis of local needs that determine the development of such initiatives. As such, they are an appropriate tool for improving the energy efficiency of regions (Swart et al., 2021) taking innovative solutions into account by changing the choice of energy supply through the use of renewable energy sources (RES) (Hill & Engel-Cox, 2017). It should be pointed out that creating an appropriate regulatory, administrative and economic environment for energy producers (including in the context of financial support for the implementation of investments) is crucial to making the right investment decisions which the creation of energy clusters and the further development and efficient functioning of energy clusters, which will be the basis for these sources, will depend on. The crucial problem addressed in the article concerns the construction of an optimal configuration of digital ecological business models created by developed energy clusters which support the positive impact on dynamic climate change. The aim of the article is to present assumptions for the effective and efficient management of digital ecological business models created by energy clusters to create positive climate change. The scope of the article concerns research into the place and role of energy clusters as a platform for building effective and efficient digital ecological business models which shape the positive impact on climate change. The research subject is

focused on identifying core factors, layers and logic for designing digital ecological business models, together with their appropriate network configuration to ensure a positive impact on climate change. The article uses qualitative research by means of comparative analysis and network analysis to determine the factors, layers and logic of digital business models. Another result of the article is the strategic recommendations and scientific postulates used to apply the solutions adopted in the publication.

1. Digital ecological business models - the perspective of new business spaces in the changing economy

The ongoing changes in the economy caused by different types of critical situations are changing the current logic of doing business in many cases. This is also influenced by the changing organizational context resulting from the evolving new dimension of the ecosystem, the aim of which should be development on the basis of the principles of sustainable, digital entrepreneurship in which businesses operate (Gregori & Holzmann, 2020). This has a particularly strong impact on, and is of particular importance to, the design and application of new digital business models of different types of organizations (Ritter & Pedersen, 2020b). Nowadays, this particularly concerns the so-called intelligent digital transformation (Zaoui & Souissi, 2020; Verhoef et al., 2021) and climate transformation, which dynamically triggers new perspectives for creating creative business models with a strong technological orientation (Baden-Fuller & Haefliger, 2013) in a constructive comparison between digital transformation and climate transition. Digital strategies with a clear market orientation (Kindermann et al., 2021; Morton, Wilson & Cooke, 2020) and long-term adaptation plans (Liu, Tong & Sinfield, 2021) to climate change (Arslan et al., 2021) implemented through business models (Rochlin, 2021) towards, among other things, the climate neutrality of Europe's economy, are a factor in the strong utilitarianism of the solutions adopted in the current platform for shaping today's business models. It should be noted that each business model of an enterprise has its own specific features based on its core attributes and opens up a significant number of new development prospects (Wirtz et al., 2016). In the event of the recent pandemic and climate crises, the digital business models of enterprises are particularly important. This interesting design of a network-configured business model fulfilled the expectations of various groups of business network actors (Jiang & Li, 2020) and social groups focused around creating a new business space in the socio-technological system of the economic environment (Frankenberger, Weiblen & Gassmann, 2013; Redondo, 2015). Trust, including digital trust, is undoubtedly a connecting factor between these groups of network actors (Jeong & Oh, 2017; Justwan, Bakker & Berejikian, 2018). Specific value drivers in terms of social values created by business models (Spieth et al., 2019) are of particular importance. The business model as a specific configuration of tangible and intangible assets concentrated in the enterprise, meets the expectations of green stakeholders who understand modern climate risks (Bleda & Shackley, 2008) while taking the strong digital development based on intelligent digital technologies into account. The core objective of the business model of enterprises is then aimed at a specific, well-defined, delivered value proposition for customers who understand climate problems, who will want to receive this value proposition without a carbon footprint (Rosenstock et al., 2020). It is also determined by the accepted income generation logic within business models using, for example, the carbon neutral delivery methodology and circular economy assumptions throughout the green supply chain cycle. As a result, a unique mix of aggregate values is created in the configuration of the applied business model of the enterprise developed by managers by means of a comprehensive component approach in the network structure (Kulins, Leonardy & Weber, 2016). The architecture of

such business models is equipped with an aspect that generates ecological, energy and climate factors. In addition, based on the system and network paradigm, it should highlight the critical components which are specific to digital and climate strategy (Paul, Lang & Baumgartner, 2017), as the organization implements a digital ecological business model through these two dedicated strategies. In this design-analytical process it is important to determine specific functions and performance for these components and for the entire architecture of business models, which determine the results of the organization specified by managers in economic and social terms as an outcome of an effective and efficient business model. Not only does such a way of thinking generate a competitive advantage at the level of market competition, but it also creates a multidimensional social effect (Dohrmann, Raith & Siebold, 2015) using specific ecological, energy and climate criteria.

2. Intelligent digital and climate transformation - the dimension of business models

The current changes in the economy could even be described as surprising. They are related, among other things, to the dual issues of digital and climate transformation. As a result, they affect a wide range of factors that shape the modern dimension of economies around the world. This requires a significant increase in new technologies created by investments and innovations. This two-dimensional intelligent transformation creates knowledge-rich new products, services, markets and business models. The source of such a process lies in emerging new types of jobs that require unique skills that we do not yet have; indeed, sometimes we do not even realize that they are already required. At the same time, this transformation requires a change in the logic of the functioning of the economy from the current linear economy to the circular economy (Manninen et al., 2018). In order to achieve this, so-called open strategic autonomy is necessary through the self-development of core digital technologies, digital sectors and green value chains based on intelligent digital transformation. The multidimensional restoration of ecosystems and biodiversity and the sustainable management of natural resources are becoming important. Then a path towards a broad development of a climate-neutral and sustainable digital circular economy will emerge. The result of this approach will be the creation of a more resilient, citizen-led and democratic knowledge-based society, based on the dynamics of development and intelligent growth. Key to such results are extended circular value chains based on green order (European Commission), waste-free production, the valorization of waste streams, industrial symbiosis, circularity hubs, modern technologies for recycling, re-use, the elimination of fossil fuels, both as a source of energy and chemical raw material, the hydrogenation and electrification of production and processes, making industrial processes more flexible, adapting to variable energy supply (RES use), and the valorization of CO/CO2 streams. As a result, there is a focus on the development and implementation of climate-neutral solutions, together with closing the flow of energy, materials and water streams to achieve a leading position in the process industry. The supporting factor strengthens innovation and public-private investments. Then a coherent system may emerge based on created symbiosis, symmetry and industrial-urban synergies, taking into account the concept of the smart city, which will result in an exponential change in the circular use of resources and reduction of greenhouse gas emissions in the designated region. In addition, the increased flexibility of technological processes with regard to changes in energy supply that enable the integration of variable energy sources, i.e. RES, including regional ones with the use of energy storage and conversion processes, plays a significant role in shaping intelligent digital transformation. A platform for constructive comparison between digital development and climate change-enhancing actions is, inter alia, new production and manufacturing technologies such as

zero defect production, reuse and remanufacturing, and digital technologies (AI, Data, Robotics) to manage circular value chains in production and service processes. This is supported by multidisciplinary material design processes by means of the safe and sustainable by design strategy, eco-design, plastic manufacturing recyclable by design technologies, new chemical processes based on new catalysts and electrification, the use of RES, and short-term and long-term hydrogen storage technologies. All this requires broad support for an innovative community acting for the development and deployment of technologies for the production of fuels and chemicals using solar, wind and biofuels. The result of this approach will be the so-called crop of new innovative, creative business models as a result of the implementation of the principles of intelligent digital and climate transformation in the economy.

3. A cluster as a specific network open to the digital and climate development of enterprises

The new dimension of running a business in a period of social, economic, political, climate, health, immigration, and military crises generates new needs and new solutions that should be implemented by organizations that want not only to survive, but above all to ensure their development while also being resilient in the face of the abovementioned crises (Tauscher & Abdelkafi, 2018). Therefore, the specific resilience of these entities should be firmly embedded in a properly captured and well understood strategic perspective (Niemimaa et al., 2019; Ramezani & Camarinha-Matos, 2020). In this respect, the path is opening up the search for the best possible and economically optimal business principles. Such a solution may be to spontaneously create specific technology networks in specific industrial conditions or to participate in cluster structures located in multi-dimensional and multi-criteria network analysis (Bankvall, Dubois & Lind, 2017). The resulting network effect determines the growth and development of the entire cluster network as well as individual organizations that create it. In addition, the often industrial, technological nature of clusters embedded in a given sector with certain dynamics and specific features creates a source of unique value for their participants (Tase, 2019). In this context, the sector is naturally supported by the potential for a highly-implemented intelligent digital transformation and the knowledge required to build systems for adaptation to climate change (ISO 14090:2019) and the necessity for the development of new energy needs (ISO 50001:2018) as part of changes in the use of traditional energy for renewable energy sources (ISO/IEC 13273-1:2016). It is also worth adding that the energy sector is changing dynamically through the use of a variety of digital solutions for both operational, interactive technical systems related to electricity generation and transmission and highly developed cyber security management in circumstances of strong threats posed by potential cyber and/or terrorist attacks. It is therefore crucial to develop a multidimensional business model for the effective and efficient management of the region’s energy potential in order for it to achieve full energy self-sufficiency.

4. An energy cluster as a new tool for the development of climate-responsible businesses in the digital economy

When conducting a multidimensional analysis of cluster structures, it should be noted that the proposed and inferred cluster models currently focus not only on the arrangement of entities expressed by the inclusion of further entities as part of increasing the size and density of the cluster mainly within its main substantive line expressed by sectoral circumstances. An energy cluster is specific, and its main objective

is to develop and exploit the region's energy potential in order to achieve energy self-sufficiency with the use of green energy, i.e. energy from renewable energy sources. It is area-based, and a strategic factor therein is the production of social values for a given region (Tello, 2020). The objective of energy clusters is therefore to develop distributed energy. They aim for the strong improvement of local energy security in such a way as to achieve economic efficiency that provides optimal organizational, legal and financial conditions in an environmentally friendly manner.

Energy clusters also enable the use of local, specific resources and national energy potential. They also foster the deployment of state-of-the-art innovative technologies where they are justified, i.e. useful to the local community and economically viable. These objectives may be direct, namely the self-sufficiency of the energy system, the increased share of RES in the energy balance, the reduced energy consumption of the urban economy, and the development of distributed energy sources.

They may also be indirect, namely the development of new business models, energy security, independence from an external fuel supply, investment attractiveness, the stimulation of society and the development of civil society, the improved quality of the power supply, the improved quality of the environment, the creation of new jobs, improved economic innovation, and boosting economic development. It should be noted that nowadays in Europe and beyond, coal energy, which leaves a so-called carbon footprint, is being abandoned in favor of clean energy, which is energy from renewable energy sources, including wind, sun, water and biomass. In this area of economic development, local energy production and distribution systems are being developed which are to a certain extent independent of monopolistic, large operators of energy distribution systems (DSO), gas distribution system operators (GSO) and heat distribution system operators (HSO). This also results in a new dimension in the construction of a competitive electric energy system. It is currently being built through the generation and distribution of energy by large economic operators to which users of the system, i.e. customers who are energy consumers, are connected. Distributed energy mechanisms are also being developed, moving away from point energy within a closed network, shaping the so-called open market for prosumer energy based on the expansion of local energy communities supported by energy storage technologies. Thus, an alternative energy market which strongly triggers changes in the strategy of adapting large electricity distribution companies is being created to some extent. In addition, another stream of development of energy systems through energy clusters is the creation of so-called direct power lines, which are the link between, for example, a large industrial plant, which has generated excess energy, which can be sold back to individual energy consumers (customers) at a competitive price. This price may be competitive for customers due to the short supply of an energy section between the energy producer and the customer, which also results in low energy losses in its supply. It is also important that such an energy cluster operates in a so-called area-based context, which determines its functioning within a closed local energy system, tight within the precise boundaries. Therefore, relationships occur between:

- an institutional, industrial energy system and an individual, personalized energy system,
- a traditional energy system and an energy system from Renewable Energy Sources (RES),
- a point energy system and a distributed energy system,
- energy based on individual customers connected to the energy network and energy based on so-called prosumers,
- industrial storage facilities and individual storage facilities.

This approach definitely changes the logic of the energy sector, and local energy clusters are a highly dynamizing factor. The energy balance of the region is then determined by means of a specific

measurement system based on, inter alia, indicators such as power in MW installed by cluster members, the total annual energy production from RES by energy cluster members in MWh, the total energy consumption within the energy cluster in MWh, the energy coverage by the cluster members in percentage terms in the municipality with reference to the supply of other energy sources to ensure the energy needs of the municipality, and the budget allocated to the creation and maintenance of the energy cluster in the region. Thus, in order to create the dynamic development of such an energy cluster, it is worth asking several key strategic questions.

- How will energy balance at different time intervals in a given region?
- How will the ratio of traditional energy used in the region to renewable energy sources change at different time intervals?
- How will the institutional energy structure change in relation to distributed energy?

The comprehensive answer to the above questions opens the space to shaping the digital ecological business models of enterprises created by energy clusters.

5. The adopted methodology of research into the digital ecological business models of enterprises created by energy clusters

The article uses qualitative research by means of comparative analysis and network analysis to determine and aggregate the structure and logic of the functioning of digital ecological business models. They are based on the foundations of design mechanisms. Design is a process that binds core functions substantively, which are, on the one hand, complex analytical and research work, and on the other hand, they consist of creating solutions for specific design tasks. Core functions include identification, modelling, diagnosis, prospective analysis, and design decision-making. The scope of each of these functions has its own specificity, which is reflected in detailed research activities (sub-functions). The design methodology should take into account both the universality of specific research canons and the specificity of approaches and methodologies used. Universality should be interpreted as the universality of principles and concepts that are common to design in technical fields, in the sphere of science, as well as in the field of organization, management, economics and others. Specificity, on the other hand, is a distinguishing feature of the research process and the instruments used (methods, techniques, algorithms) (Stabryła, 2016). In order to define core assumptions and principles for the design of the digital ecological business models of enterprises created by energy clusters, a functional-modelling approach was adopted, which exposes a function (objective, task, ownership) in the study rather than a form, and above all, introduces a pattern into the procedure. It can be an ideal or real construction and is a test to be achieved by the research process (Martyniak, 1999). In the research process, a developed approach to the content of the design science should be used. An integrated design and implementation methodology can be used here. It is primarily expressed by the following features:

- a well-defined purpose of the design process,
- the holistic arrangement of the design system components in mutual relationships,
- a coherent structure combining the process of design and implementation of the developed solution,
- a logically coherent design process with a fixed sequence of major phases: goal setting and formulation of assumptions, solution concept, preliminary design, final design, prototype, and implementation,
- communication mechanisms enabling feedback (Giesko, 2015).

In this context, the research methodology adopted should provide an answer to the following question: What factors, layers and logic of model design created as a result of the cluster network function in a given region will stimulate the emergence of the digital ecological business models of enterprises created by energy clusters?

To this end, the original design methodology of the digital ecological business models of enterprises created by energy clusters composed of the following three design processes was applied:

- layered design,
- step design,
- area-based design.

These are described in detail below.

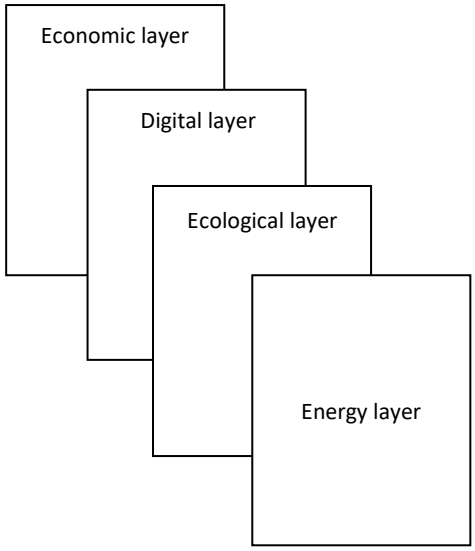
6. A layered design of the digital ecological business models of enterprises created by energy clusters - an original approach

The proper construction of the business model is a core challenge for modern managers. Its optimal configuration determines the maximum rate of return from the implemented business model. From this cognitive perspective, it can be designed and implemented by means of a layered approach. This approach consists of defining a specific substantive layer, the definition of which, together with interpretation, sets important assumptions for the creation of strategic goals in the developed strategy of the development and growth of the organization. The first layer proposed is the energy layer.

1. The essence of the energy layer is the use of different methods and techniques to identify and exchange the region's energy potential between producers and users. It is important to shape energy self-sufficiency in a given time interval based mainly on renewable energy sources, i.e. so-called green energy, for the benefit of the local energy community with a high level of prosumer functions.
2. The essence of the ecological layer is the application of various ecological criteria related, inter alia, to the management of emissions to soil, water, air, waste generation and resource use using the "cradle to cradle" logic embedded in the circular economy concept. It has a resultant nature based on the overriding objective of minimizing an adverse impact on the environment.
3. The essence of the digital layer is the use of modern digital techniques in terms of technology and communication. In technological terms, this mainly concerns the digitalization of industrial processes by means of new digital solutions, among other things. In communication terms, this concerns the exchange of information and how it is processed in relation to the adopted decision-making mechanisms. In particular, it concerns the use of artificial intelligence, the Internet of Things (IoT), Cloud Computing, and Big Data in the context of the circular and sharing economy.
4. The essence of the economic layer is to define the logic for determining the economic costs and benefits in the system management processes, which is the network of distributed energy sources in the energy cluster ecosystem for the purpose of obtaining acceptable rates of return from the operational and investment processes conducted, related to the above-mentioned layers, i.e. the digital, ecological and energy layers.

Figure 1 below presents the layer system of energy cluster management in the process of creating digital ecological business models.

Figure6. The layer system of energy cluster management in the process of creating digital ecological business models



Source: Own study.

Such an approach allows for a multidimensional look at the creation of such business models, the implementation of which allows for the achievement of numerous benefits through a single business model of the network and embedded digital ecological business models of enterprises operating in this network in a given region.

7. A step design of digital ecological business models from a network perspective – an original approach

In order to obtain the required benefits from the implementation of the digital ecological business models, it is important to determine an acceptable and feasible time interval mechanism for designing a digital ecological business model of an energy cluster. Table 1 below presents the successive steps in this process.

Table 6. Project - implementing a digital ecological business model of an energy cluster

No.	Project - implementing a digital ecological business model of an energy cluster
1.	Analyzing the energy potential of renewable energy in the region where the energy cluster operates.
2.	Analyzing the legal situation enabling the functioning of the energy cluster institutions: a. International level, b. National level, c. Regional level.
3.	Inventory of resources for the energy cluster, including digital and analogue resources.
4.	Defining principles for the creation of documents in the field of low-carbon, energy and planning economy.
5.	Updating core documents, including an update of the assumptions for the heat, power and gaseous fuel supply plan.
6.	Conducting a comprehensive inventory:

No.	Project - implementing a digital ecological business model of an energy cluster
	a. Inventory of the power grid, b. Inventory of the gas network, c. Inventory of electrical and thermal energy generating units, d. Waste management inventory, e. Inventory of water, sewage and water resources.
7.	Conducting the energy balance within the energy cluster area of activity
8.	Identifying the potential of the energy market in the energy cluster area: a. The potential of the energy market, b. The potential of the energy efficiency market, c. The potential of the thermal energy market, d. The potential of the fuel market.
9.	Identifying the potential for reducing low emissions within the operation of the energy cluster.
10.	Strategic analyses for the energy cluster covering the area of operation of the cluster in macroeconomic, mesoeconomic and microeconomic terms.
11.	Developing an institutional model for the energy cluster.
12.	Defining the assumptions and guidelines for the energy cluster as an Integrator/Aggregator of the Local Balancing Area within the National Energy System in the following areas: a. Manufacturing infrastructure, b. Distribution infrastructure, c. IT architecture within Smart Grid[18], Smart Energy[19], IoT[20], DSR[21] (Demand Side Response), DSM[22] (Demand Side Management).
13.	Developing the energy cluster schedule of activity.
14.	Analyzing the risks of the energy cluster activity in the context of the proposed solutions and changes in the legal and technological environment with reference to digital and analogue conditions applicable to the construction of the business model.
15.	Developing the Cluster Visual Identification System – an Image Book

[18] Smart Grid is a smart power grid in which advanced power equipment and telecommunications technologies have been installed to improve grid operation control and energy management. They allow for the connection of microgenerators (at low voltage level) and energy storage to the grid and the management of household appliances "behind the meter" in individual households.

[19] Smart Energy is an innovative solution that allows one to meet the expectations of the market in a modular way, while ensuring energy efficiency and economic efficiency.

The concept of the Smart Energy System (SES) is based on the phenomenon of combined energy generation in one technological process, i.e. polygeneration.

[20] IoT is a concept whereby objects can monitor different parameters, accumulate data and transfer them to each other over a computer network. The implementation of this technology for the current energy solutions is completely non-invasive. The ability to collect data, analyze it further and draw conclusions opens the door to the better use of energy and even predicting the future through artificial intelligence (AI). Data collection involves connecting modules monitoring the parameters of the most important power nodes of a given grid.

[21] Demand Side Response (DSR) is one of the countermeasures applied by Electricity Grids to ensure a power balance in the national energy system in extreme situations where the balance between electricity demand and the available generation and transmission capabilities is temporarily compromised.

[22] Demand Side Management (DSM) is an integral part of integrated energy resource planning (IRP - Integrated Resources Planning). DSM consists of using various demand-side measures (programs) to reduce the cost of supplying energy, such as saving energy (energy-efficient refrigerators, light bulbs), energy-efficient construction, the use of high-efficiency electric motors, and direct load regulation.

No.	Project - implementing a digital ecological business model of an energy cluster
16.	Preparing final conclusions and strategic recommendations for the development of the cluster.

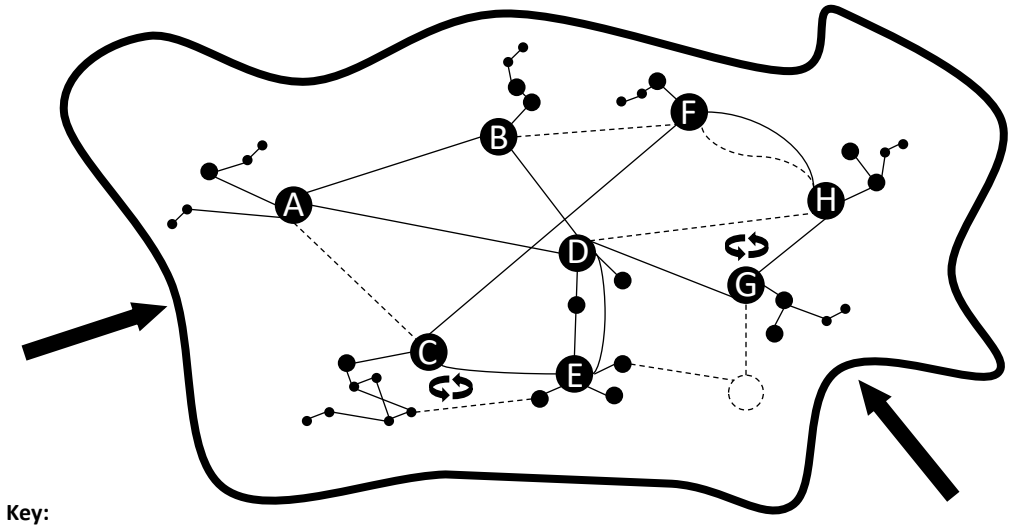
Source: Own study.

As part of the step design described, it is important to define core milestones for the effective and efficient implementation of the digital ecological business models of enterprises in the energy cluster ecosystem.

8. Digital ecological business models of enterprises in the energy cluster ecosystem – an original approach

A result of the implementation of the above mechanism for the design of an energy cluster digital ecological business model is the development of an area-based model, which emerges in decision-making in the context of operational and investment processes. It is necessary to precisely define the relationships taking place in the emerging ecosystem with specific electricity potential. Thinking about interrelationships in the system is crucial to an understanding of how an organization can change the system to influence the sustainable management of resources in its portfolio of activities, products and services. Figure 2 below presents the area-based model of the system that influences the sustainable management of resources in the portfolio of its activities, products and services.

Figure 7. Area-based model of the system that influences the sustainable management of resources in the portfolio of its activities, products and services.



Key:

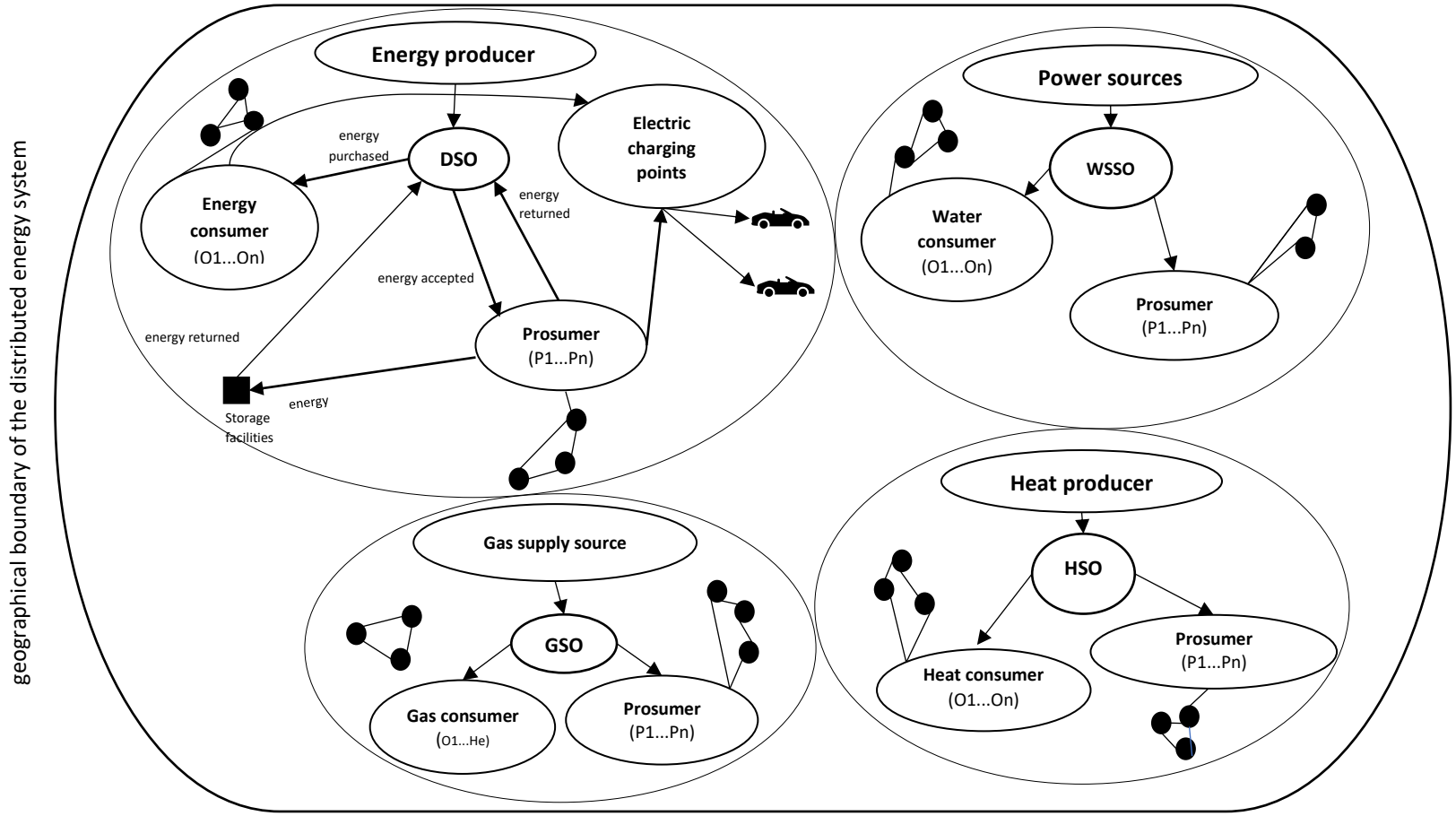
- an organization: one part of a system
- key actors or stakeholders, e.g. regulators, suppliers, communities, NGOs, technology providers, clients
- external factors, e.g. environmental constraints, policy and regulation, consumer preferences, advances in technology
- feedback loops, e.g. new communication channels, new relationships, customer feedback, recycling or reuse of products and materials, wider social value
- system boundary, e.g. geographical/place-based, sector, market
- relationship link, e.g. formal (contractual, transactional) and informal (knowledge exchange, business support, community relationships)
- systematic intervention: new inputs, changing the total output of the system, e.g. standards or rating schemes, policy changes, product or service innovation, business model innovation, increase access to solutions, reshape supply, create user demand, implement new platforms

Source: Own study based on *ISO 14090:2019*.

These relationships are one-way links, which means that organization A depends on a product or service from organization B, but not vice versa. Interrelationships are two-way links, meaning that organizations A and B are interdependent (ISO 14090:2019).

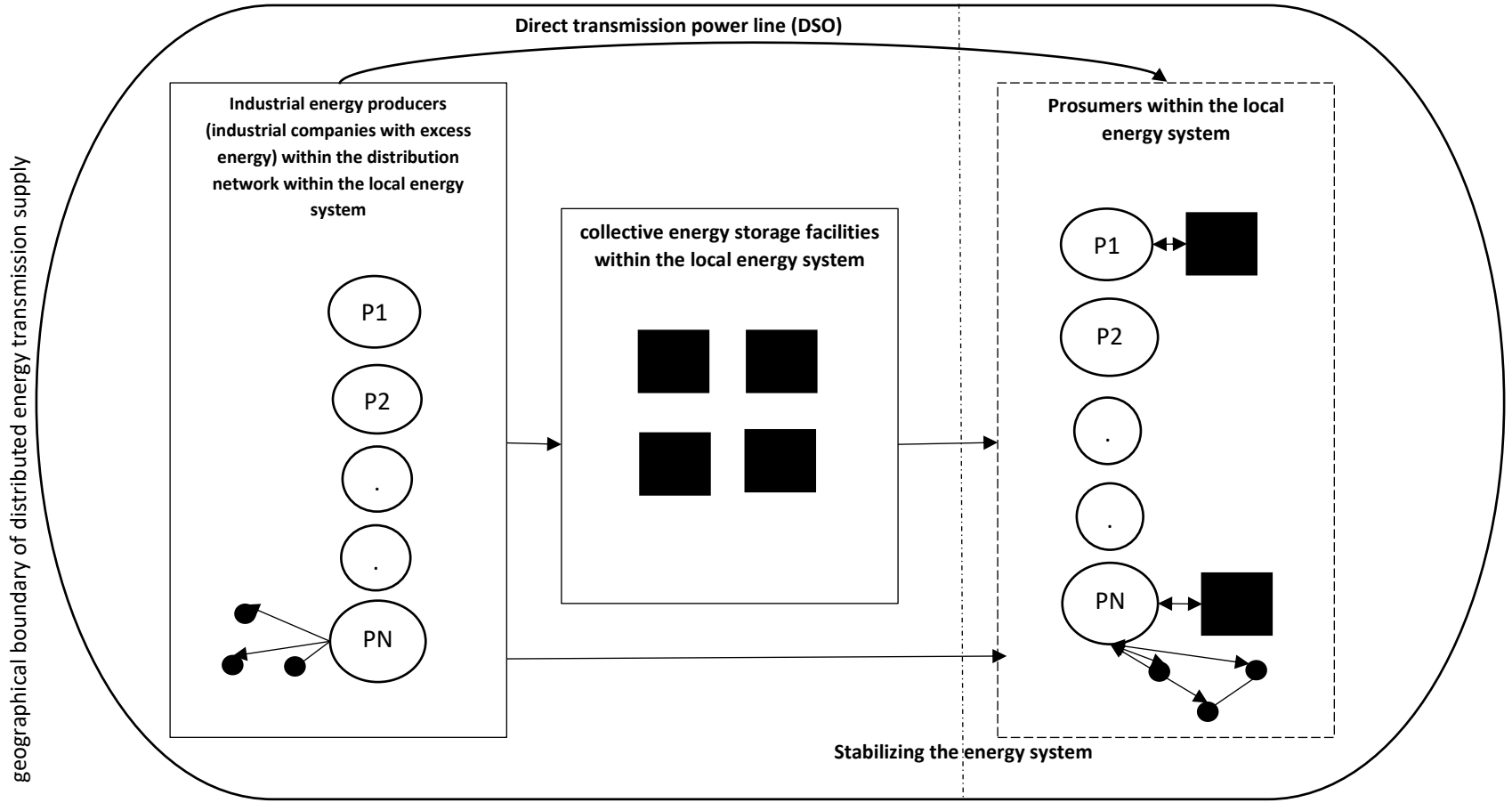
This is a baseline model for the development of a resultant, final area-based model for the digital ecological business models of enterprises in the energy cluster ecosystem. Such a model resulting from a specific network analysis allows for the geographical management of the development and growth of the energy cluster according to the developed and implemented digital ecological business models of enterprises.

Figure8. Technological network of the institutional distributed energy system.



Source: Own study.

Figure 9. Distributed energy transmission system.



Source: Own study.

As part of the process of designing the energy cluster area-based business model, the definition of the main actors of the local power system is crucial. These include the following:

1. DSO - Energy distribution system operator,
2. HSO - Heat distribution system operator,
3. GSO - Gas distribution system operator,
4. WSSO - Water and sewage distribution system operator.

These are so-called institutional actors. In their distribution systems, networks of individual customers are built, which may be individuals and companies and other entities with a demand for a particular type of media. The local energy system based on the institutional network also includes prosumers, who produce, purchase and return excess energy to the system or store it in their own or collective energy storage facilities.

Another element of the system is the relationship between industrial plants which, through a direct transmission power line, deliver generated excess energy from RES to consumers or prosumers close to that industrial plant (then the cost of purchasing energy for the consumer is relatively cheaper than buying it from an institutional operator and there are small energy losses in the transmission network). The last type of operator in a local distribution system is point prosumers, who produce energy for their own needs and return excess energy to the system or store it in energy storage facilities. The logic thus adopted determines the functioning of the energy cluster in an area in a given region, which creates its own local energy system. It is represented graphically (Figure 3, Figure 4).

9. Strategic recommendations for the construction and operation of the digital ecological business models of enterprises created by energy clusters

Based on multidimensional research related to the construction of the digital ecological business models of enterprises created by energy clusters, core strategic recommendations have been developed for their strong application in the economy.

1. The core strategic objective of an energy cluster is to create an energy self-sufficient region within which the cluster operates. It is then important to build their own local energy infrastructure, including in the area of energy distribution for energy self-sufficiency.
2. Given that the energy sector is regulated, current legislation in this area should be taken into account when building business models and energy cluster strategies.
3. The generation of green power and the impact on the local energy market are a core mechanism by which energy clusters function.
4. Energy clusters are built to reduce the costs associated with energy consumption and increase revenues from energy produced on the cluster premises.
5. It is necessary to define the civic renewable energy community precisely, i.e. a prosumer and a group prosumer. It is particularly important to promote so-called vulnerable consumers, i.e. those with minimal economic potential. It is also important to be aware that in the energy balancing system, the civic energy community is treated as a whole. The area of action of the civic energy community should be the area of one DSO. This is mainly about the location of the connection to the power grid.
6. The use of energy balancing services is a very important strategic objective for energy prosumers.

7. The concept of a virtual prosumer, a collective prosumer and a representative of prosumers is now strongly promoted.
8. The energy price within an energy cluster depends on balancing and the level of protection of energy needs of cluster participants by energy producers in the cluster.
9. Energy communities and energy clusters are created to promote the consumption of energy produced from renewable energy sources, i.e. green energy produced in an environmentally friendly manner without an adverse environmental impact, on the one hand, and high energy prices, on the other hand, result in the search for lower costs of purchasing energy by seeking cheaper energy sources within the budget, thereby increasing the competitiveness of products that are cheaper due to lower energy costs spent.
10. The place of energy communities and energy clusters is currently essentially focused on the development of distribution grid infrastructure.
11. In small, local energy systems such as local energy communities and energy clusters, hybrid systems are built using at least two technologies that work for one system, the energy system.
12. The local distribution system must be connected by combining production sources with the largest industrial players that consume the greatest energy potential.
13. Efforts must be made in the local community to minimize the use of external distribution networks.
14. Local energy structures consisting of consumers are then built by creating local energy sources.
15. It is important to comprehensively assess the possibilities available to energy cluster members for the construction of a self-balanced energy system.
16. Adjacent clusters should also be interconnected for cluster exchanges.
17. The energy production curve for the types of energy produced must be constantly analyzed.
18. The concept of energy storage for the so-called market game in the area of energy purchase and sales should be analyzed comprehensively in an energy cluster.
19. It is important to accumulate energy in energy storage facilities and to deliver it at an optimal time according to applicable tariffs.
20. The use of RES in auto-consumption should be widely promoted among energy cluster members.
21. It is necessary to define the precise requirements for the degree of energy need coverage of the cluster's own members. An energy cluster is most efficient when the energy turnover is achieved entirely within the cluster.
22. Within an energy cluster, it is important to create an image of the so-called green region.
23. Promoting local energy sources close to its consumers is an important strategic objective of an energy cluster. It is important to use one's own energy resources efficiently.
24. Cluster strategy should also refer to the so-called industrial power plant, which should be regarded as a regional catalyst for the development of distributed energy.
25. The strategic objectives of a cluster should be strongly focused on the development of the circular economy.
26. The core objective of an energy cluster is to increase the competitiveness of the local economy by encouraging the use of RES as green energy from clean energy sources.
27. Energy clusters can be a catalyst for Technology Hubs, i.e. headquarters in which entities that operate in the energy sector participate together with scientific cooperation.
28. Energy clusters can be, inter alia, a catalyst for the development of Hydrogen Valleys.
29. The role of energy storage in systemic terms as a strong stabilizer of RES energy should be enhanced.
30. A direct power line in the energy system is a strategically important connection for the development of the local energy system between an energy producer installation, e.g. a large photovoltaic installation, and a plant that wants to buy it from that producer. Such a connection can bypass the

entire network, which is a significant economic advantage for such a solution. Such an installation may also have its own energy storage facility.

31. It should be borne in mind that wind and photovoltaic farms are characterized by a random process for the production of the energy units concerned.
32. Prosumer energy is not large-scale, so one must be aware that it is part of distributed energy, but on a small, local scale, which is both an advantage and a disadvantage.
33. In order to build an effective and efficient energy cluster, the development plans of the Distribution Network Operators must be known, so that they are included in the investment objectives of the energy cluster.
34. Attention must be paid to the cost-effectiveness of energy trading in a cluster as part of its multidimensional economic analysis.
35. A very professionally defined logic of energy cluster management processes is necessary to create an effective and efficient local energy market as a distributed energy system. Distributed energy is generally everything which differs from the current energy within medium and low voltages.
36. The construction of direct lines between energy producers and energy consumers will significantly reduce costs in terms of transmission, but may increase costs for DSO. Operators are billed at fixed and variable rates that depend on the amount of energy that will pass through the grid. Therefore, if the consumer and the producer disconnect, the cost of maintaining the network will be higher, because less energy will flow through it. As such, it is important to balance this process wisely and systemically.
37. It is important that energy clusters build their own energy distribution networks. This is a very complex issue and requires thorough analysis. There is a need for a multi-criteria analysis of the regional energy potential. It should be remembered that energy from RES has high CAPEX costs and very low OPEX costs compared to traditional energy, while traditional energy has high CAPEX and high OPEX costs. It is also important to bear in mind the length of energy transmission routes as part of the decision to build their own distribution network.
38. The DSO can connect new RES producers to their distribution system. It is necessary to measure the transmission of energy on a given section of the network from the DSO.
39. It is necessary to choose the optimal model for the use of the transmission systems of the existing DSO in the context of deciding to build their own distribution networks in the local energy system operating within the energy cluster.
40. The biggest obstacle to the development of energy clusters is the current legislation and possible legal solutions allowing for economic benefits and a lack of full awareness of building the local energy market.
41. It should be remembered that today distributed energy with the increased use of RES is not a niche theme because there is a systemic change in energy, due in part to the military crisis in Europe.
42. Thermal energy is supplied mainly by local government companies or with the participation of the municipality, and it must be remembered that thermal energy is far more technologically difficult to implement than energy.
43. Often, when looking for new paths to development in their strategies, businesses do not fully recognize the fact that distributed energy and local energy supply can help improve the energy efficiency of businesses using green energy so that the products produced by these companies do not have a carbon footprint.
44. Factors related to the development of energy clusters and distributed energy have an external dimension at the state level and their legislation and an internal dimension at the level of the energy efficiency of the energy system at the local level of the municipality.

45. The intentions associated with the construction of local, distributed energy systems aim to ensure that traditionally functioning DSOs will distribute less and less energy. This will lead to significant costs for them.
46. The method of selling and leasing distribution systems to clusters will be an important process in the future.
47. It is important to allocate the investment and operating costs associated with its maintenance and energy prices that we offer in our RES, which, by adding investment in energy storage facilities, are later transferred to energy consumers in a given cluster.
48. When energy is sold, costs associated with maintaining the national energy system have to be incurred, i.e., for example, the capacity fee, which is crucial to maintaining the appropriate production level in the system.
49. The analysis of the capacity market confirms that energy production in RES causes a significant decrease in revenues in conventional power plants.
50. There is a revenue gap that makes conventional energy increasingly unprofitable.
51. The capacity market is intended to be a mechanism to fill the revenue gap between the energy to be produced from a conventional energy source to cover its fixed and variable costs through reduced sales, and to boost RES development activities within the functioning capacity market.
52. In the future it is possible that large production installations within a cluster will become critical infrastructure for the state and included in the list of these installations.
53. Energy should be balanced mainly in real time (the best solution) or in an off-line system.
54. The main power supply points in a cluster and the energy reception points within the cluster must be defined in the management of the energy infrastructure.
55. The energy in a cluster can be received and distributed to the National Energy System by a local distribution company.
56. Technological and organizational processes initiated and implemented should be tailored to the needs of an energy cluster.
57. Heat recovery as part of the circular economy can also be used in energy clusters.
58. Tri-generation must also be included in an energy cluster.
59. Energy clusters can be classified as so-called “technological sandboxes”.
60. The random nature of the storage facilities of energy produced from wind and photovoltaic farms in the area of production is being replaced with the quasi-regulated nature thereof by means of its accumulation in energy storage facilities.
61. Mining excavations can be used as tanks for energy batteries.
62. Energy storage tanks are also electro-technical cells, i.e. batteries and super capacitors.
63. Changes in prosumer settlements in terms of the use of their installations are highly controversial in the current legislation, against which distribution companies are protesting vociferously. The concept of so-called regulated revenue is being used. In accordance with the requirements laid down by the Energy Regulatory Offices, regulated revenue is the total revenue consisting of the sum of all costs in the energy company plus the intended investment expenditure included in their development plan.
64. Fixed and variable charges are very important in this case. Fixed charges are due to specific capacity at consumers’ and variable charges result from the quantity of planned energy distribution.
65. The best solution for prosumers in the near future is to have local, backyard energy storage facilities. Then the excess energy produced e.g. by photovoltaic installation should be stored in order to use it later.

66. It is important for local energy communities that the cluster coordinator has a licence for the process of energy distribution and trading. It will then be able to generate revenue through the operation of the cluster using existing energy sources.
67. Energy storage is an opportunity for better flexibility in the operation of an unstable energy source in order to maximize financial revenue from it.
68. Financial income in this case can also be considered as the avoided cost of purchasing energy from external energy sources.
69. The daily income of an energy cluster is the sum of energy production throughout the day and the energy price received in the tariff or on the free market.
70. The objective of each energy producer is that the financial income from the energy produced should aim to achieve a maximum value. Subsequently, the question of whether to load or unload a given energy storage facility is calculated and concluded precisely in economic terms.
71. The strategy of loading and unloading energy in an energy storage facility is achieved as revenue maximization, i.e. the difference between the unloading income of a storage facility in order to market it in the distribution system and the loading cost thereof. The storage facility can also be loaded with energy from the outside.
72. A core problem in RES is the randomness of energy production from a given RES source.
73. The cost of imbalance in the energy system related to the randomness of a given RES source is the sum of two products, the difference between energy produced and the energy contracted in a given sales process.
74. In contracts in unstable energy sources, an energy price that includes the cost of imbalanced energy is obtained because the buyer has to purchase additional energy from another source of generation if it does not balance.
75. The purchase price of energy from the balancing market and the sales price to the balancing market are an absolutely crucial and constantly analyzed relationship.
76. We always try to load the storage facility with the excess energy we have in our project. Therefore, the energy source produced more power than the power recorded in our contract with the customer, so we load the storage facility with the excess energy we have in our project.
77. The optimal decision-making algorithm must always be defined in this process. The storage facility should be unloaded when the fee for the energy in the system is highest. Our source produces energy and the storage facility is loaded, but it has to be unloaded for the purpose of the contract; therefore, the storage facility is unloaded under specific, favorable market conditions. Therefore, the price on the balancing or stock market is higher than the price of the settlement contract. It is not worth buying energy to perform this energy contract, either on the exchange or on the balancing market; this way, additional revenue is obtained from increased production in order to perform the contract or to achieve certain excess production.
78. Therefore, the use of a loading and unloading mechanism by means of balancing market mechanisms is important in the process of optimizing energy production. In this case, it is assumed that the price of the balancing market for purchases and the price of the balancing market for energy sales is the same. This is a controversial process to be analyzed and generates space for speculation. The purchase of energy should therefore be very expensive and the resale of energy to the balancing market should be very cheap. Then an excellent space for energy producers with energy storage facilities will be released, because with the modification of the current balancing market, producers who will be able to declare this energy on such a balancing market will be able to do so, i.e. they will be mainly RES producers. On such a balancing market, adequate revenue can then be achieved.

10. Conclusion

In a multidimensional summary of the research conducted in connection with the design of the digital ecological business models of enterprises created by energy clusters, it should be noted that the construction of such business models requires a complex analytical process with the use of appropriate factors, layers and logic of the digital business models of enterprises. From this cognitive perspective, it is important to compare digital and ecological aspects in the layered, step and area-based design of this type of business. This generates a comprehensive synthesis of results for its full application, which ensures the effectiveness and efficiency of the digital ecological business models of enterprises created by energy clusters. It should also be pointed out that the solutions used may be directly applicable in the modern economy, which aims to achieve climate neutrality. The authors are also aware of the limitations resulting from the fact that the subject presented is relatively new and strongly evolving now, including from the perspective of the military, social and climate crisis in Europe, among others. In addition, this issue could still be developed by other scientists so that added value is generated that positively influences climate change in Europe and beyond.

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Service Design as a Sustainability Assessment Approach for Circular Business Models

Case: Assessment of Finnish circular companies' business models from the service design perspective

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[+] Sustainability assessment was done as a part of Aalto Open University service design courses

Abstract

Climate changes, overpopulation, resources overuse and ecological catastrophes require companies to embrace a circular economy and improve existing circular business models (CBMs). Due to their novelty, CBMs have been critiqued concerning their sustainability input at the company level. This paper contributes to the conference theme and session by assessing existing CBMs' sustainability using alternative sustainability assessment approach service design (SD) in three areas: innovation, which is crucial for sustainable business development enabling greater sustainability of CBMs; sustainable customer experiences on a human level allowing progressive organisational sustainability, and transparency in companies' internal and external processes indicating high sustainability processes area. A pilot study assessed 16 Finnish companies with four CBMs in seven industries to answer *how sustainable are CBMs across different industries when adopting SD as a sustainability assessment approach?* The author completed an assessment at the university SD educational process for professionals. It consisted of CBMs analysis adopting various design tools and a redesign conducted at the virtual workshop. Results revealed high sustainability performance in groundbreaking technological innovation (n=8) reinforced with innovative CBM (n=6) and limited sustainability performance in all other areas: limited customer-oriented services and poor user experiences (n=2), unfamiliarity with customer needs (n=9), haziness in the service life cycle (n=6), supply chain (n=4), value chain (n=5), and waste management (n=6). Therefore the short answer to RQ would be that pertinent CBMs are sustainable partly. Finally, the study demonstrates promising results when adopting SD as a sustainability assessment approach; however, the author recommends using other established procedures.

Keywords

circular business models, service design, sustainability assessment, transparency, business innovation

1. Introduction

Climate change, limited resources, overpopulation, and the predominant *take-make-waste* economic principle requires the transition toward circular business models (CBMs), which have been in the Nordic countries since 2015 (Kiørboe, 2015). A circular economy (CE) breaks with the linear use of virgin material resources and transitions towards the economy, which is less dependent on raw materials extraction and more focused on minimising waste (de Wit et al., 2018: p.14). CE currently undertakes only 9.1% of the global economy (de Wit et al., 2018); however, strengthened by pertinent business models (BM), political support, and societal pressure, the CE will become dominant by 2050 (Enkvist & Klevnäs, 2018.).

Companies must adopt CBMs to remain competitive in the market and resilient in uncertain futures. Businesses adopting a CBM benefit from higher resource productivity, reduced resource dependence and expanded growth. They can increase competitiveness and employment and increase innovation (Harmaala 2021). Next, have a more efficient supply chain that recovers or recycles the resources used to create the products, reduces the impact on the environment, lowers operational waste, and uses resources more efficiently (Atasu, Dumas & Van Wassenhove, 2021). However, companies must radically change their internal cultural values to achieve healthy growth (Stoknes, 2021).

Many definitions of 'sustainability assessment' exist depending on the assessment process, subject of assessment, and expected assessment outputs (Therivel, Wilson, Thompson, Heaney & Pritchard 1992; Devuyst 1999). Then, the ones that contribute to the change toward a more sustainable society (Devuyst, 2001) and those that propose alternative concepts definitions of sustainability assessment titled 'assessment for sustainability ' (Pope, Annandale & Morrison-Saunders, 2004). According to Bond, Morrison-Saunders & Pope (2012), a present framing of an impact assessment of sustainability assessment focuses on delivering current and future positive impact. Therefore, it could direct any type of decision-making, profoundly diverse in its form. Bond et al. (2012) believe that sustainability assessment is still in the expansion phase. Along with Bond et al.'s (2012) notion author selected Verheem's (2002) definition of sustainability assessment stating, *"The aim of sustainability assessment is to ensure that ''plans and activities make an optimal contribution to sustainable development*". Although this definition is generic allows the development of no standard sustainability assessment.

The author identified constructive critiques concerning CBMs' sustainability in BM literature. Despite the many benefits of the CE, like service-oriented BMs that can up to 90% reduce environmental impact (Tukker, 2004); however, companies are behind in developing more sustainable business models (SBM) (Ritala, at., 2018). Baumgartner & Rauter (2017) call for tangible strategies and clear guidance in assisting companies in implementing their sustainability initiatives more concretely. The evidence of CBMs' ecological impact is limited (Bocken, Schuit & Kraaijenhagen, 2018). In this pilot study, the author focused on three CBMs' sustainability performance limitations extensively exposed in the SBMs' academic literature:

1.) CBMs' innovation for sustainable development: Schaltegger, Lüdeke-Freund & Hansen (2012) argue that BMs innovation must assist a systemic, ongoing formation of sustainable business cases. Innovation is a subject of SBMs' economic, social and environmental value creation improvements (Rauter, Zimek, Baumgartner & Schöggl, 2019); therefore, sustainable assessment is required to evaluate SBM's innovation to improve these areas. Furthermore, Guldmann & Huulgaard (2019) reported companies'

insufficiency in incremental product and process design improvements to attain sustainable development. Again, current resource consumption and waste generation are unsustainable, resulting in the ecological system's degradation; therefore, a more radical innovation of business operations is needed to result in long term sustainability requesting more sustainable business offerings (Bocken, Short, Rana & Evans, 2013; Boons & Lüdeke-Freund 2013).

2) Customer experiences are increasing sustainability in CBMs: Two years after the Paris agreement, Jain, Aagja & Bagdare (2017), in their customer experience research agenda, emphasised exploring customer experiences concerning social issues, quality of life and sustainability. Signori, Gozzo, Flint, Milfeld, & Satinover-Nichols (2019) stated a new connection emerging between sustainability and customer experience themes; however, it lacks a theoretical foundation. Furthermore, the authors recognised businesses' actions toward sustainable customer experiences; however, better-planned touchpoints could improve businesses' efforts and sustainable communications toward customers, refine strategies and move toward stronger collaborative SBMs by including customer experiences thoroughly. Besides, companies with CBM have limited transitions towards sustainability, omitting user practices, market policies and regulations (Nußholz, 2017; Gaziulusoy & Brezet, 2015; Bradey et al., 2020).

3.) Service life cycle, value and supply chain, and waste management transparency in CBMs: Researchers state that CBM placement in the business logic of Anthropocene resembles incremental rather than fundamental change (Hofmann 2019; Kennedy & Bocken 2020) and leaves significant production and consumption operations challenges unsolved (Boons & Lüdeke-Freund 2013). Moreover, CBMs remain associated with challenging processes and their ecological and social impact, and behaviour change remains unknown (Hofmann 2019; Bocken et al. 2014; Boons & Lüdeke-Freund 2013). Companies with resource efficiency and recycling CBM remain dependent on companies creating waste to collect, sort and transform it into secondary raw material (Tamminen et al., 2020). Nowadays, organisations are requested to improve supply chain transparency to meet regulatory requirements, optimise operations, guarantee high-quality products and ensure sustainable processes (Montecchi, Plangger, & West, 2021). Zhang, Huang, Wen, Pooja, & Shanmugan (2021) exposed CEs' challenging factors like cooperation, trust and transparency required to achieve sustainable outputs, sustainable growth collaboration and cross-organisational openness within networks and value chain. Furthermore, according to Vegter, van Hillegersberg, & Olthaar (2020), to evaluate sustainable business strategies is necessary to measure the concrete performance of all processes in the CBM supply chain.

Furthermore, Prendeville & Bocken (2017) state that radically new SBMs are a systemic driver of change in the industry. Design thinking, sustainable strategic development (Shapira, Ketchie & Nehe, 2017), and service design (SD) have recently become a research priority in business innovation as they can, with their methodological approach, ease a negative impact on the environment (Ostrom et al., 2015). Lee, Oh & Choi (2021) report that although interest in the SD principles or SD methodology application increased in organisations, research on the elements influencing organisational innovation and performance through SD is missing. SD, with its capabilities, can re-design companies' value propositions offerings to make the business economically viable again (Mager et al., 2020; Vink et al., 2021). Prendeville & Bocken (2017), stating that

'Service Design is *the process of planning and organising people, technology and material components to enhance the quality of interactions between customers and providers*.' (p. 293)

Harmaala (2021) states that earlier CBMs' studies have not used the SD methodology, despite being a customer-centric approach, crucial for product, service or BM innovation. Lee et al. 2021 state that

bringing customer experience value while adopting SD methodology enables the development of innovative SBMs, which are recently rapidly extending to private companies. Services being processes in their core; therefore, the SD field developed tools that evaluate, assess and investigate internal and external organisational services life cycle processes, with tools like customer service journey and service blueprint. SD establishes best practices for designing services by enhancing customers' needs and the service providers' competencies. The results are user-friendly services relevant to the customers while being sustainable and competitive for the service providers (ibid).

This paper contributes to the conference theme and session by addressing the research gap, which has not been covered yet, concerning the CBMs' sustainability performance in innovation for sustainable development, customer experiences in increasing sustainability and CBM's transparency of service life cycle, supply and value chain and waste management adopting SD as a sustainability assessment approach. The author believes that has SD the potential as a sustainable assessment approach. Therefore, a pilot study was conducted to answer the research question (RQ):

How sustainable are CBMs across different industries when adopting SD as a sustainability assessment approach?

To answer this RQ author conducted a pilot assessing 16 Finnish companies CBMs utilising the SD as a sustainability assessment approach. With the pilot, the author demonstrates the possibility of sustainability assessment of the CBMs with SD in three areas: CBMs' innovation, customer experiences and internal and external services production processes.

The structure of the paper is as follows: introduction to CBMs, literature review on utilising SD in assessing CBMs sustainability. Following the methodological part of the pilot study presents the research design, cases, methodological approach, and data analysis procedure. The paper concludes with the result section, discussion and conclusions.

1.1 Circular business models

A central point of the company is its BM. A BM is a framework where the idea is turned into a business. It describes how a company makes a profit through innovation and how capital is generated. Furthermore, the BM reflects the relationships between the different elements and thus enables the company's business logic modelling. The BM essential elements are infrastructure, supply, customer and cash flow. Sustainable development, business partners, ecosystem or co-creation, can also be added when required (Osterwalder & Pigneur, 2002).

SBMs and CBMs gained research interest (Dentchev et al. 2018) when the BM emerged as a new analysis unit (Zoot et al. 2011). Moreover, an SBMs entails a broader understanding of value and stakeholders since it *'captures economic value while maintaining or regenerating natural, social and economic capital beyond its organisational boundaries'* (Schaltegger, Hansen, & Lüdeke-Freund, 2016, p: 6). According to Linder & Williander (2017), CBM is a type of SBM (Adams et al., 2016) that integrates environmental and economic value creation by everchanging the business logic from generating profits from one-time sales goods to generating earnings from a frequent flow of reused materials and products over time (Bakker et al., 2014), and by capitalising on the embedded value in used products. Several different CBM classifications exist; in this pilot study, the author adopted Lacy and Rutqvist's (2016) classification, which distinguishes between five circular business models: 1) *circular supply chain* models, which utilise in their production recyclable materials, such as renewable and bio-based materials and energy, to increase recovery rates. Results are easy to repair modular products.; 2) *recovery and recycling* models that collect

and recover materials of end-of-life products, waste, or by-products, which reuse them in their production; 3) *product life extension* models that, with repair and maintenance services, extend the life of existing products in the market, and by upgrading existing components with newer ones improve product performance. Besides, *product life extension* models extend the product's life in the market by reselling them to second and third-hand markets or taking back the product and remanufacturing, restoring, or improving the original product's functionality or remarketing them with a lower price.; 4) *sharing-platform* models, which enable distribution of various products and assets (vehicles, industrial machinery) through co-ownership or co-access mechanisms.; and 5) *product as a service*, models that sell services rather than products, with offering customers to use a product on a subscription basis against fees or usage-based charges, instead of owning it. Selected cases for the pilot study concern 2 to 5.

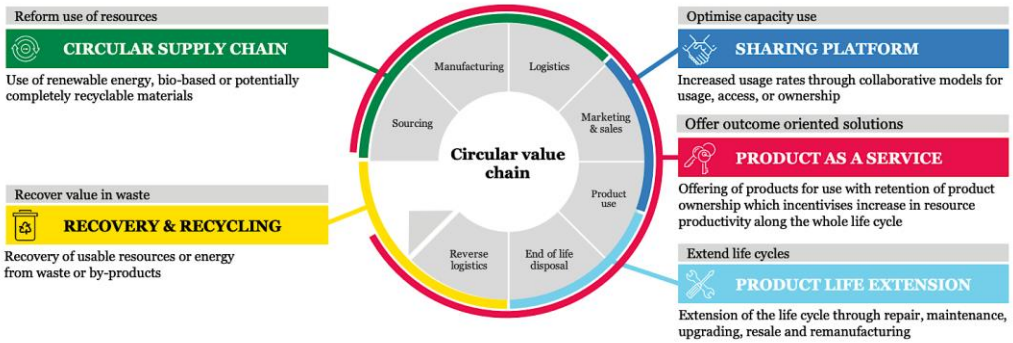

Figure 1. Classification of circular business models. Image source Sitra et al. (2019).

1.2 Service design

Services are critical in transitioning from an extractive *make-take-waste* economy toward a CE. They are inseparable elements of the product-service-systems and shared CBMs (Tamminen et al., 2020). Furthermore, services can unlock the full potential of CBMs with digitalisation and enable the development of radically new supply chain services (ibid).

A critical element in developing new circular services is the design approach, which can, with a problem solving methodological approach, reduce the impact on the environment by 80% in the first stages of the design process and 20% in the implementation stage (European Commission, 2021). The design has recently focused on investigating the transformative role of services to build a more sustainable and equitable society (Sangiorgi, 2010).

With the transition from the manufacturing to the service industry, companies began to adopt SD as an innovative performance approach, enhancing customer experiences and aggregate organisational efficiency (Lee et al., 2021). Lee et al. (2021) report that SD methodology and implementation are amplified in organisations; however, research looking at factors that affect organisational innovation and performance via SD were not. SD methodology considers SD aspects that enhance customer satisfaction, needs and business context that emphasise existing competencies (ibid). Furthermore, SD entails consistency and the implementation complexity between customers and businesses. SD applies approaches to assess customers, products, spaces, and communications processes that affect customers' experience when using the service. It evaluates processes, journeys, interactions, and systems used to conduct customer-centred experiences and capture the stakeholders' needs (Lee et al., 2021). Therefore,

SD can provide customers with holistic and valuable service experiences by addressing challenges through creative and collaborative design tools (ibid).

Lee et al., 2020 indicate that SD assists organisations in obtaining higher productivity by improving or innovating existing services to be more resourceful and operational. SD within the organisation develops strategies, proposes innovative service concepts and solutions, and changes the culture to a more customer than an organisation focused.

Although Schneider et al. (2011) define SD as a reiterative process that can design, assess, measure and redesign services, the author identified limited cases where SD was utilised as an assessment approach. Marquez & Downey (2015) used SD for service assessment and creation in the library environment. Harmaala (2021) adopted SD and BM innovation to develop, test and validate the new CBM. Bocken, Miller & Evans (2016), to assess the CBM environmental impact, developed and employed the rapid circularity assessment approach for evaluating the environmental impact of new CBM ideas. Hoffmann, de Simone Morais, & Teodoro (2020) utilised Life Cycle Assessment to assess the environmental performance of two different types of diapers. Finally, Lüdeke-Freund et al. (2017) propose a sustainability-oriented business model assessment (SUST-BMA).

Prendeville & Bocken (2017) state several synergies between SD and BM innovation. SD with a human-centred approach can foster behavioural change essential for developing SBM innovation. SD can create new concepts focused on value co-creation with an iterative process, resulting in meaningful and holistic customer experiences (Sierra-Pérez, 2021). SD enables value co-creation with various actors, stakeholders, decision-makers, and policymakers by understanding their needs, wishes, requirements, and context. SD utilises a set of tools: personas, customer service journey, service blueprints, storyboards, stakeholders map, experience prototyping in a co-design setting (Yu & Sangiorgi, 2014). Giga map, a rich picture and service ecology when dealing with complexity (Sustar & Mattelmäki, 2017). This way, SD can foster systemic innovation (Sangiorgi & Junginger, 2015) on the ecosystem level (Vink et al., 2021). Finally, positioning user experiences at its core can lead to innovative services, sustainable behavioural change and environmental sustainability (Sierra-Pérez, 2021).

2. Methodology

2.1 Design of research

The pilot sustainability assessment process lasted from April to June 2020 and from January to March 2021 and had two parts: the first part, the analysis of CBM with reporting and the second part, the redesign of CBM. In the first part, an analysed sample contained 16 Finnish companies with four different CBM, selected from the SITRA's website of Finland's circular companies (Sitra, 2020). Selected company cases were analysed as a part of an online introductory SD course for professionals at Aalto Open University. The second redesign part of the case companies' services happened at the virtual workshop adopting a circular venture template or Circularity Deck template (Konietzko, Bocken & Hultink, 2020). The qualitative data analysis had two stages: first, collecting qualitative data from the Blogger and study case by case utilising within-case analysis (Eisenhardt, 1989) to gain familiarity with the individual case data; and second, analysing collected text utilising cross-case pattern search using divergent techniques (ibid), to look beyond particular case by identifying categories of the prevailing themes and search for within *unique themes* for case similarities and differences.

2.2 Cases

The representative case selection of circular companies was made from the Finnish Innovation Fund - Sitra's website (2020) of the best Finnish circular companies (Eisenhardt, 2007). A selected set of cases consisted of 16 different Finnish companies from nine industries: transport, lightning, construction, renewable energy, textile industry, chemical, ecological composites, IT, and retail. The selected case companies' size spanned from start-ups in the early stages of their circular production (n=6), SMEs (n=5), to global enterprises (n=5). Selected companies had the following CBM: 1) *resource efficiency and recycling* (n=4); *product life extension* (n=3); *sharing platforms* (n=5); and *product as a service* (n=4) (for more info, see table 1).

Company code	Company Size	Established	First circular solution	Share of circularity in BM	Type of CBM	Production / service process	Industry
C3	local start-up	2016	2018	90%	Resource efficient and recycling	Turning industrial surplus materials into low carbon construction materials	Construction technology, Repurpose
C5	start-up	2016	2018	100%	Resource eficiency and recycling	Processing used alkaline batteries to produce fertalisers	Manufacture of basic non-organic chemicals
C6	start-up	2015	2017	100%	Resource eficiency and recycling	Composite products from recycled materials	Ecological composites
C12	medium - local	2007	2015	100%	Resource eficiency and recycling	Intelligent waste-sorting with robot	Waste-sorting technology
C1	start-up	2016	2016	100%	Product life extension	A marketplace for used smart phones	Resell
C13	medium / global	1944	no data	no data	Product life extension / Product as a service	Children clothes build to last	Textile retail
C14	medium	1997	1997	100%	Product life extension / Product as a service	IT equipment life-cycle, management as a service	IT equipment life-cycle management
C2	medium - global	2015	2016	100%	Sharing platforms	Mobility as a service	Transportation
C4 + C17	medium - global	2005	2018	100%	Sharing platforms / Product life extension	A cloud-based platform for worldwide leasing service of production facilities	Wholesale trade in metal product industry, Reselling
C7	medium - local	2003	2017	no data	Product life extension / Sharing platforms	Reselling second-hand products	Resale of military and outdoor equipment
C9	medium	2000	2016	0.25%	Sharing platforms	Rentable solutions for temporary needs	Internet services, Renting
C8	medium	1985	2014	30-40%	Product as a service	Lighting as a service	Lighting
C15	start-up	2014	2014	100%	Product as a service	Smart solar power systems as a service	Renewable electricity sales
C16	start-up	1981	2018	100%	Product as a service	Solar power	Energy services and energy production
C19	medium / global	2010	2017	50%	Product as a service	Compressed air as a service	Oil-less compressors for industry

Table 1: Overview of company cases.

2.3 Methodological approach

The case companies' CBMs sustainability assessment was conducted during three online SD courses for professionals with 2 ECTS at Aalto Open University, Finland. Alongside adopting a particular set of design tools in case analysis, for five weeks, professionals received lectures covering SD and CE, systemic design, strategic design, value co-creation, co-design, and human-centred design, experience design theoretical themes and explanation of two CE theories. Finally, participants also read a selection of supporting academic publications weekly.

The first sustainability assessment part aimed to understand the company's CBM and related products/services from different perspectives to identify possible improvements addressed in the virtual co-creative workshop. During the pilot study, professionals were divided into six groups with 3-4 members. Each group assessed one company case by adopting a set of design tools from system design (service ecology, stakeholder map), strategic design (Planet Centred Design tools by Vincit, strategy foresight), SD (persona, blueprint, customer service journey), experience design (customer service

experiences journey), and value co-creation (value mapping tool by Nesta). Furthermore, in the case assessment, professionals applied two theoretical models: the concept of planetary boundaries associated with CE strategies (Desing et al., 2020) and changing values in different economic systems (Brand & Rocchi, 2011). Participants reported their CBM sustainability assessment findings in weekly blog post assignments on a private Google Blogger website. The numerous implemented tools enabled assessment of the cases service life cycle, internal organisational processes from start to end, circular services back and front stage operations, communications with customers, the quality of customer experiences, customers' segments and companies' future strategic developments. Professionals gathered cases data from companies' websites, online sustainability reports, blog posts and social media. Some professionals contacted the companies but with limited success.

In the second redesigning services co-design workshop, companies' cases services propositions were redesigned. New SD concepts were developed at a 4-hour virtual workshop, adopting a redesigned circular venture template by IDEO or Circularity Deck template (See figure 4) consisting of five circular strategies at three different levels: product/service, BM, and ecosystem addressing identified issues in the analysis stage (Konietzko, Bocken & Hultink, 2020).

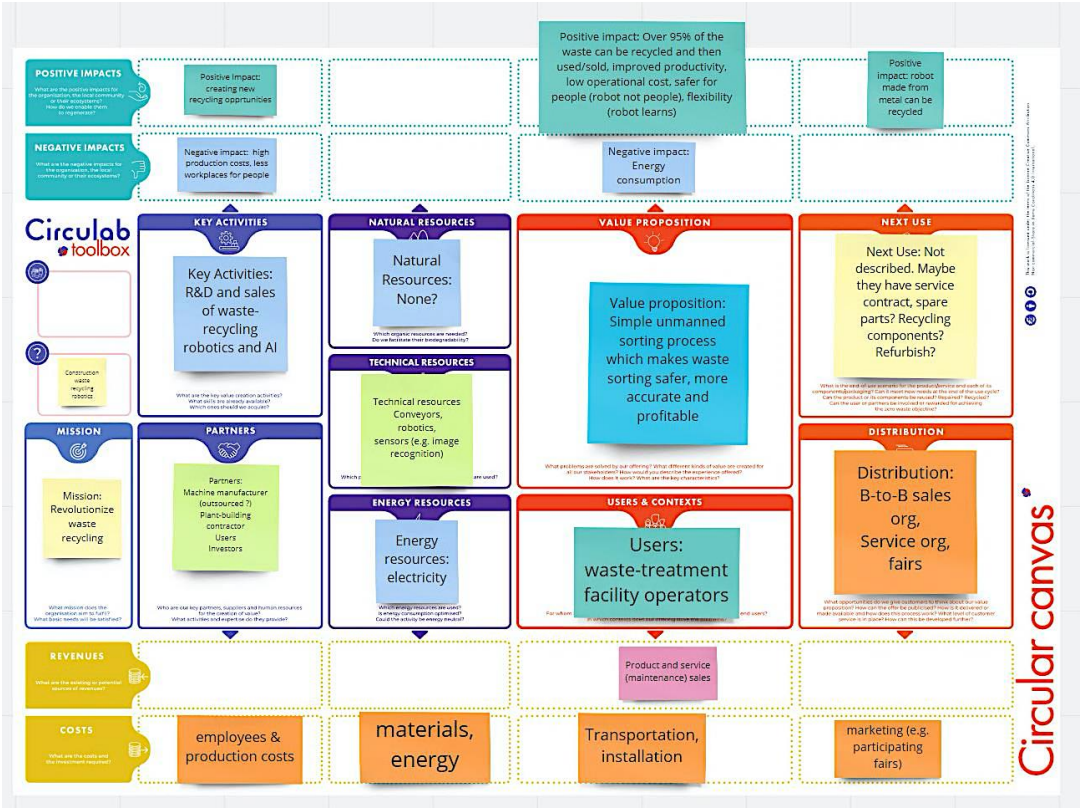

Figure 2: Example of a CBM template application when analysing the C12 company case.

First, products/services level innovation developed new products/service concepts propositions (for example, improving customer service experiences touchpoints). Second, business-level innovation redesigned companies' service offerings, including new CBMs proposals (for example, instead of selling lightning equipment, offer lightning as a service). Last, professionals proposed new collaborations and interactions on the ecosystem level to achieve better outcomes, such as asymmetrical collaborations of sharing experiences, data, and knowledge. Due to the limited pace author presents in the result section only the most relevant results concerning companies' CBMs.

2.4 Data analysis procedure

The data analysis procedure had the following stages: First, the individual case text was transferred from Blogger into Microsoft Word with belonging templates (Figure 2) and Excel tables excluding templates. This way, organised data-enabled within-case analysis and cross-case pattern search (Eisenhardt, 1989). Second, when analysing both text formats, *unique themes* were identified and transferred into the Mural – an online whiteboard application divided into three levels product/service, BM and ecosystem. Then, the author extracted the *neutral statements* and *positive statements* from the text and placed them close before identifying *unique themes*. Lastly, the *unique themes of SD concepts* were identified and placed on the Mural, following the *SD concepts* (see Figure 3). Mural enabled the cross-case pattern visualisation between different *unique themes* and *unique themes of SD concepts.*

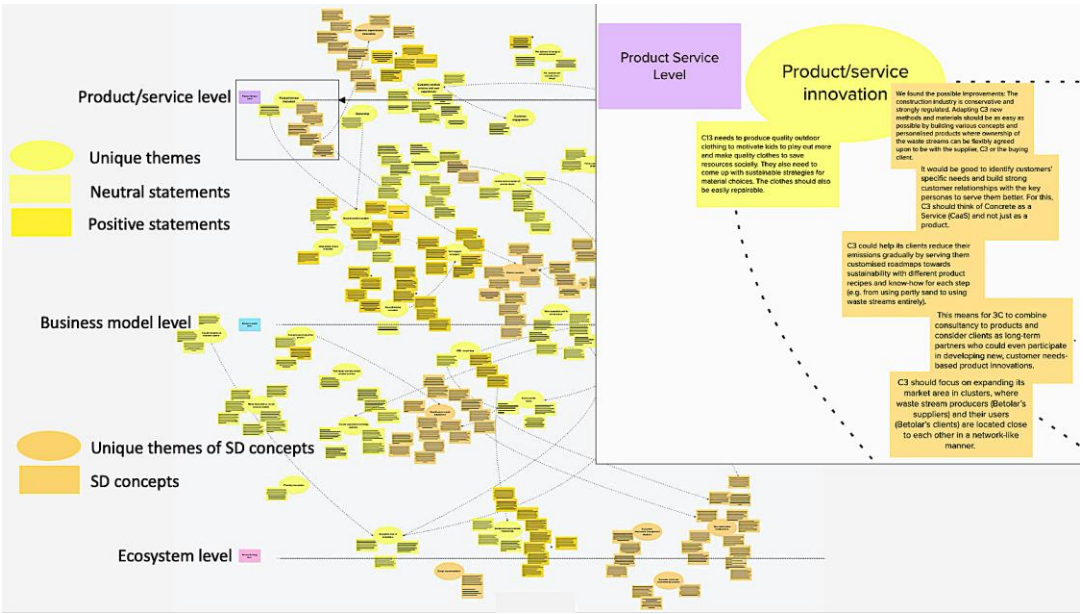

Figure 3: The cross-case pattern visualisation of *unique themes, statements* and *unique themes of SD concepts* and SD concepts placed in three levels.

3. The Results

This section reports results on three CBMs' sustainability performance themes exposed in the SBMs' literature, which the author aimed to validate in the pilot for the following reasons:

1. CBMs innovativeness is critical for higher sustainability performance (Schaltegger et al., 2012); furthermore, conceptual transformation and internal process improvement positively impact service innovation (Lee et al., 2021). Signori et al. 2019 claim that sustainability can be improved through innovation and explicit business functions. Adopting a sustainable strategy in the company can lead to competitive advantage and significant economic profit. Therefore, companies are increasingly adopting sustainability in their SBM. SD can improve existing and innovate services, which are more resourceful and operationally sustainable (Lee et al., 2021).

2. Customer experiences are crucial for increasing sustainability in CBMs (Signori et al., 2019). SD's ultimate goal is to provide holistic customer experiences (Lee et al., 2021), which can be systematically evaluated with SD tools. Sustainable customer experiences can create holistic value due to customer engagement resulting in sensation, feelings, reasonings and behaviours, arousing sustainable stimuli based on economic, social and environmental sustainability (Signori et al.2019).

3. Transparency of the company's internal (service life cycles processes) and external service processes (the supply and value chain, waste management) was selected due to SD's ability to visualise, assess and investigate internal and external organisational services life cycle processes with various SD process tools (Lee et al., 2021). Specifically, professionals highlighted these themes in terms of explicit low transparency and, therefore, a limited level of sustainability.

Furthermore, these themes provide a structure for companies' CBMs' sustainability assessment, specifically when adopting the SD approach. Moreover, professionals highlighted these themes as unique and provided neutral or positive statements when assessing CBMs' sustainability. Each *unique theme* is presented with subthemes and demonstrated with professionals' views from their blog posts.

1. Technological innovation

When considering technological innovation author followed Boons & Lüdeke-Freund's (2013, p:14) definition of when it is beneficial for sustainability performance:

"Thus, sustainable business models with a focus on technological innovation are market devices that overcome internal and external barriers of marketing clean technologies; of significance is the business model's ability to create a fit between technology characteristics and (new) commercialisation approaches that both can succeed on given and new markets."

Under this unique theme were identified the following subthemes:

1) The ground-breaking technological innovation of companies' products/services with high added value was identified in eight cases (C1, C3, C5, C6, C8, C12, C16, C19). To illustrate the results, professionals reported two exceptional companies cases, both with *resource-efficient and recycling* CBMs:

a) "*It seems that innovation is already an integral part of C5. A clean-tech C5 has a ground-breaking innovative product that solves landfill contamination by recycling alkaline batteries. The product is the only foliar fertiliser globally, made from used alkaline batteries appropriate to be used in organic farming. Farmers benefit from an environmentally responsible fertilisers alternative."*

b) "*C6 offers unique, patented technology for recycling mixed plastic waste and other hard-to-recycle waste streams. The company's unique patented technology allows multiple waste materials to be recycled and converted into new ecological composite products."*

2) Innovative CBMs reinforced with advanced technical innovation were recognised in six cases (C3, C8, C12, C15, C16, C19) where professionals noted companies' position as technologically leading innovators enabling companies to develop unique CBMs and service offerings, which have higher sustainability performance and user-friendly towards the customer C2B or B2B. To demonstrate,

a) "*C19 offers compressed air-as-a-service provided by environmentally-friendly air compressors. C19 invoice their customers based on usage, provide remote monitoring, and as the contract ends, machines*

are shipped back to the company to be maintained and re-used. C19 is the frontrunner in the industry, innovation, and infrastructure."

b) "*C16, with value-added service innovation, provides a complete solar panel service for customers who wish to cover their energy consumption with a solar panel on their roof. C16 remains the equipment owner and handles maintenance and production, while the customer pays for the photovoltaic power produced on its roof over a contract period. Later, the customer may purchase the power plant and continue to make solar power without any separate charges."*

c) "*C3, with resource-efficient and recycling, offers concrete-as-a-service. C3 uses geopolymer concrete from other industries, such as mining, energy, pulp and paper. C3 minimises the materials going into landfills and the materials used in conventional concrete. C3 products are created as a fit-for-purpose recipe for each customer. With a tailored product to the client's specific need, the C3 can maximise the product's secondary waste materials value and life cycle. The company's circular strategy reduces the demand for finite resources in concrete production. C3 licensing business model considers the planetary boundaries concept with maximising concrete manufacturing's resource efficiency and material innovation by prolonging the life cycle of their concrete products and offering aids from an environmental, economic, and social perspective.*"

3) Lack of product and SD when developing new products/services was explicitly seen in start-ups cases C5 and C6, both with *resource-efficient and recycling* CBM. Observing the company website, professionals state that C5 is not yet utilising SD thinking to its most potential. The lack of SD might result in non-transparent service/product value offerings in four cases (C3, C6, C8, C12). Professionals reported a positive C3 case where a service value proposition based on a CBM aimed to reuse waste streams and emissions in concrete production.

2. Customer experiences

Westin et al. (2022) state that recent quantitative and conceptual models have acknowledged relations between stakeholder perceptions of sustainable development, a company's brand image and customer satisfaction. Furthermore, Signori et al. 2019 recognise the need for a sustainable customer experience due to customers' requests for products and services concerned with economic, social and environmental sustainability. Furthermore, Jiang et al. (2020) findings indicate that sustainable practices improve customer evaluations of the service experience. Unfortunately, this was not the case in this pilot. Author identified:

1) Limited customer-oriented services and poor user experience were identified in two cases (C4, C7) *with sharing platforms and life extension* CBMs. Furthermore, companies were unfamiliar with their customers' needs in five instances (C3, C5, C6, C12, C13). Nevertheless, user-friendly experiences were identified in only three cases (C1, C4, C14) out of 16 analysed all three cases of *product life extension* CBMs.

To illustrate user-friendly experiences, a professional who tested C1's *product life extension* services reported a holistic online service experience: "*My overall service experience was outstanding, and I would highly rate C1's services as fast, with lower product prices and sustainable service process! What surprised me was how fast I could browse, search, decide, and purchase the phone. The whole process of buying a refurbished mobile phone took me less than 10 minutes. I received an ordered phone in less than 36h. The service was super convenient."* Nevertheless, on the C1 company website and social media, the sustainability aspect of C1's services in a broader context is barely acknowledged.

Lee et al. 2021 state that customer alignment relates to market positioning. The ability to address the customer's challenges and meet their needs can directly impact process improvement, customer loyalty, and corporate performance; however, this was not the case in this pilot.

2) Unfamiliarity with customers and their needs were identified in nine instances (C3, C4, C5, C6, C7, C9, C12, C13, C16). To illustrate, professionals reported

"The key to C9 benefit is to reach the end-user view to developing products that are more desirable and match products with the customer's needs. Empathy helps to understand the different stakeholders, and it also makes it easier to find the hidden customer needs."

C16 really aren't even interested in having more customers. For me, this looks like they don't care about customers; they seem to want to operate in B2B, and B2C might be something less interesting for them.

3) Limited marketing and communication companies' sustainability know-how was reported in three instances (C1, C4, C6). C6 has limited marketing skills, unclear service offerings, and no clear selling channels. Consequently, products are not targeted to environmentally aware markets. Moreover, C4 operates in the manufacturing industry, and its target groups are IT professionals and business leaders; therefore, C4 should emphasise innovative business ideas emphasising professionalism, accountability, and trustworthiness.

4) Limited sustainable value communication was identified in four instances (C4, C5, C8, C12). According to Viciunaite & Alfnes (2020), if sustainable companies incorporate sustainability information about their BM into their value proposition, like resources, activities, and partners, it can be for particular consumer segments to add value to the products and services offered by the company. Nevertheless, professionals exposed the C12 case:

"C12's business model is currently linear, and the company does not share their values. The business model could be switched to a service (Robotics-as-a-service) rather than a product. C12's website became evident that its communication is IT and product-driven. We started thinking about what alternatives they would have to change their communication towards sustainability and provide some new opportunities through storytelling."

5) Limited communication transparency with customers was reported with B2C customers in two cases (C4, C13), with B2B companies in five points (C3, C4, C8, C12, C13) and with B2S stakeholders in one (C12). To demonstrate, professionals wrote:

"How C12 might bring sustainability message across to the audience? For a company related to waste management, it is crucial to be transparent and publicly have the essential information on sustainability, especially for its customers."

3. Transparency of service life cycle, the value and supply chain, and waste management

In their research, Crenna, Gauch, Widmer, Wäger & Hischier (2021) suggest flexible and transparent life cycle processes concerning sustainability assessment within the current framework. They developed a life cycle for lithium-ion batteries, which has higher transparency in terms of better traceability of the data sources at different levels of detail. Nevertheless, when professionals assessed selected CBMs, they identified:

1) The haziness of the service life cycle process in six cases (C3, C4, C5, C8, C12, C13). To demonstrate the issue, professionals reported:

a) **"***C13 should hire a team assisting the company in following sustainable principles. Furthermore, C13 needs to document and share the manufacturing process, give relevant information to consumers at the right time, and have the resources to reply to customer queries."*

b) "*C5 product production and waste management strategy remain unclear. C5 describes and visualises the product development process on its website; holistic product manufacturing remains unclear for the farmer customer.*

According to Montecchi, Plangger & West (2021, p. 238), "*supply chain transparency is the practice of disclosing detailed and accurate information about operations and products, such as their origin and sourcing, manufacturing processes, costs, and logistics."* Furthermore, Montecchi et al. (2021) state that supply chain transparency is operational competence crucial for implanting sustainable principles in supply chain management. However, in the pilot, professionals reported:

2) The haziness of the supply chain in four cases (C3, C4, C8, C16). To exemplify, professionals pointed out that although the C8 is transparent on its energy consumption reduction and processes through their ISO certifications, C8 can significantly improve the transparency of the production supply chain with new lighting solutions, manufacturing process the lights, and the materials, chemicals, and suppliers used in the production process. Furthermore, to assess the C16 case, professionals adopted the sustainable design strategies tool focusing on reusability, recycling and equity (Acaroglu, 2017). They reported for the C16 case the following:

"Reusability: The production of solar panels is energy consuming and heavy on the environment, so we tried to find out whether C16 panels or solar panels, in general, are designed and produced to be reused. Are they long-lasting and efficient? Can they either be reused as panels or be disassembled into parts or smaller panels after their initial use? Do solar power plants contain other parts that could be reused? What happens to the panels after the contract period if they remain in use by the customer. Do they become waste, or are they recycled? How can the customer make the most out of the panels also in the future?

Recycling: Solar panels contain a large amount of non-renewable minerals such as aluminium, silver, lithium, tin, copper, silicon and nickel, just to mention a few. The worldwide production of solar panels is increasing rapidly […]. High volumes of new panels create greater demand for recycling technologies and end-of-life production development.

Equity: Solar panels are often produced in developing countries and require raw materials that are not always safely and fairly produced. Where are the raw materials produced and panels manufactured? How ethical and fair is the process from raw material to end product? Is solar power available to all in society? C16 *does not offer that much information on their production process online."*

Viciunaite & Alfnes (2020) emphasise that as the sustainability of some BM elements is often not seen by customers, the importance of incorporating the value BMs' segments into a value proposition; therefore, the product/service value chain must become more transparent and make pro-social and pro-environmental elements visible to consumers. Additionaly, Wrålsen, Prieto-Sandoval, Mejia-Villa, O'Born, R., Hellström & Faessler (2021) illustrate in several cases the importance of evaluating the product (batteries) value chains from a sustainability and transparency perspective to strive for circularity and

encouraging the design of CBM for product second use, improved recycling practices, and ways to eliminate waste, emissions, and pollution in the value chain. Yet, the professionals identified:

3) The haziness of the value chain in five cases (C3, C4, C6, C8, C13). Two of identified instances are illustrated below:

a) *"C3 value proposition is based on a circular business model aiming to reuse waste streams and reduce emissions in concrete production. However, C3 would need to increase the transparency of the value chain for the stakeholders and customers by displaying on the website customer references with facts and figures."*

b) "*C6 produces products from waste through its patented technology. Still, we lacked references and further information on how the technology works or how the three-year payback time has been determined.*"

4) Haziness of waste management during production and after use was identified in six cases (C3, C4, C5, C8, C12, C13). Only one company out of 16 has a closed loop of product manufacturing, use and recycling (C14). Professionals reported, among others, the following instances:

a) "*C5 describes and visualises the product development process on its website; however, holistic product manufacturing remains vague to the customer. For example, C5 touchpoints, like batteries collection, product delivery to end-users, and fertiliser use in the landfill, remain unknown to potential customers. Waste material is mentioned on the C5's website without explaining the recycling batteries process or waste material management strategy. C5's primary material is 90% recyclable, and contamination of landfills can be avoided; however, C5 does not reveal what happens with the 10% remaining material from extracting the zinc and manganese used for primary products. Therefore, C5 must create a closed-loop system to re-circulate materials after use."*

b) "*C12 reveal little about waste management and end-of-life management of their machinery despite operating in the recycling industry."*

c) *"C8 provide limited information about the replaced lightning fixtures and how these are recycled. Therefore, those parts of the service business model cannot be evaluated towards the concept of the planetary boundaries."*

4. Discussion

The paper contributes to the conference theme and session by utilising SD as an alternative sustainability assessment approach to investigate how sustainable are pertinent CBMs in innovation, sustainability of customer experiences and transparency of service life cycle, value chain, supply chain, and waste management in CBMs. Utilising SD as a sustainability approach in these areas can offer a complete picture of elements connecting to the actual sustainability performance of CBMs through:

1. Innovation is crucial for sustainable organisational development and, therefore, higher sustainability of CBMs.

2. Sustainable customer and employees experiences on a human level are linked to the advanced organisational sustainability and

3. Transparent companies' internal and external processes indicate high organisational sustainability.

If SBMs literature provides extensive benefits of high sustainable performance for the organisation, unfortunately, a pilot does not confirm this apart from high groundbreaking technological innovation (n=8). The result partly differs from Hofmann's (2019) and Kennedy & Bocken's (2020) claim CBMs' technological innovativeness and the opportunity for fundamental change. The pilot also identified (n=6) companies' technologically advanced innovations supported with unique CBMs and sustainable service offerings with higher sustainability performance. These companies combine technological innovation with BM innovation to achieve high sustainability performance.

Evaluating customer experiences, which are crucial drives for sustainable development (Westin et al., 2022), reviled three holistic, user-friendly experiences *product life extension* CBMs out of 16 analysed cases. Moreover, Jiang et al. (2022) indicate that sustainable practices improve customer evaluations of the service experience. Yet, the pilot stated limited customer-oriented services, reduced user experiences (n=5), and unfamiliarity with the customer and their needs (n=9). These findings also confirm Nußholz 2017; Gaziulusoy & Brezet 2015; Bradey et al. (2020) CBMs' user practices limitations; that way, CBMs have limited transitions toward sustainability. Last, companies do not fully communicate sustainable values of product/services production (n=4) with customers (n=2), companies (n=5) and stakeholders (n=1).

When assessing the CBM's transparency of service life cycle, value and supply chain, and waste management, a pilot demonstrates the haziness of the service life cycle in a product/service production process (n=6), supply chain (n=4), value chain (n=5), and waste management (n=6). Results confirm Hofmann's (2019); Kennedy & Bocken's (2020) claim of current CBMs' placement in the business logic of the Anthropocene, leaving significant production and consumption operations challenges unsolved (Boons & Lüdeke-Freund 2013). Furthermore, the pilot confirmed CBMs' ecological and social impact and behaviour change to be indefinite (Hofmann, 2019; Bocken et al., 2014; Boons & Lüdeke-Freund, 2013), as only one case (C14) out of 16 professionals reported a positive impact on the environment and society. Equally, due to the limited sample, the pilot study could not demonstrate the lower environmental impact of CBMs (Tukker, 2004). Last but not least, professionals exposed CBMs companies' dependency on linear industry waste (n=5), also recognised by Tamminen et al. (2020).

The research gap concerned the CBMs' sustainability assessment in CBMs innovation increasing sustainability, sustainable customer experiences and CBM's transparency of service life cycle, supply and value chain, and waste management reviled the appropriateness of SD as a sustainable assessment approach, particularly in listed areas. Concerning adopting SD as a sustainability assessment tool, according to Prendeville & Bocken's (2017) definition, SD is the planning process for organising people, technology, and materials to enhance the quality of interaction between a customer and provider. It can be established that SD is a relevant sustainability assessment tool, particularly in assessing sustainability performance concerning CBMs innovation, sustainable service experiences and transparency of internal organisational processes of the service lifecycle, the supply and value chain and waste management. However, an author would recommend using SD alongside established assessment tools (Bocken, Miller & Evans, 2016; Lüdeke-Freund et al., 2017; Hoffmann, de Simone Morais, & Teodoro, 2020).

5. Conclusion

This paper contributes to the conference theme and session by addressing the research gap concerning the CBMs' sustainability assessment, utilising the SD approach in innovation being crucial for sustainable business development enabling greater sustainability of CBMs; in sustainable customer experiences level, allowing progressive organisational sustainability, and transparency in companies' internal and external processes indicate high sustainability processes area. These themes were selected because of SBMs' academic literature critics concerning CBMs' limited sustainability performance and because they provide a holistic structure for sustainability assessment in the CBMs' innovation; customers, employees and stakeholders' sustainable experiences, and organisational internal and external processes transparency aspects of companies' CBMs' when utilising SD as a sustainability assessment approach.

To answer the RQ, *how sustainable are CBMs across different industries when adopting SD as a sustainability assessment approach,* the short answer would be partly. When assessing sustainability with the SD approach, this revealed high technological innovation, which reinforced the development of the innovative CBMs. The other two areas, sustainable customer experiences and transparency of service life cycle, the value and supply chain and waste management, demonstrate clear limitations of CBMs sustainability development and, therefore, lower sustainability performance (see Figure 4).

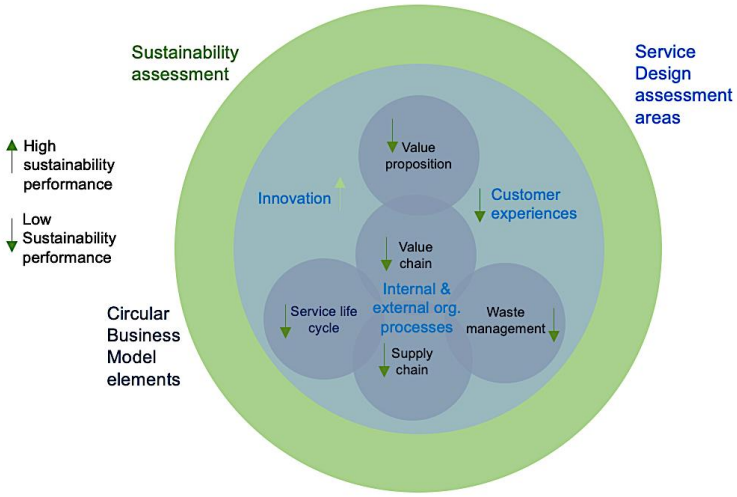

Figure 4: Diagram visualises results from the pilot study assessing sustainability in pertinent CBMs when adopting the SD approach.

This paper is unique, and it brings value to the SBMs field by utilising SD and proving proof of its appropriateness as a sustainability assessment tool in CBMs, which has not been done before, by assessing CBMs innovation, sustainable customer experiences, and internal and external organisational life cycle processes. Then, with theoretical contributions of conforming or opposing the constructive critique of the CBMs' sustainability, supported by relevant qualitative research results from the pilot study.

It seems that CBMs could minimise material input and outflow from the economic system and play a crucial role in utilising the resources and capabilities of the private sector towards the transition to more sustainable economic development. Nevertheless, the growing prominence of the CBM concept in research and practice demonstrates considerable uncertainty on how to implement pertinent CBMs in the current global economy (Galvão, Homrich, Geissdoerfer, Evans, Scoleze Ferrer & Carvalho, 2020).

The pilot study has three limitations: first, despite professionals utilising websites, companies' sustainable development reports, social media in accessing the companies' cases, they did not have direct access to companies; second, professionals who performed the analysis were not researchers but were experts in their field; and third, the cases sample was too small to make sustainability comparisons between different types of CBMs.

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From Linear To Circular Supply Chain: Insights From Case Study in Sustainable Packaging Logistics

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Abstract

The debate on the impact of packaging logistics on sustainability has shifted towards a more holistic discussion of the impact of the packaging life cycle throughout the entire supply chain, in the research stream of circular supply chain management. Since how circular economy systems really work for firms around the world is at the very beginning of knowledge development, this paper aims at providing an analysis on how to implement and manage innovative projects to shift from linear to circular economy, moving from recycling approaches to upcycling solutions, with empirical cases from Fercam Echo Labs.

Keywords

Circular supply chain, Sustainability, Upcycling, Logistics Packaging, Packaging Logistics, Wooden Pallets and Crates, Social Enterprise

1. Introduction

Many authors have emphasised the close relationship between the concepts of "logistics" and "packaging" (Garcia-Arca et al., 2014; Azzi *et al.*, 2012 p. 441; García-Arca and Prado-Prado, 2008; Hellström and Saghir, 2007; Verghese and Lewis, 2007; Saghir, 2002; Lockamy, 1995; Twede, 1992): which focuses on the "synergies" achieved by integrating logistics and packaging with the potential of increased supply chain efficiency and effectiveness (Vernuccio *et al.*, 2010). Packaging is an integral part of the logistical system and plays an important role in the supply chain (Kirwan and Coles, 2011). The link between logistics and packaging was initially summarized in the expression "logistical packaging" which was used by academics referring to the personalization of packaging useful for logistics (Paine 1990; Twede 1992; Twede and Parsons, 1997). This concept does not communicate the full potential of the link between logistics and packaging: it was considered more appropriate to use the expression of "packaging logistics" which, in addition to focusing on the interface between packaging and logistics systems, recognizes the interdisciplinary nature of the packaging itself and fully enhance the interaction among

packaging, logistics and marketing decisions (Saghir, 2004). So that the expression "packaging logistics" refers to the integration of packaging design with logistics management, with a particular emphasis on strategic aspects (Garcia-Arca et al., 2014; Saghir, 2002; Hellstrom and Saghir, 2007).

The presence of the packaging along the supply chain is pervasive, both as product itself and as combination of product-packaging (Silva and Pålsson, 2022; Massaroni and Cozzolino, 2021; Cozzolino, 2021). Even more alongside the direct logistical flow (from upstream to downstream) is the return flow of packaging and product - reverse / return logistics – that has attracted more attention in the last years (Meherishi et al., 2019). This for many reasons, such as the emerging changes in the end-market, in the productive context, and in the regulatory framework, all those aspects especially in a sustainable perspective; sustainability-focused initiatives around logistics innovation and the need for change in the use of packaging are combining also with major industry trends affecting the packaging industry: for example, cost pressures, e-commerce and digitization (in general), and shifting consumer preferences (Berg *et al.*, 2020). The idea of a sustainable packaging logistics has been growing in academia and professional contexts (Massaroni and Cozzolino, 2021; Cozzolino, 2021). The concept of sustainable packaging logistics may be connected with a strategic, systemic and holistic view, going beyond a formal - accounting, social (and environmental) - responsibility, imposed by rules and regulations, according to a sustainability that works "toward a triple helix for value creation, a genetic code for tomorrow's capitalism, spurring the regeneration of our economies, societies, and biosphere" (Elkington, 2018). The concept of sustainable packaging logistics is growing, but it is still not easy to univocally define it due to the multitude of criteria which should be considered, a large variety of packaging materials, as well as the dynamic development of the industry (Kozik, 2020), and with different actors involved and along the whole life cycle of the products and of the packaging-product combination (Lindh et al., 2016). In a general view, sustainable packaging logistics compared to conventional one, meet higher environmental, economic and social standards, have better performance and quality features, and at the same time bring new possibilities in the field of the recovery and waste management. These standards should apply to the entire packaging life cycle - from production, through packaging, distribution, transport processes, to use and disposal along the entire supply chain, in a closed-loop supply chain or also with a circular supply perspective (Kozik, 2020).

In particular, "Circular Supply Chain Management" (CSCM), which integrates the philosophy of the circular economy into supply chain management, offers a new and compelling perspective to the supply chain sustainability domain (Farooque et al., 2019; Genovese et al., 2017; Nasir et al., 2017); consequently, there is increasing research interest in this viewpoint by many authors (Ying and Lijun, 2012; Aminoff and Kettunen, 2016; Batista et al., 2018; Bressanelli et al., 2018; De Angelis et al., 2018; Govindan and Hasanagic, 2018; Howard et al., 2018; Liu et al., 2018) as underlined by Farooque et al. (2019) in their literature review paper. However, research is still at a nascent stage and great potential would be realized in this direction (Farooque et al., 2019). Inside this new framework concreate solutions may be developed but are still at a beginning phase stage.

Along this research gap the present paper aims at investigating the following research question:

RQ – What concrete initiatives are implemented by companies to realize sustainable packaging logistics innovations in a circular supply chain perspective?

To answer to the research question, the rest of the paper is organized as follow: section 2 presents the upcycling solution referring to logistics, packaging and sustainability; section 3 describes the case study

on sustainable packaging logistics in a circular supply chain management perspective, with the emblematic example of Fercam Echo Labs; in section 4 some conclusive considerations are proposed.

2. Logistics, packaging and sustainability

The European Commission adopted the new Circular Economy Action Plan (CEAP) in March 2020, as one of the main building blocks of the European Green Deal, the new European agenda for sustainable growth. In the document "Circular economy action plan" packaging is placed among the "key product value chains"[23].

The integration of Circular Economy into Supply Chain Management has been termed Circular supply chain in the literature, and Farooque et al. (2018 p. 884) define "Circular supply chain management" as following: *"is the integration of circular thinking into the management of the supply chain and its surrounding industrial and natural ecosystems. It systematically restores technical materials and regenerates biological materials toward a zero-waste vision through system-wide innovation in business models and supply chain functions from product/service design to end-of-life and waste management, involving all stakeholders in a product/service lifecycle including parts/product manufacturers, service providers, consumers, and users"*.

The purpose of CSCM is to lead towards circular supply chains from a linear one (Farooque et al., 2018). A linear supply chain extracts resources from the geosphere and the biosphere and disposes products, packaging materials, and wastes from multiple supply chain stages; the unwanted items are often deposited in landfills (Farooque et al., 2018). A closed loop supply chain improves environmental performance by bringing back goods and packaging materials to the producer to recover value (Guide and Van Wassenhove, 2006); however, the extent of value recovery in a closed loop supply chain is often limited because the efforts are restricted within the original supply chain (producer's supply chain) and do not include secondary supply chains and/or involve new channel members (Moula et al., 2017). A circular supply chain goes further by recovering value from waste by collaborating with other organizations (Farooque et al., 2018), within the industrial sector (open loop, same sector), or with different industrial sectors (open loop, cross-sector) (Weetman, 2017).

In a circular supply chain perspective, an interesting initiative is the upcycling one (Sung et al., 2021). The term upcycling originated in the 1990s (Bridgens et al., 2018) and means reuse of discarded objects or material in such a way as to create a product of higher quality or value than the original (Wegener, 2016). Upcycling has the potential to transform the way we consider individual products, as assemblages of functional component modules with multiple life spans rather than complete stand-alone objects with singular finite lives (Richardson, 2011). Sung (2015) in a literature review paper described as, despite variations among definitions, there are two dominant viewpoints in the analyzed publications: one based on material recovery of which the major aim is to maintain value and quality of materials safely in their second life and beyond by the improved recycling or remanufacturing; the other focused on product (re)creation for higher values and qualities by transforming, repurposing or refashioning waste or used materials/products either by companies or by individuals. For industrial upcycling, both as upgraded recycling and as remanufacturing, are required specialist skills, equipment, tools, space and time. The area of upcycling in a concrete application is relatively new and unexplored. Yet industrial practices – who is

[23] https://ec.europa.eu/environment/pdf/circular-economy/new_circular_economy_action_plan.pdf

doing what, when, where and how, and how (un)/successful it is – remained largely unknown (Bridgens et al., 2018).

In this paper, the focus is on packaging as an exemplar of material objects that, whilst carefully designed and manufactured, have quite short life spans and little status as objects of value in themselves. Very often once packaging served its purpose it is discarded, even though it has not degraded and is still functional or have functional materials. These materials discarded may be upcycled into useful objects, tailored to the requirements of individual and/or companies, in a circular perspective. The analyzed cases are based on circular supply chain solutions for wooden packaging – pallets and crates. Wooden pallets are load support that are indispensable for the logistics, transport, handling, and storage of goods in many industrial sectors. These pallets are horizontal wooden platforms characterized by a minimum height compatible with movement using pallet trucks, forklift trucks and other appropriate handling equipment. The wooden pallet supply chain is a complex product network, and the way pallets are managed throughout their lifecycle phases produces a notable difference in terms of environmental and economic impacts (Tornese et al., 2021; Gnoni et al., 2018). Crates are logistical boxes useful for moving highly value products, in this paper in particular they are used for the fine-art transport. Upcycling for pallets and crates offers a whole new life for discarded materials, taking a position opposed to un-usability or recycling. Recycling is typically accepted as breaking down the original material and making it into something else (also using more energy), for pallets or crates for example the typical recycled products are mainly chipboard, MDF panels, etcetera. In this specific case of wood, the shredding process compromises its very essence and in order to produce new boards, it is necessary to continue deforesting. While upcycling preserves the integrity of the material (and is totally energy saving) creating new products, often acquiring a greater value than the original object or material, thanks to a creative reuse; creative reuse that interrupts the deforestation process.

3. Case of sustainable packaging logistics in a circular supply chain management perspective

3.1. Methodological approach

The case study method seems to be the most suitable for this research, whereas the nature of the research question requires an exploratory approach (Yin, 2003). The case study methodology is well recognized as a valid approach through which to deepen understanding of a phenomenon that is still in development and/or for which the dimensions have not yet fully explained (Yin, 2003; Eisenhardt, 1989). In particular, logistics researchers have promoted the use of case study analysis as an approach to scientific inquiry, and Ellram (1996) declares that case studies are excellent for providing detailed explanations of best practices. The cases selected represent best practices on how to implement and manage innovative projects for sustainable packaging logistics to shift from linear to circular economy, moving from recycling approaches to upcycling solutions along the supply chain. The cases are taken from the experience of Fercam, primary Italian family business in transport and logistics sector, that has become one of the main logistics services providers in Europe. The analysis is based on desk research from the institutional Company's website, LinkedIn news, and official documents.

3.2. Fercam Echo Labs[24]

Fercam Echo Labs is a non-profit Social Enterprise: a permanent laboratory, that was born in 2021, which works on a more sustainable future for people and the environment. Its mission is to create networks and synergies between the Corporate Social Responsibility programs of its clients and partners, which thanks to the active participation in the laboratory will be able to carry out projects that individually they could not have carried out, preferably starting from the territory in which they manage their activity. It proposes itself to them as General Contractor for the realization of sustainable projects.

Fercam Echo Park, just realized, for example, is one of those projects. The Echo Park is an outdoor structure inside the area of the distribution center of Rome, where they have created a break area available to employees and indirect collaborators, where they can have lunch or have a coffee break. Two obsolete containers, otherwise destined for disposal for the recovery of iron, have been modified, repainting them and obtaining openings to make large windows. The non-profit association Linaria was identified as a project partner, to design and guide the creation of furnishings and accessory structures starting from wooden pallets, flowering plants and plug hotels to welcome solitary bees. The woodworking activities were a learning opportunity for a group of 7 political refugees, and with the hours of training in eco-carpentry led by the experts of the Laboratorio Linfa, the participants in the project were awarded a certificate, which is useful for entering the European world of work. Other complementary sustainable activities have been realized inside the structure (for example, with the vending machines).

Moreover, in the area dedicated to the break area and inside the Company offices, bookcases will be installed to encourage reading with voluntary and free bookcrossing initiatives, leaving books available to anyone who wants to read them, especially long-haul line drivers, during their long stops, between one stage and another. The book will then be able to travel with them, in companies branches or wherever they want to leave it. The bookcases will be made by upclycling the wooden crates built for the transport of works of art, utilized by Fercam Fine Art. In Fercam Fine Art the internal carpentry activity is one of the pillars of artworks handling operations, independently producing, according to specific needs, all the crates for transport activities. The legislation that regulates the transfer of cultural assets requires that precise rules for packaging materials be respected, so the Company uses very valuable multilayer wood panels to manufacture the crates. Whenever possible, they readjust them for subsequent transports, but the production needs of new crates still tend to outweigh the opportunities for reuse[25]. It is a noble wood, both for the nature of the material and for its intended use, therefore, it has always been the Company priority to find the right methods to re-utilize it, possibly for equally noble purposes. Also, they have already re-used the wood from these crates to make kennels for animals, the last of which was recently donated to municipal kennel.

Fercam Echo Labs is realizing with wooden pallets and crates upcycling projects of the implementation of sustainability in each of its three dimensions—economic, environmental, and social—simultaneously and alongside the supply chain, in a circular perspective.

Dino Menichetti, Fercam S.p.A. Regional Manager and Fercam Echo Labs President, declares: “In [Fercam] corporate activities, corporate social responsibility is of great importance. With Echo Labs we wanted to go beyond the Fercam business, to establish a network of collaborations and non-profit partnerships. The

[24] Text and contents from https://www.echolabs.fercam.com/it (accessed 19 April 2022)
[25] Text and contents from https://www.fercam.com/en/welcome-1.html (accessed 19 April 2022)

synergies created between the CSR programs of the various entities involved will allow each to have an even more significant positive impact, under the aegis of the 17 Sustainable Development Goals of the UN 2030 Agenda"[26].

4. Some conclusive considerations

The debate on the impact of packaging logistics on sustainability has shifted towards a more holistic discussion of the impact of the packaging life cycle throughout the entire supply chain, in the research stream of circular supply chain management. Since how circular economy systems really work for firms around the world is at the very beginning of knowledge development, the paper aims at providing an analysis on how to implement and manage innovative projects to shift from linear to circular economy, moving from recycling approaches to upcycling solutions. In particular, an empirical case focuses on upcycling pilot-projects regarding wooden pallets and crates implemented by Fercam Echo Labs in each of three dimensions of sustainability—economic, environmental, and social— simultaneously and alongside the supply chain. It describes the starting ideas, how they have been developed, what initiatives have followed – also concerning structural organizational decisions and strategic alliances. The case represents a best practice inside the sector and the preliminary concrete evidence arising from this research would be a starting point for the next research on this topic both at theoretical and empirical level.

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How Value Proposition Template matches sustainability: A bibliometric analysis

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Abstract

The paper's goal is to understand how Sustainability's topic is represented in Value Proposition Templates. Through a bibliometric analysis on Value Proposition Template and Sustainability, it's noted that the phenomenon grew in 2019 especially in the US and Indonesia and is developed in 3 out of 5 co-occurrence analysis clusters.

Introduction and Objectives

The goal of this paper is to understand how sustainability is included into Value Proposition Template (VPT) papers. In this paper it will be studied how the role of sustainability is declined in VPT and the benefits and future prospects of integration with one another.

This paper will attempt to understand how sustainability changes everyday life, and how VPTs follow this wave and adapt to change by becoming sustainable. Sustainability is increasingly becoming a key part of many companies' strategies, so it's becoming increasingly important both professionally and in terms of scientific research (Schoolman, E. D., et al., 2012). Taking a clear stance on the environmental and social impact of a company's business means extending this focus to all partners in the supply chain, including Value Proposition (Sianesi A., et al., 2018). In this paper it will be analyzed the rapid growth of sustainability in terms of developing Value Proposition (VP). Today, all companies are working on VP and therefore on templates, but how much is sustainability really explored in this context?

Value Proposition

Value Proposition represents the reason why the target audience buys products and services applied to their needs or designations. VP defines the way organizations work by focusing their activities on best serving their customers while doing so profitably (Barnes, C., et al., 2009). VP represents the strategic synthesis of a series of decisions and actions that must be jointly considered in a synergistic logic. Sustainability requires new sources and approaches to address VP (Pádua Pieroni, M., et al., 2018).

Value Proposition Template

Organizations use templates often in order to make VP easier to describe. Templates are conceptual schemes used to enhance and optimize the comprehension of a VP complex concept. Templates support companies in document's creation, they can facilitate employee's workload and assist in improving company's employees' attention (Goodyear, H. M., et al., 2013). While designing VPTs, business development and strategy are something that should be taken very seriously (Osterwalder, A., et al., 2014). An important consideration is that VPT changes over the time (Ottolenghi, C., 2022) and it's interesting to analyze whether they take into account sustainability.

Adapting templates to current trends

Sustainability has become increasingly important over the last years, thanks to society's awareness of its impact on the global environmental scenario. Social entrepreneurship considers social value creation as the primary objective of its business and looks at economic value creation as a by-product which allows the organization to achieve sustainability (Michelini, L., et al., 2012). Nowadays, many organizations choose the option of doing sustainable activities, as they see that companies that already have social and environmental certifications, attract more customers (Meseguer-Sánchez, V., et al., 2021).

Research questions

The objective of this paper is to understand how sustainability is introduced in VPT topic. For this reason, it's important to analyze from a quantitative perspective how much VPTs include the matter of sustainability. In particular, the goal is to understand how much the topic is existent, if there are authors from countries where the topic is more prevalent, if there is a specific moment in which sustainability has been developed and which are the related topics.

To understand this, research questions were outlined, such as:

- "How is sustainability's topic declined in that of VPT? How much is the topic existent?"
- "Has the relation between the two developed during a specific period of time and which are the journal which treated them?"
- "Which keywords are mainly used when this relation is treated and with how keywords have been explored over the years? How many keywords within the papers correlate with VPTs and sustainability"?

Method

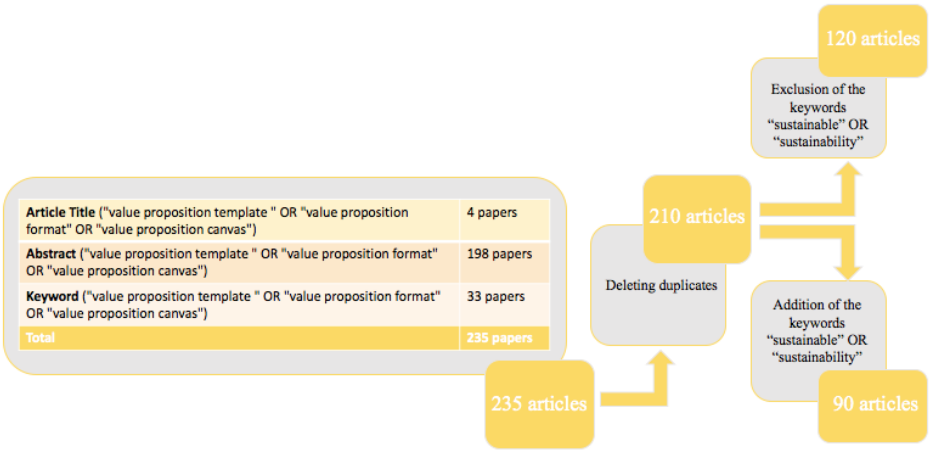
In order to analyze the literature on the topic of VPT and sustainability was produced to date, a quantitative approach has been adopted based on bibliometric analysis. Bibliometric mapping is a spatial depiction of how subject areas, research strands, and contributions are related to each other (Cobo, M. J., et al., 2012). Scopus has been used to carry out the performance analysis, while VOSviewer has been used to do the bibliometric one. This platform was chosen to collect the papers because is described as "the most comprehensive access point in the scientific, medical, technical and social sciences, including all relevant literature" (Tarantino, E., 2006), and stating to this, it's more than sufficient for the analysis.

After the analysis of the papers found in literature and a comparison with experts of the topic, 5 keywords were selected. The keywords were: *"value proposition template" or ("value proposition canvas" or "value proposition format"), and "sustainable" (or "sustainability").* To better explain the terms used in the first

search query, it was decided to use *template* because it's widely used in many papers related to the topic (Barnes, C., et al., 2009; Fenwick, D., et al., 2009; Heikkinen, T., 2020). From an in-depth analysis of the synonyms that are used in the papers, it was chosen to add the term *format* as well (Fenwick, D., et al., 2009; Walters, D., et al., 2020). In order to have an optimal research, it was also chosen to study papers that use the word *canvas* since utilized in the papers and on the topic (Osterwalder, A., et al. 2014; Belleflamme, P., et al. 2020; Meng, L., et al., 2020). The selection of documents took place in January 2022 after a precise definition of the search criteria. An initial analysis on Scopus yielded these results:

- Article Title ("value proposition template " OR "value proposition format" OR "value proposition canvas") = 4 papers
- Abstract ("value proposition template " OR "value proposition format" OR "value proposition canvas") = 198 papers
- Keyword ("value proposition template " OR "value proposition format" OR "value proposition canvas") = 33 papers

Figure 1: The query selection process



Source: Authors' elaboration

Once these articles were found, it was settled to put them together in order to analyze this phenomenon in a more comprehensive way. As showed in Figure 1, from the 235 starting papers, a cross-category analysis was done and duplicates were eliminated, bringing the starting search query to **210** papers.

Subsequently, to the three previous keywords have been added the keywords "*sustainable*" or "*sustainability*". It was selected to analyse the period 2001-2021 and to search only articles written in English. This second analysis has led to these results:

- Article Title = 3 papers
- Abstract = 81 papers
- Keywords = 20 papers

Starting from these 104 papers, 14 papers were eliminated and **90** were the total publications used for the analysis. It has been thought, however, that in order to better answer to the research questions and to have therefore a deepened analysis, both the queries were studied for better understanding the phenomenon. It was decided to use two Queries: Query A, composed by the result of the first analysis (210 papers) minus those of the second analysis (90 papers), thus leading to a result of **120** papers; the second, Query B, composed by the second analysis that contains sustainability keywords (**90** papers).

Findings

In order to understand how Sustainability's topic is represented in VPTs it was conducted a quantitative literature analysis. In Table 1 it's possible to note, that the Countries of the authors were 28 in Query A and 35 in Query B.

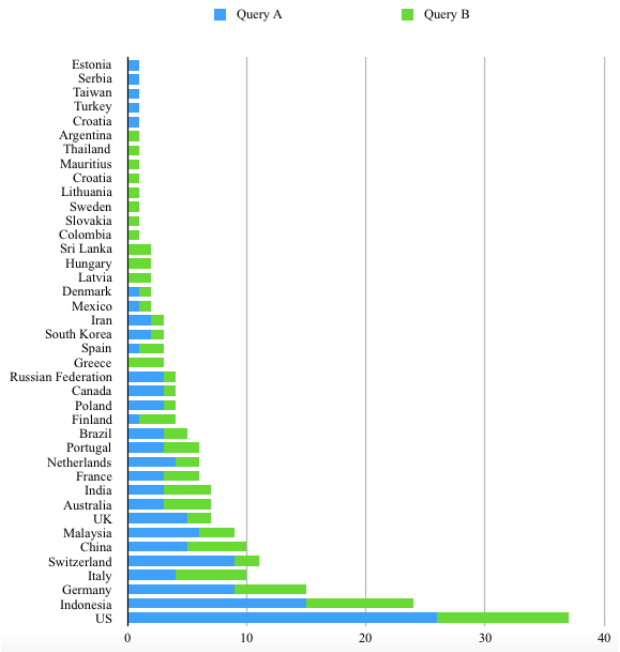
Table 1: Quantitative analysis

	Countries
Query A	28
Query B	35

Source: Authors' elaboration

Firstly, the dataset presented in Scopus was analyzed. It has been decided to show the differences between the two Queries in terms of author's countries that were productive in the academics' production. Analyzing the Figure 2, it's clear that there aren't differences in the graph for the first two countries that have the authors most productive (US and Indonesia). By contrast, Italy in Query B, is at the third place while in Query A is at the fifth, and Germany is at the fourth place in Query B while it's at the third place in Query A.

Figure 2: Countries of the authors - Query A and B



Source: Authors' elaboration

This is confirmed by analysis of variance done through SPSS which identified, as in Table 2, the sum of squares, the degrees of freedom (df), the average squared, F and the significance rate (P <0.001).

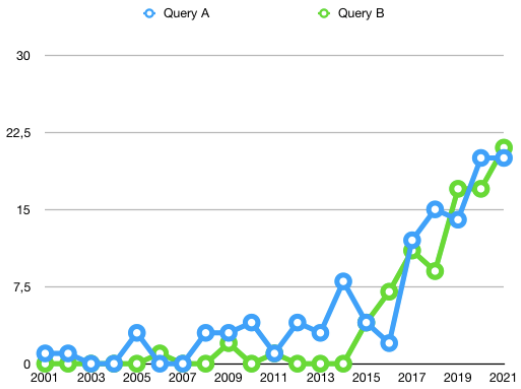
Table 2: Analysis of variance by countries

	Sum of squares	df	Average squared	F	Sig.
Between groups	3263,725	9	362,636	65,151	<0.001
Within groups	61,227	11	5,566		
Total	3324,952	20			

Source: Authors' elaboration through SPSS

Analysing Figure 3, academic production related to the two queries are different. Publications in Query A had always been presented moderately since the 2000s. From 2017 to nowadays, had had a strong growth. This is confirmed by the fact that more and more authors publish about VP importance in recent years (Metallo, C., et al. 2018). Query B is practically a non-existent topic at the publication level until 2014, but since 2015 it performed a strong growth and it's noticeble that year by year more publications in this area arose. The growth is correlated with the adoption by the United Nations of the 2030 Agenda (Tsalis, T. A., et al. 2020). From 2019 it has significant growth in publications this means that there is a two-year time gap between the two Queries.

Figure 3: Documents by year Query A and B



Source: Authors' elaboration

The statistical significance in the timeline 2001-2021, yielded a result of P <0.001 significance, extrapolated from analysis of variance done with SPSS which identified, as in Table 3, the sum of squares, the degrees of freedom (df), the average squared, F and the significance rate.

Table 3: Analysis of variance by years

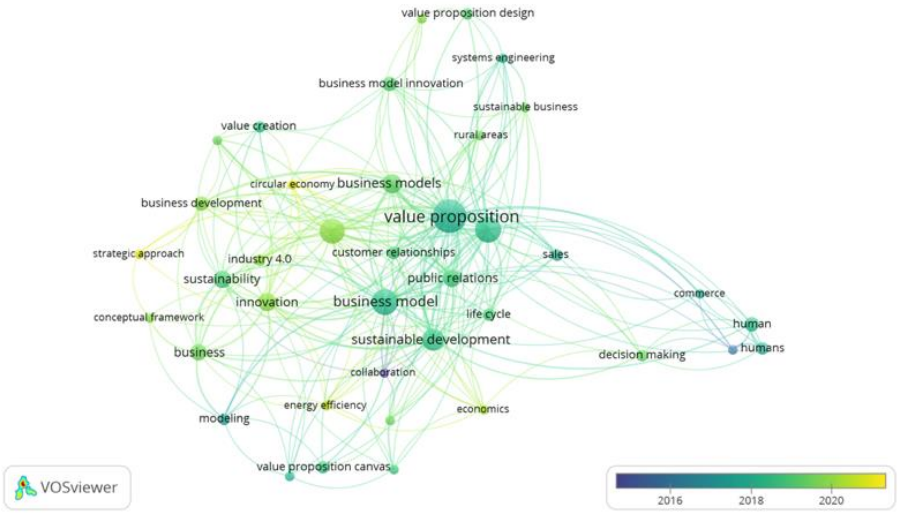
	Sum of squares	df	Average squared	F	Sig.
Between groups	1884,603	8	235,575	66,868	<0.001
Within groups	137,397	39	3,523		
Total	2022,000	47			

Source: Authors' elaboration through SPSS

In order to answer the research question of how the topic is treated and how keywords have been

explored over the years, an Overlay Visualization (used to show developments over time) was made by using the most used keywords of Query B from 2015 to 2021. As showed in Figure 4, the subject of *collaboration* was the oldest, dating back to 2015, while the *VP, business model, sustainable development* and *sustainability* were used increasingly few years later. Recently, there were the keywords *innovation, sustainable business* and *economics*. In 2021, however, the keywords *circular economy* and *strategic approach* were also used.

Figure 4: Keyword co-occurrence analysis on a time perspective.



Source: Authors' elaboration through VOSviewer

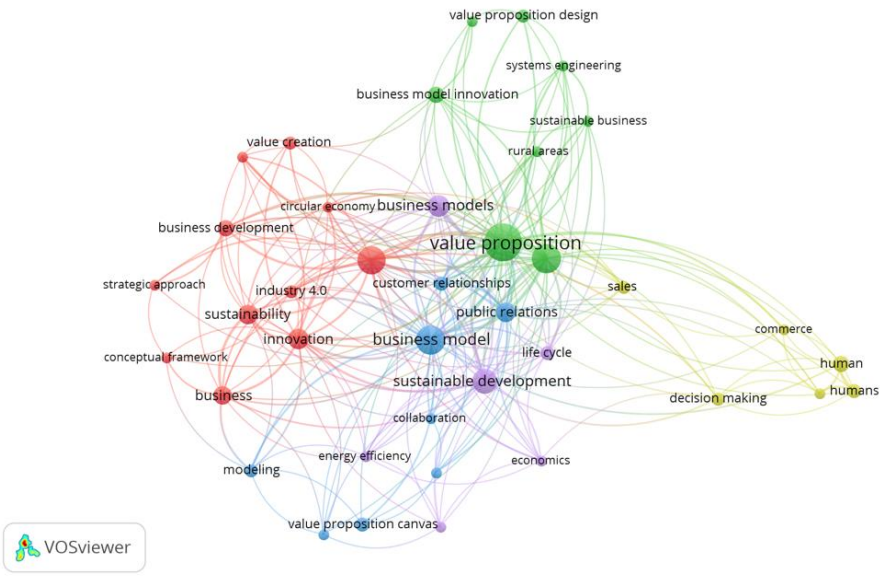
It can be affirmed that at first, the issue of collaboration emerges, then the topics of sustainable development, customer relationships, life cycle and sustainability appeared, and then more recently there were the themes of strategic approach, and circular economy.

To understand how much Sustainability concept declined in VPTs designation and how they are related to Sustainability, a co-occurrence analysis based on all the keywords was conducted. The minimum number of occurrences of a keyword was settled 3, meaning that the co-occurrence of keywords below 3 is excluded. In Query B, of the 775 keywords, 39 meet the threshold.

To fully understand how many keywords within the papers correlate with VPTs and sustainability, among the keywords most cited and with total link strength there were VP, Business model canvas and Sustainable Development. And after them, innovation and sustainability.

In Figure 5 each circle stands for a keyword from the dataset. If keywords tend to co-occur often, they are positioned close to each-other in the map; if they are positioned farther away, they are co-occurring less. The dimension expresses the number of times the keyword is cited.

Figure 5: Keyword co-occurrence analysis – Query B



Source: Authors' elaboration through VOSviewer

In Figure 5, there are 5 main clusters. Here's the details of each cluster:

- The green cluster concerns to VP, authors who deal with VP usually treat with business modelling and innovation, VP design, systems engineering and sustainable business.
- The yellow one is Human's cluster, usually authors write as well about sales, commerce and decision making.
- Purple is related to Sustainable development, and who write about this, is interested on energy efficiency, life cycle, planning and economics.
- Blue refers to Business Model, usually writers talk also about collaboration, entrepreneurship and customer relationship.
- The red cluster is correlated with those authors who write about Business Development, and about sustainability, innovation, strategic approach, circular economy and conceptual framework.

As it showed on the map, there is a cluster dedicated specifically to sustainable development. Sustainability's matter is also presented in other clusters, in the red one and, to a marginal extent, in the green one. It isn't present in the yellow and blue clusters. In the red cluster it's possible to note that sustainability circle is very connected with Business development keyword and with the innovation one. Sustainability is important in VPT and also in those topics where authors write about businesses without a specific focus on VPT.

Conclusions

From a time point of view, sustainability topic (Query B) started growing in 2015, but had a significant expansion from 2019, two years later than Query A. The majority of the authors who deal with topic in Query B, live mainly in the US, Indonesia, Italy and Germany. In Query A there aren't significant differences compared to those that write on VPTs and sustainability.

Moreover, concerning keyword connections, the authors who deal with VPTs, also deal with sustainability. Indeed, sustainability issue is strictly correlated with VPTs. Indeed, it's presented in 3 out of 5 clusters.

Going deeper, sustainable development cluster has its own specific dimension, and is connected with the entire business model, meaning that there is a need to have an integrated vision in the entire model of companies. For this reason, it's important that sustainability is presented in VP. Therefore, sustainability correlates with business development, and it confirms authors' hypothesis of the necessity for sustainability to being presented in VPTs, because sustainability is increasingly developing both in the scientific research and in businesses. Starting from what Lüdeke-Freund, F., et al. (2018) wrote, it's important to understand different kinds of Sustainable Business Models (SBM) as they help formulating hypotheses about the potential solutions they offer to ecological and social problems. Studying the representation of Sustainability's topic in VPTs is definitely a way to expand research in SBMs.

Limitations.

The limitations mainly arose because no analysis has been done on organizations and the selected articles were found only on Scopus database. Therefore, some relevant papers might be in other databases and/or might have been overlooked.

Further Research.

It might be interesting to explore how commercial companies include sustainability in their VPTs. This can be done also through interviews with managers. Businesses will have to take into consideration the increasing importance of sustainability issue and implement into business strategies and tactics.

Managerial Implications.

This quantitative analysis can provide to top management the insights to operate effectively in VPT. Firstly, businesses should use increasingly VPTs, and secondly, VPTs must include the sustainability criteria. Sustainability grows and managers should take into account synthesis tools for VPT.

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PRO-STAKE: A New Business Model to Improve Total Sustainability

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Abstract

The paper describes a new Business Model based on stakeholder engagement and satisfaction in a win-win perspective. In particular, each stakeholder is the bearer of interests that including not only rights but also duties, becoming co-producers of our organization through all their behaviours, not just those related to accountability, according to a PRO-STAKE (Producer-Stakeholder) logic aimed at fostering "total sustainability" in its various forms.

Keywords

Stakeholder, Engagement, Satisfaction, Benefit Corporation, Sustainability/Productivity

Introduction and Objectives

The need for sustainability is clear to everybody, but frequently there is some confusion about the meaning for sustainability. We do believe that sustainability is a multidimensional concept so that we need to identify the complex identity that we may call Total Sustainability.

But if we want to be focus on Total Sustainability we need a new business model based on the cooperation among all the stakeholder that must become a real “Producer-Stakeholder Model” based on the “win-win” concept.

In this view every stakeholder must develop a positive engagement, built around an input/output matrix able to “promote stakeholder satisfaction” but also improve the productivity thanks to cost reduction and quality improvement.

The aim of the paper is to assess the need for a positive Producer-Stakeholder and the importance of marketing in order to promote the development of stakeholders as creators of shared benefits.

Research questions

1. Has Sustainability mono or multi dimensions?

2. If it is a multidimensional concept, can we speak about Total Sustainability (TS)?
3. How much important are the stakeholders in Total Sustainability (TS)?
4. If they are important, are they able to contribute to TS?
5. In order to give a greater contribution, can we speak about PRODUCER-STAKEHOLDERS (PRO-STAKE) for the TS?
6. How can marketing contribute to the development of the PRO-STAKE?

Conceptual Framework and Method

The conceptual reference principles are based on the traditional approach to marketing and further broadened by applying marketing to services (public and nonprofit ones too), reconsidering them in the digital and global context, and taking into consideration the resulting need for a more sustainability-oriented approach with suitable productivity, especially in the post-pandemic and post-war crisis.

It is therefore a conceptual paper based on the observation of the best experiences and on the analysis of the extensive literature on the subject, of which a synthesis is reported in bibliography. The aim is therefore to carry out a "holistic" research. In particular, there is a qualitative phase based on the analysis of digital papers from top research centers and global consulting companies.

Index

1. Marketing and Social Reputation

The function of marketing has not always had a good social reputation. It is often cited to say that marketing activities should not be taken too seriously and this even led the Italian Marketing Society to recently publish a manifesto of marketing to reiterate some principles and values often neglected and, in any case, not always observed by operators and public opinion.

On the contrary, the Marketing mindset has always included a proper negotiation with customers, so much that customer satisfaction is consistently mentioned within its fundamentals as a key factor of good marketing, and the "win-win" approach is frequently cited to actually highlight the importance of mutual satisfaction for the prolonged life of companies in time.

It is difficult to find such a clear and direct positioning in other corporate functions. Human Resources certainly shows many behaviours that cannot be said to be "fair" towards their own employees and prospective employees. The same can be said for Procurement and Financial departments, not to mention Production departments. Many other examples can be mentioned, however it is better not to go too far as there are also many virtuous behaviours of course.

With reference to Human Resources and Procurement departments, it is no coincidence the so-called "internal marketing" practice has become widespread towards employees as well as "procurement marketing" towards suppliers.

Nevertheless, it is possible to, or better to say, there is the need to improve as the race for competitiveness never ends!

From this point of view, marketing can take the lead towards opening up satisfaction to all or, at least, to the most important stakeholders according to a spirit of collaboration strongly needed and consistent with the even more relevant brand purpose, about which the most famous brands discuss widely, as they are involved in setting a trend in line with the required recovery and resilience from the COVID pandemic.

2. Brand Purpose, Stakeholder Satisfaction and Total Sustainability

The concept of Brand Purpose is actually quite widespread as a new and essential point of reference for a management properly oriented to promote a "better world" and, therefore, a "total sustainability" in its different forms. The famous step towards the "reason for which we live" is inevitably connected to a higher attention to the interests of the community, following the *triple bottom line* approach or, if you wish, the ESG (Environmental, Social and Governance) and therefore, to the collective of stakeholders representing the evolution from "I" to "We" on which future needs has to be built. As a consequence, it is clear that sustainability must be multidimensional and related to the multiple aspects referred to above, including the economic one, in order to be able to speak of a true total sustainability (TS) related to brand purpose-doing and not only to brand-purpose telling.

The attention to Stakeholder Satisfaction is not something new. The innovation is actually in the fact that the attention seems to have become one of the principles and values to observe, so that it is not just a declaration of intents, even though worthy, but a practice implemented mainly by the brands that wish to show the way, as true leaders do, towards a complicated future but nonetheless also sustainable when negotiating both with customers and community stakeholders.

What highlighted above needs to be interpreted not just in terms of "soft" attitude, but also in terms of "good management" and, therefore, advantageous for the trust it generates in consumers and stakeholders. For those who can think ahead, TRUST PAYS even though it may not seem so at a first glance.

3. Benefit Corporations

It is therefore not by accident that lately a growing number of Benefit Corporations is being established in the world and in Italy. The goal of this type of companies is not just profit and dividends paid to shareholders, but also to improve and increase the positive impact of their own activities on the company, their own employees, suppliers, environment and, more in general, on their own stakeholders, in line with what said above.

In particular, according to Hiller (2013), B-Corps are being established starting from the need of companies to voluntarily adopt ethical decision-making and socially responsible standards, also in relation to the low levels of trust caused by global financial crises. As a result, marketing needs to make an effort in the search and definition of consistent and innovative aspects in order to allow companies to develop/create new business models that, at the same time, may guarantee more productivity and (some) tangible benefits (positive effects or reduced negative effects) to their stakeholders.

More in details, in order to obtain and avoid losing the certification, B-Corps must meet specific standards in terms of environmental and social impact, measured through the BIA, the B Impact Assessment (Honeyman & Jana, 2019), in addition to complying with the relevant regulations of the countries where there is a specific legislation governing them (B-Corps, according to law).

It can therefore be said that B-Corporations operate in the view of "regeneration", implementing and overcoming, as a result, the concept of "sustainability" and "circularity" thanks to their ability to generate more economic, social and environmental value than the one used to produce.

The path of a company towards the transformation and transition into a B-Corp is quite complicated and full of obstacles and may take a lot of time. When walking the path, many critical issues emerge, which are connected to the past of the companies, to current management, to communication procedures etc. With regard to this, the important thing on which to play is the rich legacy of one's own company and the contribute it may give in the years to the local community and area and, therefore, to its own field of action.

4. Stakeholder Engagement

The above said seems to prove that public and private, profit and non-profit organizations are sharing the idea of developing better relationships with the different stakeholders, pushed not just by the pressure caused by the pandemic, but also, and maybe above all, pushed by the confidence that such a new approach may be beneficial to the longevity of their own organizations, thus generating a positive reputation, meant as a true strength and characterized by their only reason to exist.

Such a sense of responsibility, associated to the sincerest spirit of collaboration, stimulates more balanced negotiation with the outer world that may recall the abovementioned "win-win" approach to be developed with consumers as well as with stakeholders. In this sense, we can therefore speak of total sustainability only if there is the contribution of all the stakeholders involved.

In order to achieve a balanced negotiation, however, the several actors need to positively collaborate and make each one their own part. We can therefore speak of a true partnership or, using a more fashionable term, of engagement, a positive and functional one, to share a part of the journey towards a collective benefit.

However, it must be acknowledged that still today many stakeholders are not aware of the collaborative dimension leading to a mutual benefit. They are still used to ask for more than to give and this makes it difficult to have a positive engagement.

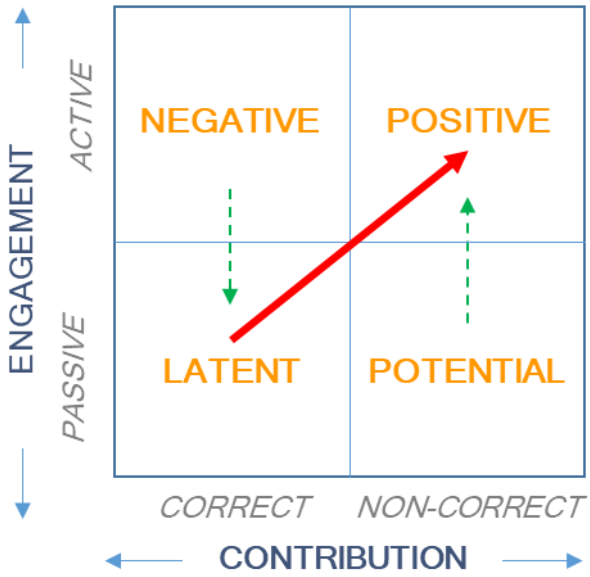
With reference to this, it is important to note that, in this paper, stakeholder engagement is understood in a broader meaning, be it formal and informal, and therefore it includes any stakeholder behaviour and not just those interpreted as accountability.

This also makes it highlight once again how participation can easily create a non-zero-sum situation, when it is "opportunistic".

As the following figure 1 shows, we can always, and in any case, talk about stakeholder engagement. The problem is that the same engagement sometimes is active and other times passive, just like the contribution, which sometimes is correct and other times not correct. It is clear that to gain benefit for all it is essential that it has to be active/correct (that is positive), while still today, in some cases, it is

passive/not correct (that is latent), when not even active/not correct (that is negative). Smart companies therefore need to apply a "marketing towards stakeholders" in order to make them become active/correct, so they can give a positive contribution.

Fig. 1 - SH Engagement Compared to their Contribution



It should also be noted that for a certain company not all the stakeholders are important in the same way, therefore it is useful to be aware how to "weigh" them by rating them, and how to value them by ranking them, in order to work on the most strategic ones.

From this perspective it is even possible to estimate a Positive Engagement Index (PEI) for each stakeholder through the following mathematical formula:

$$PEI = \frac{(VS1xPS1\%) + (VS2xPS2\%) + (VS3xPS3\%) + \ldots.. (VSnxPSn\%)}{100}$$

where V stands for engagement rate (for example from 1 to 10), S1, S2, S3, Sn indicate the different stakeholders and P represents the percentage weight of a stakeholder.

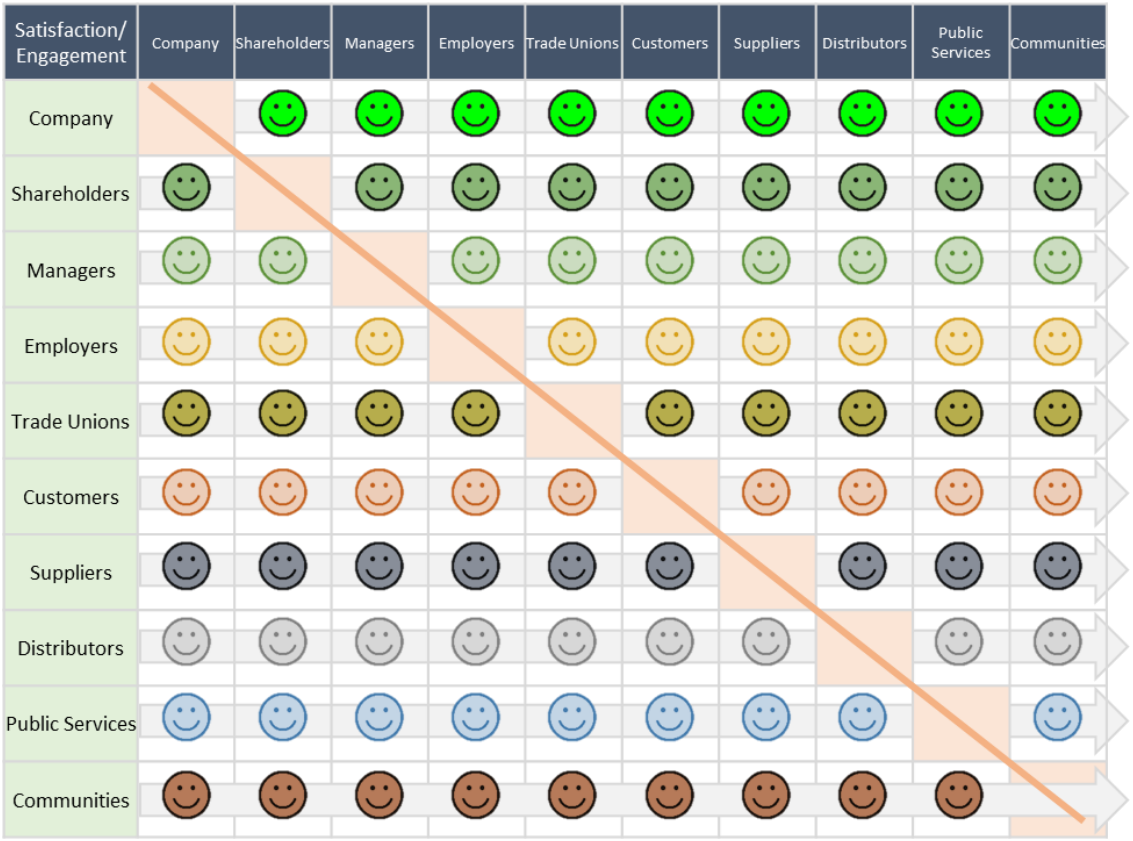
5. Stakeholders' Input-Output Matrix

The larger and clearer picture of a role that, nowadays, stakeholders are called to play leads, as a consequence, to look at the matrix characterising them.

As shown in the following figure 2, each stakeholder can actually develop, as an input, an engagement that can lead, as an output, to a satisfaction output.

Each stakeholder is involved, more or less strongly, with all the stakeholders and contributes to "build" others' satisfaction. In other words, a stakeholder is a carrier of interests, but these refer to its own rights (in particular overall satisfaction) as well as to its duties (in particular the positive collaboration with others).

Fig. 2 – Stakeholders' Input-Output Matrix



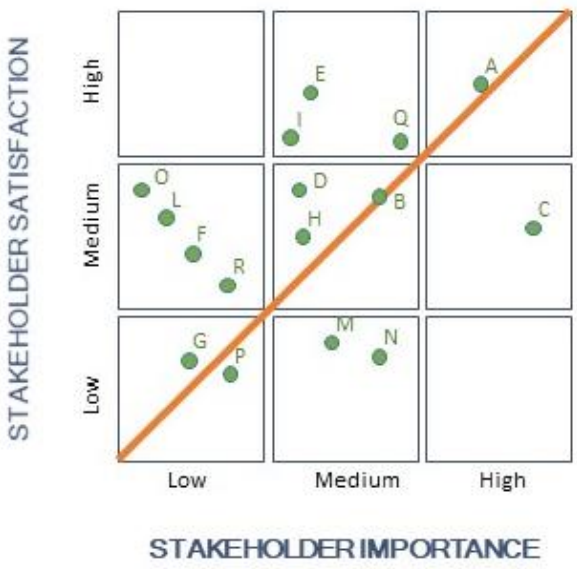
6. The Producer-Stakeholder Model (PRO-STAKE)

In the light of what said above, it is clear that stakeholders, taking into account the current competitive status, can and must become co-producers of our organization, notwithstanding the need for a suitable preparation that can be developed by the same stakeholder or promoted by those involved.

With regard to this, we can speak of a real "stakeholder marketing" by an organization to stimulate stakeholders to become aware of the mutual benefits that may result. As it often happens with consumers, stakeholders can be categorized as gold, silver and bronze, using a classic positioning matrix like the one displayed below (Fig. 3).

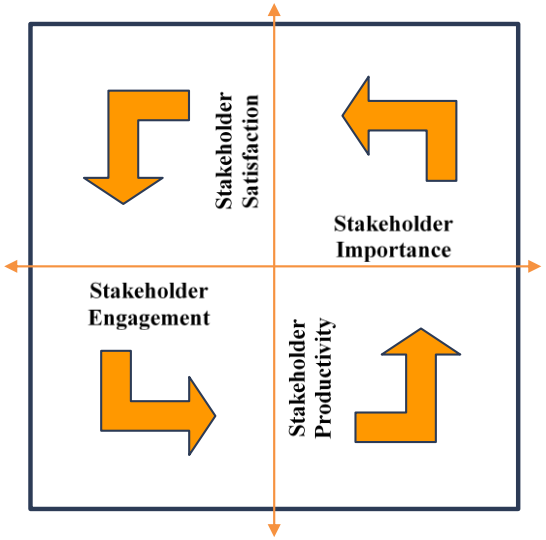
The matrix makes it easy to understand that stakeholders on the right of the balance diagonal line need us to take action to foster satisfaction in order to be able to ask them for a level of engagement commensurate with their importance.

Fig. 3 - Stakeholder Positioning Map



The active engagement of the several stakeholders may lead to look at them increasingly more as new "productivity agents", referring to a virtuous process that is outlined below (Fig. 4).

Fig. 4 - PRO-STAKE Model (Producer-Stakeholders)



From the graphic the new concept of Producer-Stakeholder clearly emerges, from which a new acronym can be generated, that is **PRO-STAKE.**

The proposed Business Model is therefore based on the active involvement of all stakeholders to achieve the goal of Total Sustainability.

7. Conclusions and Projects Promoting PRO-STAKE

The creation of a PRO-STAKE model is clearly very challenging because it involves many profit and non-profit, private and public operators and each of them has built, in the past, behavioural habits with a quite individualistic approach, but also short-sighted, which means lacking a true vision. More than fifty years

ago Ted Levitt, a professor from Harvard Business School, wrote an article titled *Marketing myopia*, in which he pointed out how managers often cannot see the "bigger" picture and, due to their opportunism and individualism, neglect future-oriented activities, which instead are more convenient even for them.

The recent pandemic brought back the attention of people towards two factors that, according to corporate jargon, can be defined Critical Success Factors: sense of responsibility and spirit of collaboration to survive in a community experiencing difficulties.

Those same factors can be recalled to support "good management", which is able to sail in the stormy waters that is today's international competition.

In such a prospective "good marketing" is needed that can involve stakeholders, at least the most essential ones, with a "win-win" mindset, which should always be one of the main marketing features. In other words, a serious *accountability* is no longer enough, even when matched with qualified standards, as there is a need for a bigger picture that can only be achieved thanks to the professional contribution of marketing.

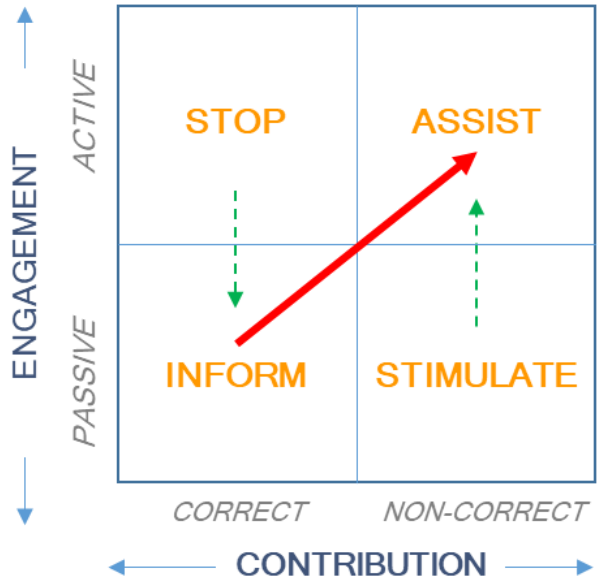
In order to start developing such a winning mindset many projects can be launched each time that are functional to each field of activity.

The first feature of those projects can be to develop a mindset functional to the single operations. This makes it useful the graphic shown below (Fig. 5).

Figure 5 draws inspiration from the previous Figure 1, but in this case, it shows how to act according to the four identified quadrants. It is therefore a matter of:

a. **assisting** and strengthening stakeholders who are already active and correct;
b. **stimulating** passive stakeholders who however have the opportunity to give a correct contribution;
c. **informing** passive stakeholders who give a non-correct contribution to make them understand they can do more and better;
d. **containing** active stakeholders who however give a non-correct contribution, trying to make them develop towards a correct activism.

Fig. 5 - Management of Stakeholder Engagement



Within the framework of such a strategic path, more tactic initiatives must be taken among which the following are highlighted:

a. professional development and training to "treat" short-sightedness, making it clear why it is beneficial to move towards a collaborative logic;
b. activities to strengthen the several professional associations (starting from the several branches of Confindustria, the Confederation of Italian Industries).
c. communication activities through special publications, conferences, websites and industry-oriented social media;
d. reporting and sharing cases of "good practice" and giving out awards and certificates of merit;
e. activities to connect Sustainability to Good Management;
f. activities of…

In conclusion, it is not a matter of "soft attitude", but of forward-thinking management and marketing establishing medium/long-term goals according to a MAI Logic (Marketing As Innovative) and not a MAU Logic (Marketing As Usual) or, if you prefer, "If you don't trust innovation, try usuality" to see what results are achieved.

With regard to this, the end-of-year 2020 speech held by the President of the Italian Republic, Sergio Mattarella, within which there were references to the pandemic and resilience is encouraging: "Now we must plan for the future. We do not live in a historical parenthesis. This is a time for builders. The next few months will be decisive towards overcoming the emergency and laying the foundations for a new season. No distractions are allowed. No time must be wasted. Energies and opportunities must not be wasted in pursuit of illusory partisan advantages".

These words are still relevant today as ever.

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Transition policy mixes and incumbents' business model adaptation: A case study of UK Zero-Carbon Homes

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Abstract

The literature on sustainability transitions has highlighted the important role of government interventions through technological changes. However, the relationship between transition policies/policy mixes and firms' business models is under-researched. This paper illustrates the dynamics between transition policy mixes and incumbents' business models in the context of the UK's Zero-Carbon Homes policy mix.

Keywords

Sustainability transitions, Business model adaptation, Transition policies, Policy mixes.

1. Introduction

From Kyoto Protocol to Paris Agreement, there is a consensus among all nations that government interventions are needed for a transformative and long-term change towards sustainability. Socio-technical transitions to sustainability are proposed by academics in the last two decades to investigate the process of this transformation, its required conditions, and the barriers to achieving it (Kemp, 1994). Transition policies refer to government interventions to induce sustainability transitions. They often coalesce with other classes of policies such as environmental or innovation policies (Borrás and Edquist, 2013, Del Río et al., 2010, Alkemade et al., 2011). Such policies are usually justified by correcting 'environmental externalities'[27] and/or 'market failures' (Popp et al., 2010, p. 878). Transition policies have been studied through evolutionary theories in the context of innovation systems (IS), the multi-level

[27] Market prices do not sufficiently reflect the environmental side effects of economic activities.

perspective (MLP), strategic niche management (SNM), and transition management (TM). Despite their popularity, transition policies and theories are subject to the following limitations and critiques.

First, traditional theories and empirical studies offer broad perspectives of transitions, zooming out and engaging with transition phenomena in their overall scope. These theories tend to overlook the micro-foundations where multiple actors (e.g., firms and policymakers) interact to produce change. Second, the extant research is largely technology-centric and under-emphasises the importance of non-technological innovations (particularly, business models) in transitions. Third, the literature on transition policy is more often limited to a single policy instrument rather than a more comprehensive policy mix (Köhler et al., 2019). Studying and evaluating the interplay of different policy goals, instruments, and processes in a policy mix format is crucial to analyse how policies facilitate, hinder, or accelerate transitions (Reichardt et al., 2016). Fourth, the literature is criticised for mainly looking at transitions from a bottom-up approach where changes are usually driven by newcomer firms at the niche level and move to regimes through windows of opportunity (Trencher et al., 2021). The literature seems to disregard both technological and non-technological innovations of incumbents in regime levels as well as niches. This is while niche and grassroots innovations have rarely been powerful enough to bring transformative changes because of their fragmented nature (Scrase and Smith, 2009). Besides, because of their deeper financial, human, and intellectual capital, incumbents are argued to have the potential to drive radical transitions (Trencher et al., 2021, Köhler et al., 2019).

A growing interest is observed in sustainability transitions studies regarding the reactions of incumbent actors to transition policies in terms of deploying strategies such as lobbying, donating to political campaigns, or shaping public discourses (Al-Saleh and Mahroum, 2015, Geels and Verhees, 2011, Hess, 2016, Konrad et al., 2012). However, with a few exceptions, the relationship between transition policy mixes and incumbents' business models has not been well addressed in previous studies (e.g., Hannon et al., 2013, Al-Saleh and Mahroum, 2015). As such, there is a need to uncover why incumbents resist radical changes in socio-technical regimes, how their business models influence their responses to transition policies, and what needs to be done in designing transition policy mixes to address this resistance. Designing policy mixes is a challenging task for policymakers to achieve sustainability goals (Mah et al., 2021).

This paper analyses how interactions between governments and incumbents affect socio-technical transitions towards sustainability through transition policy mixes. In particular, it addresses the question: *what should be considered in designing a transition policy mix to support the required adaptations and innovations in firms' business models toward sustainability?* This paper illustrates the dynamics between transition policy mixes and incumbents' business models in the empirical setting of the UK Zero-carbon Homes (ZCH). ZCH was selected as the case study because: (i) ZCH was an 'intentionally-built' transitions policy mix, (ii) it had an ambitious policy target of supporting decarbonisation, and (iii) it is considered a failed transition to sustainability. Analysing a failed transition is helpful to identify the potential challenges ahead of transition programmes and prepare for them.

This paper contributes to transitions literature by providing a zoomed-in representation and micro-level dynamic between two important elements of socio-technical regimes, i.e., policies and industry incumbents. The importance of this research is underpinned by the assumption that policy recommendations for sustainability transitions will be inadequate unless the context of a particular sector or society is taken into account (Bergman and Eyre, 2011, Foxon, 2011). With this study, the reasons for

transition failure in the UK's ZCH transition policy mix are identified, and insights and lessons for other cases in the current and future transition policies are provided.

2. Business model adaptation

In this paper, the focus is on business model adaptation as our unit of analysis is incumbents in a socio-technical regime and the way they adapt or transform their business model in response to transition policies. However, it may also involve business model innovation as a possible outcome of business model adaptation (Snihur et al., 2021, Saebi et al., 2017). Saebi et al. (2017, p.569) entitle the changes in existing business models as business model adaptation and define it as "the process by which management actively aligns the firm's business model to a changing environment, for example, changes in the preferences of customers, supplier bargaining power, technological changes, competition, etc.".

Business model adaptation can be seen as a great challenge to firms – especially for incumbents – as it may require them to change all or several essential elements of their business such as value propositions, value delivery, and value capture (Aspara et al., 2013). Furthermore, barriers such as managerial resistance (Chesbrough, 2010) and ambiguity and uncertainty of external factors (Pinkse and Groot, 2015, Kennedy and Bocken, 2020, Osiyevskyy and Dewald, 2015) could make business model adaptation a time-consuming, expensive and risky process. Although this challenging task has been the subject of many studies in recent years (Frishammar and Parida, 2019, Biloslavo et al., 2020, Carlborg et al., 2021), the influence of governmental intervention in incentivising or hindering incumbents to adapt their business models towards sustainability transitions is yet to be investigated. This is of great importance as incumbents play a key role in socio-technical regimes and have the resources to drive/ hamper radical transitions (Trencher et al., 2021, Köhler et al., 2019).

3. Research design and methodology

3.1 The ZCH policy mix

The Zero-Carbon Homes (ZCH) policy mix is an example of governments' attempt to shift the previous policies, shape market outcomes, maintain economic competitiveness, and mainstream sustainable niche-level technologies (Greenwood, 2012). Although there is consensus among policymakers and academics around UK's long-term under-supply and inefficient housing, there is less agreement about the ways to achieve wholesale changes in the housing industry (Wilson and Barton, 2021). It is important to analyse the circumstances that cause housebuilders to change their approach or logic of doing business. The ZCH is studied in an embedded single in-depth case study with an interpretive approach to explain, describe or explore the phenomena in the 'real world' and provide lessons for other cases (Yin, 2003). This paper articulates and elaborates on the underlying reasons for ZCH's failure from a business model perspective. This will lead to the consideration of new factors in designing environmental policy mixes to support the required adaptations in firms' business models towards sustainability.

3.2 Data collection

This research involved multiple sources of evidence for data triangulation (Eisenhardt, 1989). The following sources of data were employed: (a) secondary sources including policy documents, newspapers, trade journal articles, academic papers, house builders' reports, business models and websites (Table 1), and (b) primary sources involving semi-structured interviews with housing policy experts, housebuilders, and academics (Table 2). The interviews were conducted between April-October 2021 until they sufficiently provided different perspectives and facilitate the interpretation of the policy mix problems.

Table 1. Secondary data sources

Policy mix instrument	Source
Code for sustainable homes	GS=22, NT=212, AP=23
Eco-towns and Carbon challenge	GS=18, NT=268, AP=9
Building Regulations	GS=21, NT=50, AP=44
AIMC4	GS=7, NT=9, AP=0
Zero-carbon hub	GS=97, NT=40, AP=3
Tax stamp duty exemption	GS=12, NT=22, AP=0
ZCH in general (including reports and planning policy statements)	GS=8, NT=24, AP=64

*GS: government sources, NT: newspapers and trade journals, AP: academic papers

Table 2. Interview details

Data	Interviewee affiliation/expertise	No. of interviews	Duration (average)
• Policy	Department for Business, Energy and Industrial Strategy; Ministry of Housing, Communities and Local Government; Building Research Establishment; Policy council; National House Building Council; Future Homes Hub; Zero-Carbon Hub	7	65 minutes
• Industry	Volume housebuilder; The Home Builders Federation	6	50 minutes
• Academia	Sustainability transitions; Innovation management; Environmental geography and governance; Science, technology, and innovation policy	4	60 minutes

3.3 Data analysis

The qualitative data organizing software Nvivo12 was used for archiving, coding, and revising the data. Coding the collected documents led to representing the interplay and co-evolution of policy mixes and incumbents' business models, as well as the nature and dimensions of the ZCH transition programme. Secondary data along with the transcription of interviews were coded and conceptualised following the methodology proposed by Gioia et al. (2013).

4. Findings

In this section, the two emergent theoretical dimensions are presented that shed light on the reasons behind the failure of ZCH. Figure 1 shows the data structure resulting from the coding analysis. According to the findings, the main reasons for the ZCH transition failure can be categorised into two main dimensions: policy shortcomings and business model adaptation barriers.

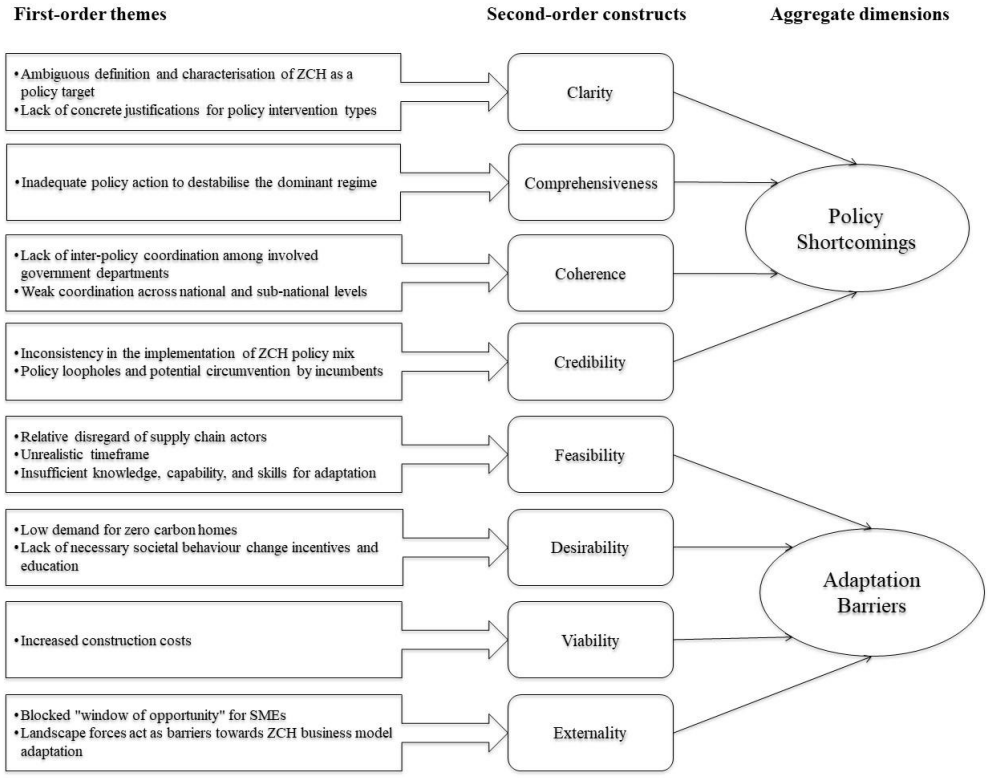

Figure 1. The coding scheme and data structure

4.1 Policy shortcomings

The ZCH policy mix, while being considered a unique ambitious policy toward sustainability, has been the subject of significant criticism from academics and practitioners. Four macro-level constructs of ZCH policy shortcomings and their associated factors were identified. ***Clarity*** is related to the ambiguity and the fuzziness of the policy mix in the early stages of the programme including its target definitions and justifications. ***Comprehensiveness*** refers to the lack of destabilization through regulatory instruments. ***Coherence*** explores the relationships between involved policy departments at different international, national, and regional levels. ***Credibility*** highlights the weakened reliability of the policy mix through implementation inconsistencies and policy loopholes.

4.2 Adaptation barriers

Given the complexity of the housing industry and the difficulty of the changes in business models, it is instructive to break down the transition challenges that are associated with the incumbents' business models. The zero-carbon homes were considered an expected value proposition induced by the government. Based on this value proposition, the barriers to business model adaptation were categorised into four categories: feasibility, desirability, viability, and externality. ***Feasibility*** explores the possibility of the expected value proposition from a technical perspective, through available and/or accessible

resources of a business model, and within a realistic timeframe. Problems such as the relative disregard of supply chain actors in the policy mix, its unrealistic timeframe, and the lack of knowledge and capability for adaptation lowered the feasibility of the policy mix. ***Desirability*** refers to the target customers, their low demand for zero-carbon homes, and the lack of behaviour change incentives for them. ***Viability*** deals with the problems related to value capturing in housebuilders' business models and highlights the increased construction costs and the lack of economic benefits as the main financial problems. Externality deals with the external factors from outside the socio-technical regime – landscape and niche level – that affected the way housebuilders adapt their business models to comply with the ZCH policy mix.

4.3 ZCH as a system failure

The ZCH policy mix suffered from some policy design/implementation shortcomings. However, it was not the only reason for its failure. Even if the policy shortcomings were addressed, the policy mix might not have succeeded because of its narrow focus on technical specifications and for not considering the business model challenges for large industry incumbents. Not surprisingly, the firm-level barriers were traced back to incumbents' business model main elements – i.e., value creation, value delivery, value capture. By using incumbents' business models as the unit of analysis, this paper pursued a systemic research approach to analyse the regime (policy mixes and business model main elements), niche (involvement of SMEs) and landscape levels (recession and change of the government's priorities). Figure 2 provides a summary of the findings and depicts a zoomed-in schematic representation of interdependencies between policies and incumbents at a socio-technical regime level.

As shown in Figure 2, the problem of the UK housing industry and zero-carbon homes was not a market failure that could be fixed with demand-pull policies such as stamp duty exemption. Although market creations prompted incumbents to change their business models to benefit from the potential advantages, because other adaptation barriers were not addressed, they were not committed to changing their core business models. As such, when demand-side support was removed, the zero-carbon homes policy became unviable. Therefore, the problem was rather a 'system failure' with various involved stakeholders who had the power to influence the direction of transition individually or collectively. The conservative and fragmented nature of the UK's housing industry and its supply chain, exacerbated by consumer preferences, planning regimes, and slow housing provision, ask for a 'system transition' and transformative innovations within this industry.

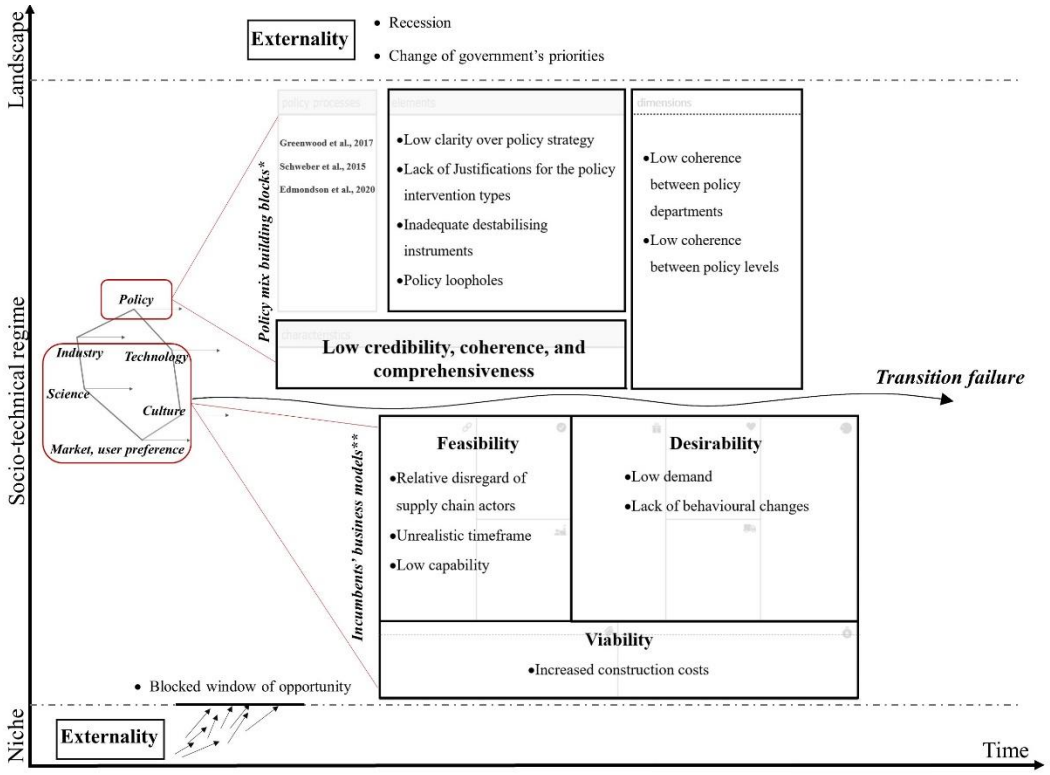

Figure 2. The failure reasons for zero-carbon homes based on the zoom-in perspective of the policy mixes and incumbents' business models within a multi-level perspective of socio-technical transition

5. Conclusion

This paper contributed to both transition policies and business models by linking these two strands of literature in an empirical setting. Moving beyond technological changes in sustainability transitions, this paper shed light on the interplays between two important elements within a socio-technical regime: policies and incumbents. Using incumbents' business models as the unit of analysis provided a systemic dimension in which the whole socio-technical system could be analysed. The paper demonstrated why business models – particularly of incumbents – should be considered in any transition policy mix, and how these two core players are critical in determining the fate of transitions.

Although the role of business models in societal transitions has been analysed by previous studies (see for example: Bidmon and Knab, 2018), they take a wide macro-level perspective of business models and socio-technical regimes. In comparison, this study brought a firm-level approach to systemic transition theories such as MLP and IS. By Juxtaposing the business model's main elements with the regime section of MLP, this paper investigated 'what' the sources of business model adaptation barriers are, 'why' they exist, and 'how' they can be addressed by transition policy mixes.

Further research is necessary to deliver more empirically grounded recommendations for designing and implementing transition policy mixes. Also, examining relatively successful policy mixes (such as Norway's electric vehicles) along with the failed ones may help to sharpen the generalisability of the findings presented in this research.

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What Green Business Model actually is?

Understanding of Green Business Models Among SMEs, Startups, Consulting and Public Businesses in Denmark

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Extended abstract

INTRODUCTION

Over the last decade, green business become a hot topic worldwide. It is obvious not only because of an increasing number of academic research publications but also of the amount and the scope of the European Union initiatives, different governmental regulations and support plans for moving environmental challenges to business opportunities. Even though many big multinational enterprises started to implement various sustainable initiatives, it still can be challenging for small and medium-sized enterprises (SMEs) to implement significant changes and make their business greener. Moreover, there is a tendency for the failure in green business innovation, because of the various reasons such as the novelty of the green business field, complexity, lack of the tangible benefits, scarce investment, and questionable motivation of businesses and industries to become greener (Hennemann et al., 2021).

In the existing body of the literature, green business models are often researched next to sustainability (Sommer, 2012, Pigosso et al., 2018, Pieroni et al., 2019, Løkke et al., 2020) and circular economy (Henriksen et al., 2012, Pigosso et al., 2018, Kopnina, 2019) topics. A couple of literature sources identified green business models as the process, where business improves on the environmental scale and still performs well based on economical values (Sommer, 2012, Henriksen et al., 2012, Abuzeinab and Arif, 2014). Nonetheless, the main difference between these authors´ definitions was that Sommer (2012) related green business models with the entire value chain, yet Henriksen et al. (2012), and Abuzeinab and Arif (2014) considered separate parts of the business model. Furthermore, some of the authors looked wider and described the green business model as a natural part of the business model ecosystem of the business (Nair and Paulose, 2014).

This study is performed as part of the Greenbizz project, where researchers in collaboration with public organizations and private consultancies help Danish, Swedish and Norwegian SMEs and startups to develop new, green business models (Greenbizz, 2022). In order to assure an effective business model development process, it was crucial to first identify a common understanding of the term green business

models between SMEs in the separate countries involved in the Greenbizz project. This extended abstract introduces the research prosecuted in Denmark.

During the background investigation of the grey Danish literature, appeared, that the following topics are often discussed parallel with the green business models: (1) Environment, (2) Energy type, (3) CO2,(4) Resource and material use, (5) Technology construction (product-, production-, process technology), (6) LCA, (7) Waste and waste construction, (8) Circular economy, (9) Business model construction, (10) Helix construction, (11) UN´s Sustainable development goals, (12) Cradle-to-cradle. Naturally, this raised a concern about how SMEs, startups, also consultancies and public businesses working with them perceive a green business model and if there is a common understanding between these businesses.

Therefore, the purpose of this research is to investigate the term green business model, based on the multiple case study of Danish startups, SMEs, public organizations and consultancy firms, in order to define a shared understanding of the subject, if there is any. Additionally, it is expected that the analysis of data will result in the proposition of a clear and detailed definition of green business models. Consequently, there is stated following research question:

RQ: What green business model characteristics are ascertained by startups, SMEs, public businesses and consultancy businesses in Denmark?

METHODS

To investigate the perception of a green business model and the origin of the definitions that are used around in private and public organizations, a qualitative method has been chosen. The qualitative method allows a comprehensive investigation of the research question where the researcher is involved in the data collection process (Flick, 2018). Besides that, this research is using the abductive approach, where interaction between theory and empirical observations are close and it seeks to develop new theories (Dubois and Gadde, 2002). Furthermore, this research employs triangulation methods, which use primary and secondary data from different data sources and apply various data collection methods, which increase the external validity and reliability of this research (O´Connor and Gibson, 2017).

In order to explore the understanding of green business models in Danish SMEs, consultancy firms and public organizations, primary and secondary data was collected. The process of the data collection consists of two steps: (1) selection of target groups, and (2) semi-structured interviews. Theoretical sampling is used in order to collect data on a green business model subject purely for theoretical and not statistical matter (Glaser and Strauss, 1967). Consequently, there are selected four target groups: (1) Danish SMEs, (2) Danish startups, (3) Danish consulting businesses, and (4) Danish public businesses or knowledge businesses.

Semi-structured interviews with 21 respondents were conducted utilizing an interview guide developed using Adams (2015) suggested principles for the semi-structured interview guides. All interviews were recorded and afterwards transcribed. Consequently, these notes are condensed into a predefined template for each interview, where keywords essential for answering research questions are highlighted.

PRELIMINARY RESULTS

Interviews were conducted with 21 businesses, from which seven were consultancies, six SMEs, three startups, three public businesses, one business that can be identified as both - consultancy and startup, and one consultancy/SME business. Collected data provided insights into the respondents´ definition of a

green business model and its characteristics. Furthermore, the results of semi-structured interviews provide insights into how involved businesses are with the green business models and where their knowledge derives from. Moreover, the results provided comprehensive insights into how businesses relate to green business models and the topics defined in the literature review.

Nevertheless, results show that there is no unified understanding of what a green business model is. Furthermore, the knowledge of the respondents is built up based on different sources and various criteria.

CONCLUSION

This study conveys research regarding green business model understanding in the SMEs and startups in Denmark by answering four research questions stated in the introduction. This knowledge is vital for recognition of what the common understanding of the green business model is for the Danish startups, SMEs, consultancy and public businesses. Furthermore, by identifying how and where the research´s target groups learn what the green business model is, it is expected to trace the rudiments of green business model theory among practitioners in Denmark. Consequently, the results of this study are contributing to academic research by filling out the gap in the green business model research and providing background for current and future green business model development projects in Denmark. It also stresses the necessity of a common comprehensive definition of the green business models.

This study delivers a valuable contribution to track 4.1. in the NBM 2022 conference by investigating shared understanding of the green business models by startups, SMEs and related consultancies and public business in Denmark. It builds the fundament for further research and helps to explore the potential for green development.

Keywords

Green business models, small and medium-sized enterprises, startups, consultancies, public business

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Barriers to the sustainable business model innovation-The case of manufacturing SMEs in Sweden

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Extended abstract

Responding to the sustainable development goals (SDGs), companies of various ages and sizes, in various industries and geographic locations, are increasingly changing their business logic in an effort to become providers of goods and services that reflect a commitment to economic, environmental, and social sustainability (Lynch et al. 2020; Geels 2019; Nosratabadi et al. 2019; Zollo et al., 2013). Small and mid-size enterprises (SMEs) are essential to the EU's transition to a sustainable economy because they could provide potential solutions to climate change, resource efficiency, and social cohesion. SMEs are the backbone of the European economy as they represent 99% of all companies in the EU, employ about 100 million, and add value in all sectors (European Commission, 2020).

However, sustainability transitions face numerous challenges (Köhler et al. 2019; Nosratabadi et al. 2019; Hernández-Chea et al. 2021) and little is known about the effectiveness of the sustainable business model (SBM) (Alonso-Martinez et al. 2021). In addition, limited evidence exists on how firms engage in developing and implementing SBM (Köhler et al. 2018), and the theory of thek firm lacks the macro-perspective analysis of sustainability transitions (Bidmon and Knab 2019; Köhler et al. 2019). Moreover, research has not primarily focused on the challenges that SMEs face during the transition towards sustainability which presents new challenges for SMEs to innovate and change their existing business practices, especially in the early phase. Nosratabadi et al. (2019) recommended future research that analyzes the processes of transition from a traditional business model (BM) to a SBM in different industries. Thus, there is a need for a comprehensive insight that explains how companies deal with sustainability in their BM (Bocken and Gerardts, 2020; Bocken et al. 2014) and which challenges and barriers they face. This study aims to identify different challenges that SMEs in the manufacturing sector in Sweden face and to compare these challenges from our empirical data and the challenges that are identified in the literature (Guldmann and Huulgaard 2020). We will develop a conceptual framework for challenges and barriers based on the literature studies and our empirical data.

Recently, BM for sustainability is receiving more attention from industry and academics (Pieroni et al., 2019). Various researchers have conducted investigations of SBMs and sustainable business model innovation (BMI) (Bocken et al., 2014; Boons & Lüdeke-Freund, 2013; Schaltegger et al., 2016). Bocken et al., (2014) define the sustainable BMI that providing substantial positive and/or significantly reduces

negative environmental and societal effects achieved by changes in how the organization and its value network create, deliver, and capture value or change its value propositions. While Geissdoerfer et al., (2016) refine this definition by conceptualizing it as a process with a specific focus on the integration of sustainable value among a wide range of stakeholders. These studies reflect the trend in the research that looks beyond an organization's profit-centered focus to the environmental and social aspects of its BM (Alonso-Martinez et al. 2021). The SBM can create a competitive advantage by offering the superior customer value and by contributing to the sustainability of the organization and society (Nosratabadi et al. 2019; Lüdeke-Freund, 2010). Despite this increased interest and focus, research and practice still lack a general and shared understanding of the innovation process, the building blocks needed to develop SBM, and the frameworks and tools that can implement an SBM (e.g., Breuer et al., 2018; Geissdoerfer et al., 2016; Zollo et al., 2013). The study of the BM regarding sustainability is still in its early stages. Researchers generally regard BMI, whether concerned with sustainability or not, as critical to firm performance, the process focus, and, more specifically, the events that trigger the BMI process (Osterwalder et al., 2005). Yet BMI as a process is still relatively unexplored. Several researchers called for more research on the design and development of SBMs (Breuer et al., 2018; Geissdoerfer et al., 2016; Roome & Louche, 2016). In particular, they encouraged researchers to emphasize the process of sustainable BMI by focusing on the "how" questions related to the development of sustainable BMI in practice.

When it comes to SBM innovation, there are many challenges. BM literature usually categorizes barriers as internal or external to the firm (Ulvenblad et al, 2018; Bocken & Gerardts, 2020). External barriers are mainly external to the firm such as lack of external funding opportunities, no government support in form of training and guidelines, or lack of coherent legislation. Internal barriers originate within the firm and could be perceived as challenges that could be handled or managed (to some degree). For example, unclear business strategy, restrictive mindsets, or lack of in-house knowledge. Despite many studies that focus on the challenges/barriers of SBM, we have limited knowledge of how identified barriers relate to outcomes of the SBM process (Bocken and Gerardts, 2020). In addition, there is a limited understanding of the different internal and external factors to sustainability transitions (Hernández-Chea et al. 2021). Regarding SMEs, one-third of SMEs in the EU struggle with complex administrative and legal procedures when trying to make their business more resource-efficient (European Commission 2020). Thus, we need to elaborate on barriers and drivers of the BMI process, especially for SMEs with great potential but with limited resources of making that transformation.

Thus, the question that emerges here is how SMEs can integrate and implement the SDGs into their strategy, which relates to both the company's BM and business development, as well as its social responsibility, and thus create profitable and sustainable companies. So, to support and enable SMEs to implement a SBM that is integrated into their daily lives, there must be support in the public and private systems in a systematic manner. A comprehensive view of how firms should approach embedding sustainability in their BM is needed. Thus, this paper aims to study and evaluate the SMEs that respond to sustainable development in their BM. In another word, this study will answer the following question: what barriers do SMEs face during the transition into SBM?

To identify challenges and barriers for SMEs, A qualitative approach will be applied by conducting semi-structured interviews and workshops with 10 SMEs from the manufacturing sector in Sweden which is in the early phase of sustainability transition in their BM. The interview and workshop will include people who have different roles in the companies. We will analyze their BM, sustainability impact, and identify barriers as well as drivers to develop and implement SBM. Secondary data has been collected from the

five SME's websites (Table 1) and more data will be collected from the rest of the companies as this is still an ongoing study.

Furthermore, when comparing empirical data with the challenges that are identified in the literature, we expect to present a typology of different types of barriers for SMEs while transitioning to SBM. The expected result include a conceptual framework that focus on sustainability transitions in SMEs from a multi-level perspective (Hernández-Chea et al. 2021). Following the step of identifying challenges and barriers, this paper aims to provide potential opportunities to alleviate the impact of these challenges and a guideline to support the decision-making process of SMEs in the manufacturing sector in light of their transition to SBM.

Table 1. SMEs participating in the research project

	Business concept	NOE*	Business idea	Sustainability
A	valve and pump service (Machines, manufacturing)	22	Provide maintenance valves and pump services for process industries, thermal power plants, chemical industries and all other clients who transport media in any form.	Prioritize all measures that promote quality for the minimum cost.
B	products for healthy houses (Chemical products, Wholesale)	17	Create added value for customers by offering functional products for growing problems in properties.	Work actively to reduce negative environmental impact. They provide the best solutions for clean surfaces with as little environmental impact as possible.
C	manufacturing and trading in packing cases, timber packaging and accessories and as well as their recovery. (Packaging, Wholesale)	92	supply the European market with suitable quality new and secondhand packing cases as well as supplying timber packaging for the local market.	Meet customers' needs and expectations, minimize and prevent environmental impact. Improve the working environment for all employees and minimize illness, accidents, discrimination and bullying. Work to achieve an even distribution between female and male workers. Work for a diversity of ethnic affiliation within the company
D	Specialists in the manufacture, assembly and powder coating of steel pipes.	47	offer complete solutions as they handle the logistics and collect deliveries, do final assembly, pack and mark shipments.	Minimized the environmental impact. Use materials that are suitable for the environment. A good and pleasant work environment. products have the "Möbelfakta" label, which means that the product meets the Quality, Environment and Social Responsibility requirements.
E	Food production	4	organic farming, farm shop and delivery of organic vegetables directly to about sixty schools and companies in the immediate area. the ability to order vegetable and fruit boxes online	Without chemical pesticides, biodiversity. Organic farming therefore contains more flowers, bumblebees and birds. maintain an ecological cycle on the farm.

*Number of employees

Keywords

Business Model (BM), Business Model Innovation (BMI), Sustainable Business Model (SBM), Small and mid-size enterprises (SMEs), challenges.

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Do they see eye to eye? Management and customer viewpoints of ordinary and extraordinary experience in a phygital scenario

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Abstract

Phygital is increasingly playing a pivotal role in our daily lives. However, while research about online and offline customer experiences is long-established, questions remain about the features of phygital customer experiences and effective customer experience management tactics in a phygital context. The purpose of this study is to empirically examine the phygital customer experiences based on the intensity of consumers' responses and reactions to stimuli. Our primary contribution is to develop a framework for understanding the kinds of extraordinary and ordinary customer experiences in phygital contexts. In closing, we offer some implications and extensions for future research based on our theoretical development.

Track 3.1 - Assessing and Managing the Sustainability Performance of Business Models

Track chairs: *Florian Lüdeke-Freund (ESCP Business School) and Romana Rauter (University of Graz)*

Assessing and managing the sustainability performance of business models requires exploring and integrating various topics and concepts (e.g. business model, systems level approaches) as well as tools and metrics (e.g. from fields such as sustainability reporting and accounting, life cycle assessment).

This track is open to conceptual and empirical papers that integrate the notions of business model and sustainability performance in new and convincing ways.

Exploring the implications of the value concept for performance assessment of sustainable business models

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Abstract

It is commonly accepted that the performance of sustainable business models is determined by their value creation for stakeholders, primarily understood in aggregated macro-level social, ecological and economic terms. However, very few studies attempt to measure this value creation beyond qualitative evaluations of firms, and the ones that do, focus on measuring the output of the firm. Because these output-based and firm-based metrics do not measure the fulfilment of stakeholder needs, they can only approximate actual stakeholder value creation. This implies that the conceptualisation and operationalisation of value created with sustainable business models require further clarification. In response, this paper analyses the characteristics of value itself based on insights from marketing and stakeholder research and how this affects the understanding of a business model's sustainability performance. Conceptual propositions for value-based performance assessment of sustainable business models are derived from the characteristics of subjectivity and heterogeneity, relationality and experientiality, idiosyncrasy, incommensurability, one-sidedness and non-linearity, situation-specificity and transience, and interdependence. The analysis suggest that the trinity of ecological, social and economic value needs to be reformed with a value concept based on stakeholder-specific need-fulfilment that allows actual assessment of stakeholder value creation. This assessment can only be conducted in collaboration with the stakeholders whose needs are being addressed.

Keywords

Sustainable business model, stakeholders, value, performance, assessment, measurement

1. Introduction

Sustainable business models pursue the goal of value creation for an organisation's various stakeholders (Stubbs and Cocklin, 2008). The performance of sustainable business models is primarily understood qualitatively as the aggregated dimensions of social, ecological and economic value (e.g. Patala *et al.*, 2016; Schaltegger, Hansen and Lüdeke-Freund, 2016), or through specific quantitative metrics, such as CO_2 emissions (e.g. Alonso-Martinez, Marchi and Di Maria, 2021). However, following stakeholder theory (Freeman, Wicks and Parmar, 2004; Harrison and Wicks, 2013), the creation of stakeholder value is based on the degree to which a firm meets the respective stakeholder needs. These needs are highly subjective with regard to the differentiated and partly idiosyncratic stakes of each stakeholder. For instance, employees have different stakes compared to investors, and face different needs and different dimensions through which they perceive the value offered.

However, the SBM literature provides no causal justification rooted in the origins and attributes of *value* that economy, society, and environment are the dimensions through which all stakeholders perceive value. At the same time, output-based quantitative metrics can at best approximate how much a business model fulfils stakeholder's needs. These aspects show that the predominant conception of social, ecological and economic value is too broad to understand a business model's sustainability performance with the necessary depth. If the objective of SBMs is to contribute to sustainability transformations with the creation of stakeholder value, performance assessment needs to reflect the characteristics of *value* itself. Few SBM authors define the central concept of value, with some notable exceptions (Breuer and Lüdeke-Freund, 2017; Lüdeke-Freund *et al.*, 2020; Upward and Jones, 2016). A discussion of the central construct of *value* and its implications for the understanding of an SBM's performance is missing, even when performance is explicitly analysed (e.g. Alonso-Martinez, Marchi and Di Maria, 2021). Comparing the richness of analogous insights from marketing research on the nature of customer value (Gummerus, 2013; Sweeney and Soutar, 2001) with the value notion used in the SBM literature suggests that the latter is underdeveloped. This paper discusses the nature of value and how its characteristics should be reflected in the assessment of business models' sustainability performance. This objective is reflected in the following research question:

What are the implications of the value concept for the assessment of a business model's sustainability performance?

2. Current perspectives on value and performance of sustainable business models

The concept of the business model explains what value is offered and how it is created and delivered (Boons and Lüdeke-Freund, 2013; Teece, 2010). There is overwhelming support that the primary objective of sustainable business models' on the organisational level is value creation for its stakeholders (Bocken *et al.*, 2014; Freudenreich, Lüdeke-Freund and Schaltegger, 2020; Schaltegger, Hansen and Lüdeke-Freund, 2016). This value creation can contribute to other purposes such as meso-level or macro-level sustainability transformations of markets, industries or society (Schaltegger, Hansen and Lüdeke-Freund, 2016; Stubbs and Cocklin, 2008). To understand the performance impact such business models have, it is thus crucial to assess the kinds and amount of value they are creating (Lüdeke-Freund *et al.*, 2017). The literature distinguishes the aggregated dimensions of social, ecological and economic value (Evans *et al.*, 2017), which is primarily assessed qualitatively through the value proposed by a firm (e.g. Bocken *et al.*, 2014; Snihur and Bocken, 2022). The few authors proposing quantitative measures or measuring SBMs' sustainability performance quantitatively have aligned themselves with the notion of stakeholder value creation (e.g. Alonso-Martinez, Marchi and Di Maria, 2021; Ilyas and Osiyevskyy, 2021; Lüdeke-Freund *et al.*, 2017). Lüdeke-Freund *et al.* (2017), for example, argue for prioritising performance management of issues with high materiality for stakeholders, which could then be assessed via indicators of the GRI (Global Reporting Initiative) standard. However, the output-based performance metrics that are then commonly used to understand performance do not measure whether or how much stakeholders *value* these outputs. In the literature, quantitative performance assessment is thus relying primarily on a conflation of outputs and needs via proxy indicators rather than direct measures of stakeholder value. While the sustainability performance assessment literature suggests a stakeholder perspective (e.g. Silva, Nuzum and Schaltegger, 2019), an evaluation of value, through intended recipient stakeholders, has not been attempted so far.

Snihur and Bocken (2022) explain this dearth of quantitative performance assessments with a lack of construct clarity and replicable impact measures. Indeed, these gaps in the existing literature can be traced to either broad and generic conceptualisations of value or even a lack thereof. Surprisingly, few SBM papers provide an explanation of what value is and when it occurs (exceptions include Breuer and Lüdeke-Freund, 2017; Freudenreich, Lüdeke-Freund and Schaltegger, 2020; Upward and Jones, 2016). Upward and Jones (2016), in line with these other authors, draw on human sciences and explain value as an actor's perception of a fundamental *need* (e.g. functional or psychological) being met by certain *satisfiers* (e.g. a product or service). However, the stream of literature cognisant of the origin of value also tends to assume that the needs of stakeholders are of social, ecological and economic nature: "Sustainable value incorporates economic, social and environmental benefits conceptualized as value forms" (Evans *et al.*, 2017, p. 601).

In this regard, it often remains unclear whether economic, social and ecological value refers to the recipient (e.g. society being the subject) or the content of value (e.g. Evans *et al.*, 2017). Both interpretations have conceptual issues. In the first case (recipient), the subjects would be too heterogeneous in themselves to identify their common needs (e.g. what the needs of *all* of society are). The inanimate parts of nature are even incapable of having needs, such as resource deposits having neither needs nor agency to claim them without the aid of other stakeholders. Additionally, most actors interact with more than one domain, with the prime example being the firm itself. In

the latter case (content), it is unclear who the recipient would be, and whether the needs of all stakeholders could really be summarised in these three dimensions. The relationship between an individual's perception (e.g. a stakeholder) of psychological or functional value (e.g. Sweeney and Soutar, 2001) and the aggregated social, ecological and economic dimensions dominating the SBM literature has never been explained convincingly.

Lüdeke-Freund *et al.* (2020, p. 75) conclude that this trinity is "but a placeholder for the *value pluralism* that must be acknowledged when a stakeholder-responsive interpretation of value is applied". Additionally, other characteristics of value (e.g. idiosyncrasies or incommensurability, Gummerus, 2013) have not been discussed in the light of their implications for performance assessment. If the purpose and conceptual distinctiveness of business models are based on the value concept, then performance needs to be assessed through this lens. Before existing performance management approaches could be adapted, it should be explored how the central notion of value affects the very understanding of sustainability performance itself.

3. Analysing the characteristics of value for assessing the sustainability performance of business models

Various conceptions of value exist, for instance rooted in strategic management and micro-economic theory, or marketing research. From the strategic management perspective, value is primarily measured as economic *exchange value* created by the firm's bundling of resources that is captured by the firm or other actors (Bowman and Ambrosini, 2000). However, this approach only measures the value actors are willing to give up in return, not the value they actually perceive (e.g. Gummerus, 2013). Such a perceived *use value* has to exist and exceed the exchange value for actors to engage in an exchange, else there would be no benefit to it. Monetary units can only capture extrinsic elements of this excess use value (i.e. potential for more economic value creation), as intrinsic elements such as emotional well-being cannot be easily priced. An emphasis on measuring financial value would also subordinate social and ecological objectives to economic goals (Harrison and Wicks, 2013). Additionally, as finances are finite and tangible, measuring only exchange value creation would lead to a zero-sum game, where value could only be 'created' by appropriating more value from other stakeholders.

This paper thus builds on and extends the SBM literature with a value concept based on consumer marketing and stakeholder theory (e.g. Gummerus, 2013; Harrison and Wicks, 2013; Sweeney and Soutar, 2001). The following, partially interrelated characteristics of value are analysed in this section: Subjectivity and heterogeneity, relationality and experientiality, idiosyncrasy, incommensurability, non-linearity and one-sidedness, situation-specificity and transience, and interdependence. Based on these aspects, propositions are derived for the design of a value-based performance assessment system.

3.1 Subjectivity and heterogeneity

Value is *subjective* in that both its dimensions and the desired amount are determined by the respective needs and values of a stakeholder (Upward and Jones, 2016). These needs express themselves *heterogeneously* across stakeholder groups. Business models relate to stakeholders on the individual level (e.g. employees, consumers, or community members) and organisational level

(B2B customers, business partners, NGOs, or public authorities). For instance, individual consumers will perceive value also in terms of positive emotional states (Sweeney and Soutar, 2001), while business partners' criteria could be more closely related to rational economic, social and ecological dimensions (Patala *et al.*, 2016). These fundamentally different interests on different levels need to be reflected in performance assessment dimensions. Applying the ecological, social, and economic dimensions to all stakeholders does injustice to the plurality of stakeholder interests, and contradicts well-established research on individual-level value (e.g. consumer value, Gummerus, 2013). For example, the widely-used PERVAL (perceived value) scale of Sweeney and Soutar (2001) measures consumer perceptions of the fulfilment of key value dimensions (functionality, and emotional or social appeal). Analogous measures are required for other stakeholder groups. Finally, inanimate or conflated objects or variables without interests or needs cannot *perceive* value. It is thus questionable whether value is a concept that can be applied to a monolithic "ecology" or "society" stakeholder that actually conflates various actors or even inanimate objects without agency. Nonetheless, societal and ecological impacts can be of value to other stakeholders and the firm itself (e.g. societal and ecological stability).

Proposition 1a: Value-based performance metrics need to reflect stakeholder needs rather than firm outputs.

Additionally, if value is based on specific needs (Upward and Jones, 2016), business model performance needs to be assessed through the subjective extent to which a need is met rather than 'raw output' alone. For example, value-based performance cannot be measured in terms of carbon emissions or wage levels, only in terms of how these meet stakeholders' needs for environmental protection or fair reimbursement. A specific *output* of a business model can thus be considered a *satisfier* if it can be causally linked to at least one stakeholder need. Stakeholders will hold certain expectations regarding their desired fulfilment of a need (Lüdeke-Freund *et al.*, 2020; Stubbs and Cocklin, 2008). This also means that performance assessment based on value can only be conducted together with the respective stakeholders, and never by the firm alone. Stakeholders need to be asked how they perceive the fulfilment of their needs based on what the business model offers them (Castellas, Stubbs and Ambrosini, 2019). The outputs of the firm can only be measured as satisfiers to those needs (Upward and Jones, 2016).

Proposition 1b: Value-based performance needs to be assessed through the perceived degree of stakeholder need fulfilment rather than firm outputs.

3.2 Relationality and experientiality

Many authors consider only tangible exchanges of outputs between the firm and its stakeholders (for an overview, see Freudenreich, Lüdeke-Freund and Schaltegger, 2020) as satisfiers for stakeholder needs. However, value creation is *relational* and *experiential* because stakeholders evaluate not just the value of an output, but also the relationship itself through which this exchange takes place (Gummerus, 2013; Harrison and Wicks, 2013). The needs of stakeholders are affected by the tangible exchanges, psychological and social effects of affiliation to the firm, and treatment by the firm in the firm-stakeholder relationship (Freudenreich, Lüdeke-Freund and Schaltegger, 2020; Harrison and Wicks, 2013). Harrison and Wicks (2013) argue that stakeholders' perception of value is driven, for instance, by perceptions of just conduct vis-a-vis themselves and others, or reputational benefits from affiliation with a socially-responsible firm. This means that value should

not only be assessed as a consequence of exchanged goods or services alone, but as the experience of the entire relationship (Gummerus, 2013). The unit of analysis for performance assessment is thus extended by these characteristics: Whereas the value perceived is usually considered to be contained in the value proposition component only (Bocken *et al.*, 2014; Boons and Lüdeke-Freund, 2013), the activities and relationships through which this value proposition is created also affect the needs of involved stakeholders.

Proposition 2: Value-based performance assessment includes satisfiers that reflect the entire experience of the firm-stakeholder relationship (i.e. tangible exchanges, treatment, and affiliation to the firm).

3.3 Idiosyncrasy

Because value is subjective to stakeholders' needs, certain value dimensions can be also *idiosyncratic* to particular stakeholders (Gummerus, 2013). As each stakeholder has by definition a unique stake in the business model (Freudenreich, Lüdeke-Freund and Schaltegger, 2020), stakeholder needs are not necessarily shared across stakeholder groups. For instance, while career development may be an important outcome for employees, it would not be a relevant outcome for consumers (unless it provides emotional value to the consumer). Uniform value dimensions across the business model's stakeholders (i.e. social, ecological, economic value) would only be permissible for performance assessment where interests converge. Employees, consumers and community members, for instance, may share an emotional need for environmental protection despite their unique stakes. It should thus be determined which needs apply to one, to several, or to all stakeholders. This ultimately leads to a mixed set of 'universal' and stakeholder-idiosyncratic needs and thus indicators for performance *assessment.*

Proposition 3: Value-based performance assessment should distinguish between more universal and idiosyncratic needs and assign them to the applicable stakeholders.

3.4 Incommensurability

The heterogeneity and idiosyncrasies of value dimensions result in an *incommensurability* of value (i.e. inability to simply add value dimensions on top of each other) *within* and *across* stakeholders (Castellas, Stubbs and Ambrosini, 2019). Heterogeneous drivers of value such as personal development for employees or the creation of jobs for governments cannot be easily added and transmuted into one singular dimension of total social value. This lack of a common scale means that it is not possible to aggregate all the value that is created into one economic, ecological, or social figure. Additionally, measuring and aggregating value through translation into monetary terms may only capture the value a stakeholder is willing to exchange (Bowman and Ambrosini, 2000) rather than the value they actually perceive. At the same time, if some needs are idiosyncratic to one or a few stakeholders, they should not be assessed in aggregated one figure that applies to all stakeholders. Instead, the characteristic of subjectivity provides a solution to this challenge: If value should be assessed based on the relative fulfilment (for example using Likert-scaled items) of needs, some form of average fulfilment (e.g. median score rather than a total) might be taken for each stakeholder, or even for all stakeholders. However, these average figures need to be evaluated in the context of the deviations from that average in order to understand whether some conventional needs (e.g. financial) or stakeholders (e.g. shareholders) are disproportionally

addressed. When the averages of two firms are similar, but the deviations from that average are lower for one firm, than that firm displays a more balanced consideration of stakeholder needs.

Proposition 4a: The assessment of overall value creation within and across stakeholder groups should be conducted through normalised figures of average fulfilment of stakeholder needs.

Proposition 4b: The balance of value creation within and across stakeholder groups can be assessed through the size of deviations of individual needs and stakeholders from the average fulfilment of stakeholder needs.

3.5 Non-linearity and one-sidedness

The relationship between a satisfier and the perception of value by stakeholders can follow *non-linear* and *one-sided* functions. Increasing or decreasing the performance of a good from a particular reference point can have diminishing effects on marginal utility (Kahneman and Tversky, 1979). At the same time, satisfiers can have stronger or exclusively one-sided effects on either the positive or negative side, as illustrated by the Kano Model of customer satisfaction (Matzler and Hinterhuber, 1998): A value satisfier might have a primarily negative effect when absent because it is expected but does not excite (e.g. basic expectations). Petersen, Hörisch and Jacobs (2021), for example, find that consumers disvalue offers associated with CO_2 emissions above industry average, but see little added value in below-average emissions, at least for the low involvement product of batteries. Conversely, value drivers may have a primarily positive effect because they are not expected (yet) but excite when present (e.g. for latent needs; Matzler and Hinterhuber, 1998). One-sidedness is not exclusive to customers, as illustrated by the similar two-factor model of hygiene (negative) and motivator (positive) factors of employees' satisfaction (Herzberg, 1987). For example, while timely payment of wages may not yield positive associations of value, late payment will definitely result in negative ones. For assessment, this means that dimensions can have only negative or positive effects on the average need fulfilment. This also supports that assessment of value can only be conducted in dialogue with stakeholders, and has to be based on their expectations. Similar to the Kano Model assessment (Matzler and Hinterhuber, 1998), stakeholders can be asked how they would feel if a certain satisfier would be present, and how they would feel in the opposite case.

Proposition 5: The scales for value assessment should reflect the directionality (positive, negative, or both) of need satisfiers.

3.6 Situation-specificity and transience

The value of an interaction or experience is *situational* in that it depends the context of the interaction or experience (Gummerus, 2013). Individuals can take multiple stakeholder roles (Upward and Jones, 2016), such as employee, customer and member of a community. The salience of their role can shift depending on the situation (e.g. being at work vs. being in a store), also shifting the salience of perceived value dimensions. Lüdeke-Freund *et al.* (2017, p. 186) argue that business models reflect a contextual logic that "expresses a business model's *value framing* with regard to its socio-cultural, political, legal, economic, and technological spheres." While this notion of value framing is not explored further, it implies that these spheres affect the needs and values of stakeholders (*values* and value are related, but distinct, Breuer and Lüdeke-Freund, 2017). This means that the correlation between a firm's satisfiers (output) and the value they create behaves

differently across different settings (e.g. countries or social groups). For instance, establishing the same working conditions could create different amounts value for a textile factory worker in Western Europe compared to South(-east) Asia due to differing pre-existing reference points. These makes it hard to transfer value assessments across contexts or spheres, and thus require separately designed measures cognisant of needs, values, and expectations.

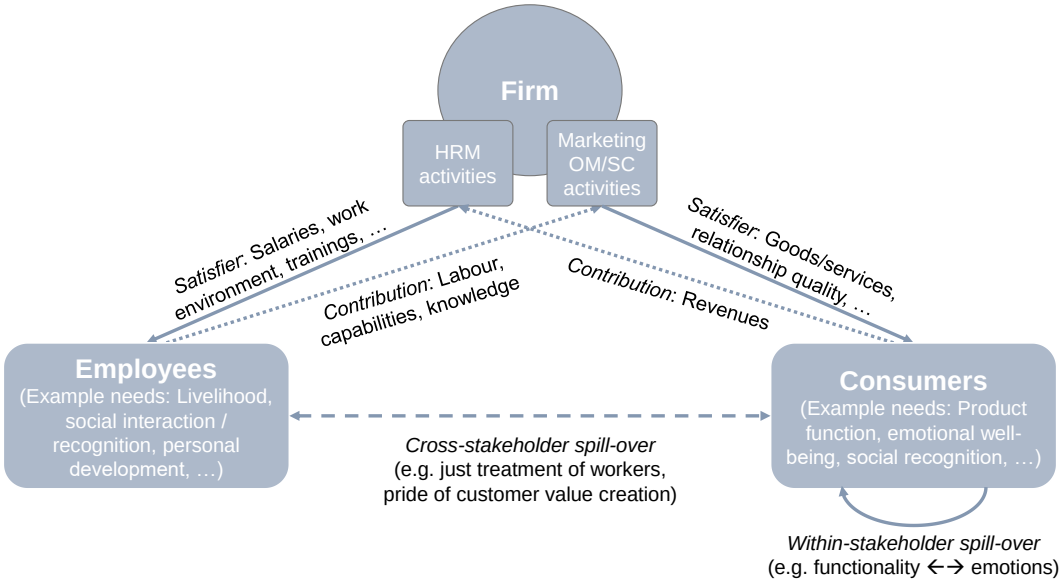
Additionally, value perceptions are also *transient* because expectations change with time (Boons and Lüdeke-Freund, 2013). Over time, the excitement of satisfiers wanes, turning qualities into linear or basic ones that are expected to be present (Matzler and Hinterhuber, 1998). While this related initially to new excitement features of products, stakeholder expectations regarding their treatment (e.g. labour conditions) may solidify similarly. For instance, if a company introduces new satisfiers to the aforementioned workers accustomed to a different standard, the satisfier will over time wane so that it behaves similar compared to the value for a textile worker accustomed to a higher standard. The correlation between a satisfier and the value it creates will thus change naturally over time.

Proposition 6: The various contextual spheres and the situation of stakeholders change the needs that define which value is perceived and their relationship to satisfiers.

3.7 Interdependence

Every business model represents an activity system of causal relationships between repeated activities or choices that transform resources into valuable satisfiers (Casadesus-Masanell and Ricart, 2010; Zott and Amit, 2010). Understanding these causal relationships is less important for assessing performance itself, than for understanding and increasing its drivers (i.e. *how* value is created. In this context, different kinds of value and their creation are *interdependent* for two reasons. First, business models transform stakeholder contributions into valuable outputs for other stakeholders (Lüdeke-Freund *et al.*, 2020). Suppliers or employees, for example, contribute to the creation of products and services, while the capture of revenues allows the reimbursement of said stakeholders (Norris, Hagenbeck and Schaltegger, 2021). Second, value offered to one stakeholder may create spill-over effects *within* and *across* stakeholders. Within a stakeholder, the different value dimensions may affect each other, such as exceptional functionality enhancing the joy derived from a product (Sweeney and Soutar, 2001). Across stakeholders, the perception of just, socially-desirable treatment of stakeholders (Harrison and Wicks, 2013) may be a source of emotional value and social-enhancement value for consumers (Sweeney and Soutar, 2001) and other stakeholders. These aspects suggest that the creation of value for one stakeholder is often the prerequisite for creating for others (Castellas, Stubbs and Ambrosini, 2019). Figure 1 illustrates the simplified and non-exhaustive interdependencies and stakeholders through the example of employees and consumers.

FIGURE 10 INTERDEPENDENCIES AND SPILL-OVERS BETWEEN STAKEHOLDER VALUE



In practice, detailed and accurate analyses of value interdependencies should include both the activity system itself, the roles and contributions stakeholders make, as well as their needs and satisfiers. However, existing approaches considering activity systems are usually stakeholder-unspecific, need-unspecific, or both (e.g. Abdelkafi and Täuscher, 2016; Brehmer, Podoynitsyna and Langerak, 2018).

Proposition 7a: Value-based performance assessment needs to map interdependencies in the activity system between the needs for stakeholders and their reciprocal contribution to satisfying the needs of other stakeholders.

Proposition 7b: Value-based performance assessment needs to map potential indirect spill-overs between needs within and across stakeholders.

3.8 Concluding summary of the analysis

The analysis illustrates that performance can only be assessed under consideration of the subjective, heterogeneous, idiosyncratic, interdependent and dynamic needs of stakeholders. This requires active involvement of stakeholders in the assessment process, both in determining the kinds and relevance of needs as well as the extent to which they are satisfied. Table 1 summarises the propositions that emerged from the analysis of the value concept's implications for the performance assessment of sustainable business models.

TABLE 7 CHARACTERISTICS OF VALUE AND PROPOSITION FOR VALUE-BASED PERFORMANCE ASSESSMENT

Value characteristic: Value is…	**Proposition for assessing value-based performance**
…subjective and heterogeneous: Dimensions and required amount of value are defined by the needs of stakeholders, leading to a plurality of heterogeneous value types.	Proposition 1a: Value-based performance metrics need to reflect stakeholder needs rather than firm outputs. Proposition 1b: Value-based performance needs to be assessed through the perceived degree of stakeholder need fulfilment rather than firm outputs.

…relational and experiential: Value is based on the experience of outcomes of and treatment in the firm-stakeholder relationship.	Proposition 2: Value-based performance assessment includes satisfiers that reflect the entire experience of the firm-stakeholder relationship (i.e. tangible exchanges, treatment, and affiliation to the firm).
…partially idiosyncratic: Many needs are specific to only one or a few particular stakeholders.	Proposition 3: Value-based performance assessment should distinguish between more universal and idiosyncratic needs and assign them to the applicable stakeholders.
…incommensurable: It is impossible to add different kinds of value into a total.	Proposition 4a: The assessment of overall value creation within and across stakeholder groups should be conducted through normalised figures of average fulfilment of stakeholder needs. Proposition 4b: The balance of value creation within and across stakeholder groups can be assessed through the size of deviations of individual needs and stakeholders from the average fulfilment of stakeholder needs.
…potentially one-sided and non-linear: Satisfiers may create only positive or negative effects, which can diminish or escalate the further an experience moves from the reference point.	Proposition 5: The scales for value assessment should reflect the directionality (positive, negative, or both) of need satisfiers.
…situational and transient: Needs and value differ across contexts and situations stakeholders find themselves in.	Proposition 6: The various contextual spheres and the situation of stakeholders change the needs that define which value is perceived and their relationship to satisfiers.
…interdependent: Different kinds of value can be a prerequisite or satisfier for other kinds of value within and across stakeholders.	Proposition 7a: Value-based performance assessment needs to map interdependencies in the activity system between the needs for stakeholders and their reciprocal contribution to satisfying the needs of other stakeholders. Proposition 7b: Value-based performance assessment needs to map potential indirect spill-overs between needs within and across stakeholders.

4. Discussion and conclusion

If a business model's primary purpose is to explain value creation (Teece, 2010), value has to be the basis of performance assessment. Approaches that do not account for the central construct of value (e.g. Alonso-Martinez, Marchi and Di Maria, 2021; Ilyas and Osiyevskyy, 2021) are thus suitable for other units of analysis, but miss the essence of the business model. In this regard, SBM research needs to adopt an evidence-based and theory-based value concept that reforms the normative

construct dominating the current discourse. In response, this paper advocates for a subject-specific need-fulfilment approach (extending Lüdeke-Freund *et al.*, 2020) rather than measuring firm output to understand *what* value is created. While other forms of impact may be validly understood this way, value-based business model performance cannot be assessed without the evaluation by stakeholders themselves. This suggests a stakeholder perspective that has been conceptualised and operationalised insufficiently in the few previous studies on SBM performance (e.g. Alonso-Martinez, Marchi and Di Maria, 2021; Ilyas and Osiyevskyy, 2021; Lüdeke-Freund *et al.*, 2017). If the entire relationship is relevant to stakeholders' perceptions of value (Harrison & Wicks, 2013), the relationship improvement inherent in engaging in a stakeholder-based assessment may in itself represent a source of value. This *mere-measurement effect* has to be acknowledged as a natural consequence of the relationality of value creation.

Due to their highly dynamic nature (Gummerus, 2013), value perceptions remain hard to assess, and which will always require adaptation across different contexts, similar to the utility of different consumer value scales in different situations. Taking a stakeholder perspective increases complexity and effort of the assessment (e.g. Silva, Nuzum and Schaltegger, 2019), which can constrains its granularity and comprehensiveness. For instance, it can be difficult for smaller organisations to assess value creation for heterogeneous subgroups that exist within most stakeholder groups (e.g. consumer segments). Nevertheless, this reconceptualization is required to remedy the construct and operationalisation issues that prevented the measurement of stakeholder value creation so far (Snihur and Bocken, 2022). While not the focus of this paper, stakeholder value creation is undoubtedly affecting wider societal and ecological variables (e.g. income equality or climate change) that should be represented as a separate but connected macro-level in performance assessment.

However, because business models explain also *how* value is created (Boons and Lüdeke-Freund, 2013), it is nonetheless important to measure the outputs as satisfiers to those stakeholder needs. The differentiation between subject-specific value and outputs of a firm enables correlating the performance to its drivers. At the same time, more output (or less in negative aspects) does not automatically result in higher value perceptions of stakeholders because it may not always be perceived as relevant to current stakeholder needs. Some stakeholders might for instance initially attribute little intrinsic value to environmental protection and thus be content with high greenhouse gas emissions. Because value expectations are dynamic rather than static or pre-defined (Gummerus, 2013), companies can affect the importance and salience of needs toward sustainability. If companies want to create progress on macro-level environmental and societal issues, they need to find connections to micro-level stakeholder needs (e.g. psychological safety), or even create a connection if they find none. In other word, firms need to ensure that they turn as many outputs as possible into satisfiers by linking them to stakeholder needs. Assuming that value exists without a beholder or even for an abstract one (e.g. nature) is not only lacking grounding in value research (e.g. Gummerus, 2013), but can also hamper business models' contributions toward sustainability transformations.

The propositions developed here can also be understood as a design guideline (see Table 1) for managers seeking to understand and improve the sustainability performance of their business models. Sustainability reporting standards, particularly the Integrated Reporting (IR) standard, are acknowledging the role of the business model (Lüdeke-Freund and Dembek, 2017). The IR standard, however, emphasises the measurement of various types of resources or capital (e.g. natural or

human) rather than stakeholder need fulfilment. Going beyond this, practitioners should engage with their stakeholders directly, and ask them about their perceptions of need fulfilment, be it in semi-structured interviews or through structured surveys. The suggested separation of output and needs-based value allows managers to identify causal links between satisfiers and value. For instance, the capital-based metrics of the IR standard could be correlated to stakeholder perceptions of need fulfilment. This also helps diagnosing problems in companies' stakeholder value propositions, e.g. when less environmental damage fails to elevate stakeholder value due to failure to relate it to stakeholder needs.

Future research can operationalise the propositions in a stakeholder perceived value scale similar to consumer perceived value scales (Sweeney and Soutar, 2001). For this, the idiosyncratic and universal value dimensions based on each stakeholder's needs have to be established and validated, for instance through phenomenological research with stakeholders. While the notion of consumer value is well-established in the marketing discipline (Gummerus, 2013), more insights could be integrated from disciplines concerned with other stakeholders. Supply chain management, human resource management, finance and corporate governance could for example yield insights into the needs of business partners, employees, and financial shareholders, respectively. The conceptual propositions of this paper will help translating these insights into SBM performance assessment systems reflective of the nature and origins of value.

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Operationalizing Corporate Sustainability Implementation: A Scale Development Proposal

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Abstract

Given the relevance that the implementation of corporate sustainability has gained both from the academic and the practitioner points of view, this paper suggests a scale to measure the level of corporate sustainability implementation, operationalizing the sustainability concept through four dimensions: prosperity, planet, people and governance.

Keywords

Corporate sustainability, sustainability implementation, indicators, multi-level scale.

Introduction

The concept of Corporate Sustainability (CS) has received growing attention from both academic scholars and practitioners in the corporate world (Amini & Bienstock, 2014). CS is based on a holistic and systemic perspective to address the many challenges of sustainable development (Lankoski, 2016; Lozano et al., 2015). It incorporates the Triple Bottom Line (TBL) concept (Elkington, 1998) in terms of environmental responsibility, economic prosperity, and social equity (Antolín-Lòpez et al., 2016; Dyllick & Hockerts, 2002). Although there is an increasing interest in CS, the research has paid less attention to the related aspect of Corporate Sustainability Performance Measurement (CSPM) (Antolín-Lòpez et al., 2016; Dyllick & Muff, 2016). There is no single field of literature nor a standardized framework to measure CS, and often different terms are used, such as sustainability indicators (Hojnik et al., 2020; López-Arceiz, 2020; Rahdari & Rostamy, 2015), sustainability measurement (Asiaei et al., 2021; Antolín-Lòpez et al., 2016; Cagno et al., 2019), sustainability assessment (de Olde et al., 2017), or performance (Silva et al., 2019). The literature on CS measurement in a broad sense is ample, and yet there is still no agreement on how to actually measure CS.

Further, measuring CS is not only an issue of measuring results, outcomes, or performance: another relevant perspective is that of measuring the degree to which sustainability is put into practice in businesses. This perspective is useful to assess the level of maturity in sustainability implementation at the firm level, but also at higher levels of interest, such as within a specific cluster of firms belonging to an industry and/or a geographical area, where local public and private institutions can act to promote sustainability based on the state of art of its implementation among local firms.

The corporate social performance model (Wood, 2010) indicates that three connected elements are pivotal: principles, processes, and performance, indicating that real performance is acquired only when responsibilities are acknowledged and processes are implemented. So, the first question that a business leader should ask himself/herself is "to what degree am I effectively managing the different aspects of sustainability?" or "What is the level of sustainability implementation in my business?"

Some measures of sustainability implementation have been proposed in the Corporate Social Responsibility (CSR) and the CS literature by the means of scales inspired by different frameworks (Cantele & Zardini, 2018; Wong et al., 2021), such as the CSR pyramid model (Carroll, 1991), sustainable development (UN World Commission on Environment and Development, 1987), the TBL concept (Elkington, 1998), stakeholder theory (Freeman, 1984), or other combinations of CSR practices, such as standards or certification adoption (Godos-Diez et al., 2021; Zhu et al., 2019).

Based on these frameworks, the scales already used in the literature appear limited in terms of the number of aspects/items considered, as well as in reference to the more detailed requirements of the CSR/sustainability performances or indicators proposed in the academic literature and CSR/sustainability standards and guidelines available from professionals and the business world. This means that the existing scales are useful for empirical research purposes, but they fail to offer a comprehensive measure of sustainability implementation for business, which encompasses the complexity of the CS aspects to be considered.

The aim of this research is to develop a multi-level scale of sustainability implementation, useful for firms (but also for clusters or trade associations assembling them into a specific territorial context) to self-assess their sustainability status, and for researchers who need a more comprehensive scale based on both the consolidated literature and the most recognized sustainability standards.

Literature and standards review

The literature on sustainability and CSR measurement is vast, and identifying relevant work is complex, given the different and not necessarily overlapping terms used in this field, such as performance, measure, indicators, impacts, outcomes, etc. Consistent with our research aims, the starting point of our work was the literature on CSR and sustainability scales, to define the higher-order dimensions of sustainability, as well as the sustainability indicators literature, to enable the identification of candidate items for the scale proposal.

With respect to higher-order dimensions, the literature on CSR and sustainability scales has largely used three approaches: Carroll's model, sustainable development/TBL, and stakeholder theory (Cantele & Zardini, 2018; Wong et al., 2021). For example, Carroll's model was used by Maignan

and Ferrell (2000) in their corporate citizenship scale, encompassing the economic, legal, ethical, and discretional dimensions of CSR. Turker (2009), on the other hand, develops his CSR scale by taking the stakeholder approach, thus considering CSR in terms of society, employees, customers, and government. The sustainable development or TBL approach characterizes those scales in terms of the operationalization of the dimensions of economic development, social equity, and environmental protection (Alvarado-Herrera et al., 2017). Scales based on a single approach present some limitations; for example, they do not consider the environmental dimensions or do not assess specific stakeholder relationships in any depth (Wong et al., 2021).

From the sustainability indicators side, certain studies have proposed lists of indicators based on review of the literature or sustainability standards or a combination of these two sources. Antolín-Lòpez et al. (2016) present a systematic literature review to identify the most relevant CSPM tools used by different stakeholders and provide an overview of these. They analyze their content following the TBL perspective, identifying similarities and/or differences in how these CSPM tools represent the three dimensions of CS. Finally, they propose a standardized list of sub-dimensions that should be considered when trying to measure CS.

Cagno et al. (2019) develop three Industrial Sustainability Performance Measurement Systems (ISPMS) based on a literature review and characterized by a different number of indicators. These three ISPMS (full ISPM, intermediate ISPM, and a core ISPM, depending on the number of indicators included) constitute a scalable tool, aimed to maintain adequate coverage of the three pillars of TBL in different firm contexts, with different levels of resource availability, skills, and awareness of sustainability.

Rahdari and Rostamy (2015) propose a system of Most Common Indicators (MCIs) to assess sustainability at the firm level, transcending the current literature and relying exclusively on the analysis of regulatory frameworks, management systems, guidelines, and rating systems. The proposed MCIs are grouped into a three-dimensional Environmental, Social, and Governance (ESG) framework.

In addition to the analysis of indicator lists proposed in literature reviews, the main standards of CSR and corporate sustainability were also taken into consideration to define the items and constructs of the scale. Among the myriad of standards and guidelines, we decided to concentrate on the most common and general, which are widely used, issued by authoritative organizations, and not dedicated to specific industries or topics. Another issue was the applicability to small and medium enterprises, which represent most businesses in Europe.

In the choice of standards, we considered the elements of the corporate social performance model, by including principle, process and performance/reporting standards. In particular, standards issued by the United Nations (UN) defining the general principles and aims of CSR and sustainable development were considered: the UN Global Compact and the UN Sustainable Development Goals.

In terms of process standards and guidelines, ISO 26000 and SA 8000 were included as management systems on social responsibility and accountability applicable to all kind of organizations. B impact assessment and Ecovadis were also used to define the items: both rating systems present an overall assessment of sustainability based on different dimensions and are often applied by small and

medium enterprises aspiring to become B Corp or included in the supply chain of multinational corporations.

Finally, the Global Reporting Initiative (GRI) standards were accurately incorporated within the scale proposal, as they are the most relevant sustainability standards and present a large and detailed list of performance indicators.

Methodology and preliminary analysis steps

According to previous studies (Latif et al., 2018; Clauss, 2017; Spieth & Schneider, 2016; Lechuga Sancho et al., 2021) the process of scale creation and validation can be successfully completed in the following steps: Step 1: definition of the domain of constructs and dimensions; Step 2: item generation and categorization; Step 3: expert validation; Step 4: pre-test and pilot test; Step 5: data collection; and Step 6: cross-validation.

As explained in the previous sections, the object tested in this study is CS implementation. More precisely, the proposed scale is aimed at measuring the level of implementation of sustainability practices; i.e., the implementation of specific company activities demonstrating the inclusion of all the relevant sustainability concerns in business operations (Lechuga Sancho et al., 2021). Following this premise, the first step of our analysis was focused on the definition of the relevant sustainability dimensions (Step 1). According to the existing literature and to the relevant standards, we could refer to several dimension definitions; for example, the traditional TBL dimensions (Elkington, 1998) i.e., economic, social, and environmental (Cagno et al., 2019); the ESG framework, which focuses on the environmental, social and governance dimensions (Rahdari & Rostamy, 2015, Antolín-Lòpez, 2016); or to Carroll's CSR pyramid (Carroll, 1991), which considers economic, legal, ethical, and discretionary dimensions, omitting the environmental aspect. However, we decided to blend the different approaches, in this way bridging the gaps in each individual approach: the ESG framework ignores the economic dimension; the TBL framework does not place governance in a distinct section; and the omission of the environmental dimension in CSR pyramid. By fusing these different perspectives we were able to give adequate consideration to both to the economic dimension, which is particularly significant for the small and medium firms to which we would like to address the survey; to the environmental and social issues, which are crucial in every current debate on firm sustainability; and to the governance issue, whose relevance is also confirmed by the standards, which in some cases (e.g., the B Impact Assessment, ISO 26000, and GRI standards), consider governance items separately and specifically, or consider governance as a section above the remaining ones.

In combining these different perspectives, we defined four content dimensions: economic, social, environmental, and governance. Moreover, coherently with the 5P sustainable development goals approach, we chose to name the selected dimensions as: prosperity, people, planet, and governance.

After having defined the four relevant dimensions, the analysis moved on to the identification of the constructs that are conceptual sub-categories that can be placed within the four dimensions (prosperity, people, planet, and governance), allowing us to define their content boundaries.

To do this, after referring to the standards and the relevant literature, we understood that there is no agreement regarding the definition of the constructs, or in their placement within the

sustainability dimensions. For example, should the anti-corruption construct be treated as a governance issue (as the BIA does) or as an economic issue (as the GRI does)? Should the sustainable supply chain construct be broken down in social and environmental items (as the GRI does) or should it be treated as a single construct due to the fact that it addresses just one stakeholder category (i.e., the suppliers)? Should the voluntary donation issue be considered an economic construct (due to its economic impact) or as a social construct (due to the stakeholder category addressed, for example the community)?

Starting from these questions and given the heterogeneity that characterizes both the literature and the standards, the definition of each construct was developed through a bottom-up process that began with single items that defined, through a formative approach (Isa & Reast, 2014; Clauss, 2017), the content boundaries of each construct and thus indirectly, the content of each dimension (Step 2).

To define the relevant content items, the first step was the identification of relevant indicators. To do this we focus on standards and literature reviews that suggest lists of indicators (Rahdari & Rostamy, 2015, Cagno et al., 2019, Antolín-Lòpez, 2016). However, while the indicators normally refer to specific qualitative or quantitative pieces of information that are generally comparable and able to demonstrate change chronologically (Rahdari & Rostamy, 2015), we refer instead to indicators, not with the aim of replicating them, but rather, with the goal of identifying their relevant contents. In other words, we aim to capture all relevant items, avoiding any duplications that will make our survey less effective and more difficult to complete. In addition, since the main objective of our study is to measure the level of implementation of sustainability practices, we measure the item identified by the indicators using a five-point Likert scale, widely used in previous survey methodology by scholars on CS in small and medium enterprises (Roy & Therin, 2008; Gadenne et al., 2009; Zhu et al., 2019; Lechuga Sancho et al., 2021). We define the five-point scale as follows: 1 = has never considered, 2 = has considered, 3 = has considered and worked on plan development, 4 = has organized implementation, and 5 = has implemented successfully.

Having identified and formally defined the items, we read them critically, with the aim of building relevant constructs in a formative way (Isa & Reast, 2014) and placing each of these within one of the four previously defined dimensions (prosperity, planet, people, and governance). In following this formative bottom-up process, we identify 32 constructs, grouped as follows: four for the prosperity dimension, six for the planet dimension, 15 the for people dimension, and seven for the governance dimension (Table 1).

Table 1

Dimensions and constructs

Dimensions	Constructs
Prosperity	PR1: Local economic development PR2: Indirect economic impacts PR3: Innovation PR4: Investment
Planet	PL1: Pollution prevention and reduction PL2: Sustainable use of resources PL3: Climate change mitigation and reduction PL4: Environmental protection, biodiversity, and habitat recovery PL5: Transport and mobility PL6: Environmental management systems
People	PE1: Work conditions and social protection PE2: Welfare PE3: Health and safety at work PE4: Training and professional development PE5: Diversity and gender equality PE6: Human rights at work PE7: Rights of outsourced workers PE8: Community Involvement PE9: Philanthropy and social investment PE10: Human rights PE11: Social and environmental assessment of suppliers PE12: Suppliers Involvement and partnership PE13: Product sustainability, health, and safety PE14: Traceability, labeling, and commercial communication PE15: Safeguard, warranties, data protection, and customer satisfaction
Governance	GOV1: Good, fair, and inclusive governance GOV2: Sustainability governance GOV3: Stakeholder engagement GOV4: Ethics and integrity GOV5: Fair operating practices GOV6: Transparency GOV7: Reporting

The next steps will be:

Step 3: Expert validation, aimed at assessing the questionnaire's face validity (whether items appear to measure sustainability dimensions); content validity (whether all important aspects of the dimensions are covered) and clarity of the wording.

Step 4: Pre-testing, aimed at testing the questionnaire's practicality (is it difficult to answer or not) and the responsiveness and ease of administration (questionnaire completion time) and piloting, test focused on the feasibility of the questionnaire (response rate, indicator collinearity, external validation).

Step 5: Data collection via online administration of the questionnaire to about 800 small and medium enterprises located in the northeast of Italy.

Step 6: The collected data will be randomly divided into two datasets for cross-validation.

As previously stated, the study is still in the initial phase, with only two of the six steps concluded. However, despite this, we can highlight preliminary contributions, in particular the difference from previous work on the derivation of sustainability scales. In detail, the proposed scale is characterized by only partial convergence with the previous literature and standards, both for the dimensions and the constructs as well as the item definitions. The reason for these differences may be attributable to the lack of consensus on the definition of a universally accepted concept of sustainability dimensions, constructs, and items.

Further, the work diverges from previous studies focused on sustainability indicators because it transforms the indicators collected from the literature and standards into items representing specific company practices. This is consistent with our aim to measure the level of implementation of sustainability practices, rather than the level of sustainability performance.

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Measuring shared value through sustainable business model innovation: the Flourishing perspective applied to Enel industrial plants

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Abstract

Although the concept of shared value had received relevant attention, only a few studies have empirically investigated how companies successfully manage and measure the creation of shared value through sustainable business model innovation (BMI). Drawing upon the Flourishing Business Canvas (FBC), our aim is to investigate how Enel – one of the world's largest companies in the renewable energy sector – implements and monitors sustainable practices of shared value creation in the construction, operating and repurposing phases of three industrial sites worldwide, namely the (1) Bungala solar plant in Australia, the (2) the Aurora solar plant in Minnesota (U.S.) and (3) the Teurel solar and wind plant in Spain.

We collected data on the Bungala industrial plant concerning the measurement process of shared value creation in the period between December 2019 and February 2022, through semi-structured interviews with plant managers and with global sustainable managers. We also triangulated these data with Enel's internal documents about the performance measurement of sustainable practices implemented, such as practices catalogues, feasibility maps and quantitative KPIs. We planned to collect similar data for Aurora and Teurel industrial sites.

Our preliminary findings on Bungala industrial site suggest that Enel strategically considered (1) the three contextual systems of Environment, Society and Economy and (2) the multi-stakeholder perspective of People described by the FBC to manage and monitor several sustainable practices that created shared value for internal and external stakeholders, thus enhancing its competitiveness while simultaneously advancing the economic and social conditions of the communities where it operates.

Keywords

Business Model Innovation; Sustainable Development; Shared Value; Flourishing Business Canvas.

Theoretical Background

Shared Value: ten years of scholarly debate

Shared value has been defined by Porter and Kramer (2011) as 'policies and operating practices that enhance the competitiveness of a company while simultaneously advancing the economic and social conditions in the communities in which it operates' (p.6). By recognizing the connection between competitive advantage and social issues, companies are conceived as capable to simultaneously increase their profitability and solve social problems (Porter & Kramer, 2006), offering a strategical solution to move beyond the trade-off between social and economic goals caused by conflicting institutional logics (Battilana & Dorado, 2010; Besharov & Smith, 2014).

More specifically, Porter and Kramer (2011) speculate that shared valued can be created by (1) reconceiving products and markets, which implies to serving the increasing social needs of customers such as environmentally friendly products or healthier food, (2) by redefining productivity in the value chain in a way that negative externalities and internal costs on firms originated by inefficient value chains are minimized and (3) by enabling local cluster development so that companies productivity is boosted and also greater local development is achieved.

Although the concept of shared value has proved extremely appealing to some of the largest corporations (Dembek, Singh & Bhakoo, 2016, p.244), it also attracted a number of critiques by management scholars (Crane et al., 2014; de los Reyes Jr, Scholz & Smith, 2017). For instance, Crane et al. (2014) claim that it narrowly focuses on win-win opportunities and it "does not provide guidance for the many situations where social and economic outcomes will not be aligned for all stakeholders" (p. 136). The failure to recognize social and economic tensions through an oversimplification of ethical and moral dilemmas in business may eventually lead companies to commit exclusively on the limited number of win-win opportunities (de los Reyes Jr, Scholz & Smith, 2017), which are not sufficient to solve our broader societal problems. Moreover, it can also originate decoupled communication strategies that do not reflect the actual corporate social responsibility commitment but only focus on shared value creation practices (Wickert, Scherer & Spence, 2016).

Despite the several concerns on the limited generalizability of the concept of shared value, Porter and Kramer (2011) did not portray it as the panacea of capitalism dysfunctionalities, stating that "not all societal problems can be solved through shared value solutions" (p. 17). In most of the business situations and contexts, companies do not face win-win opportunities (Dembek, Singh & Bhakoo, 2016), but cope with divergent stakeholder interests and competing logics that must be addressed with solutions such as selective coupling (Pache & Santos, 2013) or differentiation strategies (Smith, Gonin, & Besharov, 2013).

In their effort to moving past the stand-off between Porter and Kramer (2011) and Crane et al. (2014), de los Reyes Jr, Scholz & Smith (2017) introduced the norm-taking and norm-making ethical frameworks to help managers to address both the win-lose cases where the company profits but

society suffers and the lose-win cases where society gains but at significant cost to the company. However, to leverage such ethical frameworks, managers should be able to evaluate the potential contribution of their companies to society, while the existing literature has not yet addressed 'the question of how to quantify shared value to help make strategic choices' (p. 161). In line with what described above, Dembek, Singh & Bhakoo (2016) also highlighted in their literature review that 'the current efforts to measure shared value do not appear to offer a solution' and thus 'a question to be addressed by future research is that of how shared value should be measured' (p.245).

In our study, we aim at exploring if specific forms of sustainable business model innovation (BMI) can provide effective measurement tools for companies to evaluate the creation of shared value. In particular, we investigate how companies can leverage innovative artifacts of business models to accurately describe their economic, societal and environmental performance.

Business Model Innovation to evaluate Shared Value

One of the most acknowledged definitions of business model has been given by Amit and Zott (2001) who define it as 'the content, structure, and governance of transactions designed so as to create value through the exploitation of business opportunities' (p. 511). In order to underline the concept of value proposition, Teece (2010) also explained that "a business model articulates the logic, the data and other evidence that support a value proposition for the customer, and a viable structure of revenues and costs for the enterprise delivering that value" (p. 179).

Zott, Amit & Massa (2011) explain how value creation mechanisms can be object of innovation aimed at improving companies' performance. By strategically reconfiguring the interrelated activities of value creation, delivery and capture, BMI can have a direct effect on company performance (Zott & Amit, 2007, 2008). More specifically, the sustainability performance of companies has been demonstrated to be positively affected by specific forms of BMI (Evans et al., 2017; Stubbs & Cocklin, 2008).

Various scholars discussed how BMI can serve to the creation of shared value and improve the sustainability performance of companies (Florin & Schmidt, 2011; Mehera & Ordonez-Ponce, 2021; Michelini & Fiorentino, 2012). Although previous studies focused on the initiatives implemented to jointly create economic and social value, on the BMI drivers and leverages to create shared value, to the best of our knowledge, management literature has not yet investigated how BMI can be key to assess and measure the sustainability performance of companies.

Graphical, textual and schematical representations of business models are widely used to effectively evaluate 'all key classes of participants (partners, customers, suppliers) and value exchanges between them (tangible and intangible benefits and knowledge)' (Zott, Amit & Massa, 2011, p. 1026). For instance, the nine business model building blocks designed by Osterwalder and Pigneur (2010) are extremely diffused among practitioners who want to describe the rationale of how an organization creates, delivers and captures value financially.

However, in the case of shared value, the BMI literature has not yet provided new tools to measure the amount of shared value created and the resulting sustainability performance achieved. Thus, our study aims to use distinctive elements of the flourishing framework on strongly sustainable business models designed by Upward & Jones (2016) to empirically investigate how companies can evaluate, measure and represent the creation of shared value.

Flourishing Business Canvas

Upward & Jones (2016) identified a possibility for companies to flourish by proposing an ontology of business models that goes on a continuum from profit-normative to strongly sustainable business model. The flourishing goal consists of doing good to do well and it pays attention to environmental regeneration and social benefits in addition to financial performance (Hoveskog et al., 2018).

In case of companies' flourishing goal, 'BMI requires making strategic choices that recognize the importance of external factors such as the environment, society, the economy (markets), a range of stakeholders (including customers), and the value propositions that meet those stakeholders' needs' (Hoveskog et al., 2018, p. 4385).

Upward and Jones (2016) also designed a visual practitioner tool called Flourishing Business Canvas (FBC), which consists of (i) the three contextual systems of Environment, Society and the Economy; (ii) the four perspectives of Process, Value, People and Outcomes adopted by Kaplan and Norton (1996); and (iii) sixteen question blocks aimed at guiding practitioners towards the flourishing goal through BMI.

We believe that the FBC is a suitable tool to measure and represent the shared value created by companies as it includes the needs of all stakeholders and the value created for each of them, which is the strategic logic of shared value creation. Moreover, the three contextual systems of FBC take into account potential negative externalities of a company on Environment and Society, unmasking possible decoupling strategies hidden behind an alleged logic of shared value creation.

Therefore, in our research we use the FBC to explore how Enel, Italian energy company operating in the renewable sector , pursued a flourishing goal to create shared value in its industrial plants. In particular, we use some specific elements of the FBC to measure and represent the shared value created in those plants.

Research Methodology

Case selection

Enel is a multinational energy company that operates globally in more than 30 countries in 5 continents, with a net installed capacity of around 90 GW, of which 53 GW are from renewable energy, resulting the world's largest player in renewables by installed capacity. Enel adopted the so-called Open Power innovation approach with the aim of contributing to the sustainable energy transition thanks to open collaboration with start-ups, small, medium and large companies, universities, experts, and investors (Chesbrough, 2016). By leveraging a global ecosystem of open innovation, Enel crowdsources ideas and technologies coming from external actors. For instance, Enel created more than 20 Innovation Hubs around the world and manages the Open Innovability platform to launch on-line challenges that can be solved by individuals or organizations located anywhere.

Enel is a suitable case of company that successfully created shared value. Since 2014, Enel contributed to solve the social need of climate change by heavily investing in renewable power, passing from 119,51 millions of equivalent tones of direct GHG emissions in 2015 to 69,8 millions of equivalent tones of direct GHG emissions in 2019. However, Enel also increases its revenues in the same period, passing from 75,66 millions of euros in 2015 to 80,33 millions of euros in 2015. Enel is a win-win case where an increase of profitability and the contribution to solve social problems are jointly achieved.

We therefore selected Enel as case study to analyze how FBC can be used to measure the shared value created. More specifically, Enel adhered to the Shared Value Initiative[28], which is a platform for companies seeking to solve societal challenges through market solutions. Enel also applies a model of creating shared value in its industrial plants (Fig.1), which consists in six activities implemented at different stages of the plant lifecycle. [29]

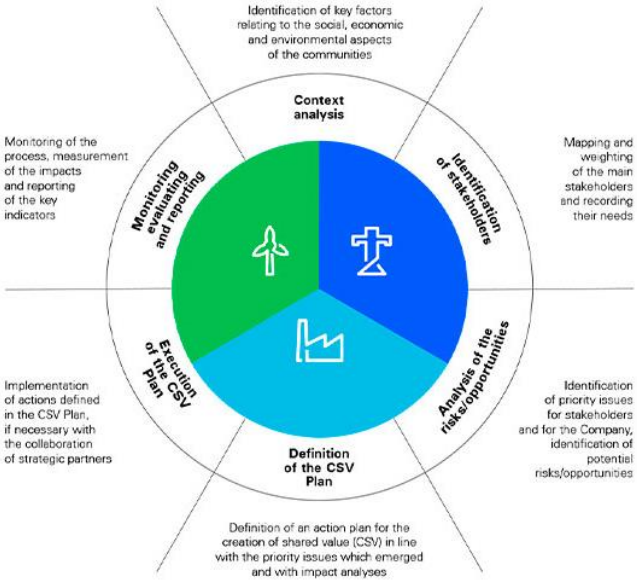

Figure 1 – The Creating Shared Value model of ENEL

Enel divides the life cycle of its industrial plants into 3 phases in which there is a differentiation of the shared value creation process: (1) the construction phase, (2) the operation phase and (3) the decommissioning or repurposing phase. For each phase, Enel has defined a catalogue of sustainable practices, which have been collected over time, that can be applied to the industrial plant in order to create shared value. In addition, Enel monitors its sustainability performance with specific KPIs, keeping also track of the stakeholders to whom the shared value is delivered.

Data collection

Our research will analyze three industrial plants managed by ENEL where the creating shared value model has been applied. The industrial plants are (1) the Bungala solar plant in Australia, (2) the Aurora solar plant in Minnesota (U.S.) and (3) the Teurel solar and wind plant in Spain. The data collection to measure the shared value created is detailed in Table 1. In particular, we already had 3 interviews with the two plant managers of Bungala solar plant and 7 interviews with global

[28] https://www.sharedvalue.org/
[29] https://www.enel.cl/en/sustainability/creating-shared-value/creating-shared-value.html

sustainable managers of ENEL. The interviews with the plant managers of Aurora and Teurel industrial sites are planned respectively for June and July 2022. We also had a two-day meeting with the employees of the shared value creation department in Rome and we had access to ENEL's internal documents concerning shared value creation in the period between January 2020 and January 2022. In particular, these documents are (1) the catalogues of the sustainable practices of the industrial plants (one for the construction phase and one for the operational phase); (2) the feasibility maps of the sustainability practices for the three analysed plants; (3) the KPIs concerning the sustainability performance of the plants.

Industrial site	**Direct interviews**	**Internal documents**	**General interviews, documents or meetings**
Bungala solar plant	3 interviews with the two plant managers (1 hour each interview)	- Feasability map of sustainable practices; - KPIs on sustainability performance of the plant	- 7 interviews with global sustainable managers of ENEL - Catalogue of sustainable practices for the construction phase - Catalogue of sustainable practices for the operating phase - Two day meeting on the 19th and 29th of December 2019
Aurora solar plant	2 interviews scheduled for June 2022	- Feasability map of sustainable practices; - KPIs on sustainability performance of the plant	
Teurel solar and wind plant	2 interviews scheduled for July 2022	- Feasability map of sustainable practices; - KPIs on sustainability performance of the plant	

Table 1 – Data collection

Data analysis

We used specific business model elements of the FBC to categorize and a analyze the data collected on Bungala industrial site. Through an active categorization process, we used (1) the three contextual systems of Environment, Society and Economy and (2) the multi-stakeholder perspective of People described by the FBC to measure the shared value created by the sustainable practices implemented by ENEL. Our analysis is limited to the industrial plant of Bungala, as we still have to collect all the data for the other two industrial plants.

Results and Discussion

The following tables contain the results of the shared value created through the implementation of sustainable practices in Bungala industrial plant, divided for the construction phase (Table 2) and operational phase (Table 3).

Practice	**Contextual system (FBC)**	**Beneficiary stakeholder (FBC)**	**Data on shared value creation (societal value)**
Employment of skilled aboriginal people in the SCS (deal with contractor B.A.C.)	Social	Aboriginal local people	30% of skilled aboriginal people employed in the SCS → 1500 site employees (Aborigenal people)

Employment aboriginal people not skilled with TRAINING and MENTORING service	Social	Aboriginal local people	70 aboriginal people trained, mentored and employed in the SCS
Heritage training by member of Nukunu community on the culture and history of Aboriginals	Social	Aboriginal local people	1400 workers of SCS received training → 2 times per week in 1 month
Students of Porto Augusta's schools visiting the plant and received training	Social	Students of local schools	500 students visiting Bungala I and received info on history and culture
Stem Program (for free) for aboriginal students in partnership with Pollyfarmer foundation	Social	Aboriginal students of local schools	15 students received traning and competences on solar plants for a total value of the program equal to $50 k even (even if provided for free)
Reactivation of the railway to transport equipment (no water for dust, less CO2, less diesel)	Environment	Natural environment	190 t di greenhouses emissions (CO2) saved 68000 L Diesel saved 40% of water saved
Waste recycle program:	Environment	Natural environment	40% of Non Hazardous waste was Recycled 30% Reused soil 0% donated materials

Table 1 – Shared value created in the construction phase of Bungala

Sustainable Practice	**Contextual system (FBC)**	**Beneficiary stakeholder (FBC)**	**Data on shared value creation (societal value)**
Permanent local employment program: aboriginal people involved in the operational phase	Social	Aboriginal local people	4 aboriginal people employed on site by contractor that have been trained
Sustainable tourism through a partnership with local touristic operator	Social	Tourist agency and students	Approximately 500 students visiting the Bungala sustainable plant

Table 2 – Shared value created in the operational phase of Bungala

The preliminary results show how the environmental, social and economic data on sustainability performance of ENEL's industrial sites can be effectively categorized according to elements of the FBC, to highlight how shared value has been created within each contextual system. Moreover, it is possible to highlight the beneficiary stakeholders to whom value is delivered by each individual practice, stressing the importance of a multi-stakeholder perspective. The quantitative data concerning the shared value created by each practice provide an accurate performance measurement, highlighting the centrality of extra-financial indicators and dimensions when accounting for social and environmental issues.

Enel uses a shared value creation model that enables the planification of sustainability practices and the measurement of their benefits for the local communities and stakeholders with whom it works. Through BMI, using the FBC, it is also possible to measure the shared value created.

In conclusion, these preliminary data suggest that it is possible to track the win-win opportunities through BMI and that there are already applicable business models that represent and measure the shared value created.

Future development of this research project will mainly focus on the collection and analyses of quantitative and qualitative data for the Aurora and Teurel industrial sites, in order to provide a complete understanding on how Enel manage the creation of shared value in the construction, operating and repurposing phases.

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How to use management control systems to embed sustainability in the corporate culture of your business model?

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Keywords

sustainability, management control systems, corporate culture

Introduction

Both sustainability and Management Control Systems (MCS) are topics that have been extensively discussed in the literature for quite some time. However, MCS focusing on sustainability are often identified as an area for further research opportunities. We have found some conceptual studies regarding the design of MCS aimed at sustainability (Arjaliès, Mundy, 2013, Lueg, Radlach, 2016, Maas, Schaltegger & Crutzen, 2016), and several empirical studies on this topic (Ligonie, 2021, Ditillo, Lisi, 2016, Narayanan, Boyce, 2019, Arjaliès, Mundy, 2013). However, numerous studies confirm the need for further empirical research in this field (Gond et al., 2012, Hartmann, Perego & Young, 2013, De Villiers, Venter & Hsiao, 2016, Ditillo, Lisi, 2016, Sundin, Brown, 2017, Latan et al., 2018, Ligonie, 2021, Joshi, Li, 2016) in a systematic literature review, Traxler et al. (2020) reveal that current literature lacks empirical, theory-guided, and critical analyses. According to our knowledge, our research is the only empirical study comparing and analyzing the MCS from different perspectives of diverse companies that focus on sustainability.

This need for further empirical research on the topic of MCS and sustainability led us to pose the following research question:

How are MCS focusing on the creation of sustainable value designed in practice?

Extant accounting and control literature commonly views management controls as a means to direct an organization towards strategic and operational goals (Ouchi, 1977, Gond et al., 2012, Simons, 1995, Tucker, Thorne & Gurd, 2009, Langfield-Smith, 1997, Ferreira, Otley, 2009). This traditional view defines MCS through its cybernetic and processual nature. In our study, we define MCS more holistically as "systems, rules, practices, values, and other activities management put in place to direct employee behavior" (Malmi, Brown, 2008, p. 290).

Our findings show that sustainability is a crucial element in the organization's culture of a sustainable business model and that MCS entail essential tools to embed sustainability in the organization's culture. A business model can be defined as "a description of how value creation between parties or partners— based on certain principles—is organized, at a particular moment, in a specific context, and given available resources" (Jonker, Faber, 2021, p. 20), while a sustainable business model is aiming at sustainable value creation. Sustainable value creation is a concept open to many interpretations and is often seen as a clichéd term. Based on our findings, we have defined sustainable value creation as finding a balance between creating ecological-, social- and economic value (Jonker, Faber, 2019), referring to the Triple Bottom Line approach that comprises these three pillars of sustainability (Carroll, 1979, Elkington, 1994).

Methods

We engaged twenty companies based on purposive sampling to enable this exploratory qualitative analysis. The most crucial criterion for selecting these companies was an active focus on creating sustainable value so that the objects to be investigated fall within the scope of this research. In order to determine whether a company is expected to be sensitive to MCS aiming for multiple value creation, at least two of the criteria below must be met:

- The presence of a sustainability manager
- The integrated report, which shows that sustainability plays a vital role in the company's strategy
- High ranking on Sustainability indices (e.g., the Dow Jones Sustainability Index)
- Winning sustainability prizes/sustainability awards.

However, even if a company meets all the four criteria, it is not guaranteed that this company focuses on multiple value creation. Greenwashing is a common practice regarding sustainability (Boiral, 2013). Therefore, in addition to the criteria mentioned above, preliminary exploratory discussions with the (potential) interviewees were held to determine the intentions and actual focus regarding sustainability.

The anonymized sample selection is presented in table 1:

Company	Sector	Revenue (€)	Employees	Shareholder
1	Food	100 mln – 1 bln	100 – 1k	Private Owned
2	Manufacturing	1 bln – 10 bln	10k – 100k	Listed
3	Agriculture	1 bln – 10 bln	10k – 100k	Private Owned
4	Food	10 mln – 100 mln	100 – 1k	Private Owned
5	Agriculture	10 bln – 100 bln	10k – 100k	Private Owned
6	Manufacturing	1 bln – 10 bln	1k-10k	Listed
7	Logistics	1 bln – 10 bln	10k – 100k	State Owned
8	Manufacturing	1 bln – 10 bln	10k – 100k	Listed
9	Food	100 mln – 1 bln	100 – 1k	Listed
10	Agriculture	100 mln – 1 bln	1k-10k	Private Owned
11	Manufacturing	100 mln – 1 bln	1k-10k	Private Owned
12	Manufacturing	1 bln – 10 bln	1k-10k	State Owned
13	Real Estate	100 mln – 1 bln	100 – 1k	Listed
14	Service	1 bln – 10 bln	10k – 100k	Listed
15	Financial Services	1 bln – 10 bln	10k – 100k	Cooperative
16	Service	1 bln – 10 bln	1k-10k	Association
17	Financial Services	1 bln – 10 bln	10k – 100k	Listed
18	Financial Services	1 bln – 10 bln	1k-10k	Listed
19	Manufacturing	1 mln – 10 mln	1-10	Private Owned
20	Manufacturing	10 mln – 100 mln	100 – 1k	Private Owned

Table 1: Characteristics of the 20 selected companies.

The research design involved data triangulation (Modell, 2005) through reliance on a multiplicity of informants and data sources (Flick, 2002, Patton, 2002). Data were collected using various evidential sources: public business reports, semi-structured interviews, direct observation during site visits, and internal documents of the companies. In total, we conducted 53 interviews across the twenty selected organizations.

Data were analyzed through a theory-building process using the open, axial, and selective coding stages of Grounded Theory (GT) (Strauss and Corbin, 1990).

Theory

Due to our GT approach, we did not choose a particular control system but divided the control elements into cultural and non-cultural controls well reflected by social and technical controls (Gerdin, 2020).

Social controls typically imply that managers seek to more *indirectly* influence subordinates' behavior through shaping their mindset in the hope that they will internalize the values and beliefs of the organization and act accordingly (Abernethy, Dekker & Schulz, 2015, Simons, 1995). Examples of social controls include the use of vision, mission, and strategy statements (Simons, 1995, Merchant, Van der Stede, 2017), employee socialization (Abernethy, Brownell, 1997, Bedford,

Malmi, 2015) and employee selection processes (Ouchi, 1979, Abernethy, Dekker & Schulz, 2015, Campbell, 2012, Merchant, Van der Stede, 2017).

In contrast, technical control seeks to influence employee behavior *directly*. As put by Kärreman and Alvesson (2004, p. 152), for example, such MCS work primarily "with plans, arrangements, and systems focusing on behavior and/or measurable outputs." Hence, technical types of MCS have primarily been associated with the use of behavior controls such as rules and routines (Gerdin, 2005, Kreutzer et al., 2016, Ouchi, 1979), and output controls such as the use of PMSs, budgets, and employee incentive systems (see e.g. Grabner, 2014, Simons, 1995, Merchant, Van der Stede, 2017).

Also, the interdependencies of control elements (Grabner, Moers, 2013) are relevant in our analysis. However, we do not assume any ex-ante interdependencies between the control elements. Instead, we propose to view the MC package of a given organization as containing the complete set of MC practices regarding sustainability, thus mirroring the organization's control environment in this respect. Therefore, we will search for interdependencies between the determined control elements in our analysis. The two types of interdependencies between MC practices, i.e., complements and substitutes, are defined by Grabner & Moers (2013) as follows:

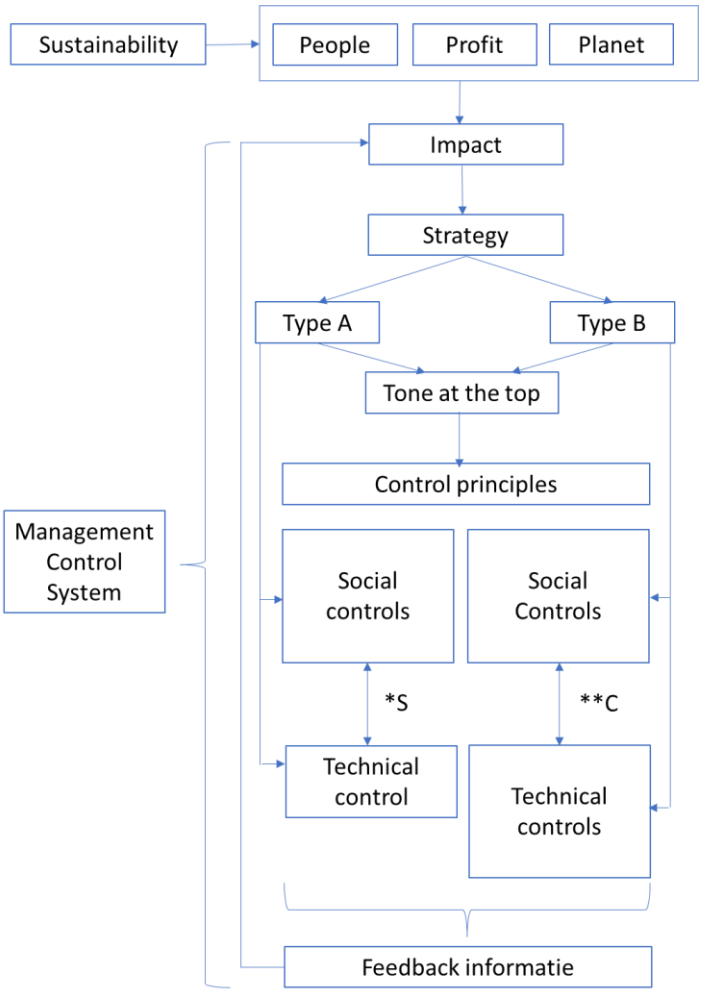
MC practices are complements when the benefits of one MC practice increase with the use of (some) other MC practice (and vice versa).

MC practices are substitutes when the benefits of one MC practice decrease with the use of (some) other MC practice (and vice versa).

Findings

Figure 1 represents our empirical findings regarding MCS focusing on sustainable value creation. These values are not limited to the organization itself, but concern the impact of the organization's products over the whole value chain. The value creation of the three P's over the whole value chain is incorporated into the organization's strategy.

In our findings, a distinction became apparent between companies established for a sustainable purpose, further called Type A, and companies transitioning towards a sustainable business model, further called Type B. For both types of companies, support from the top (the CEO in particular) is considered crucial for successfully implementing a sustainable business model. However, we recognized different patterns regarding embedding sustainability in the cultures of Type A and Type B organizations and the interdependencies of social and technical controls in this respect. Social controls play an essential role for Type A and Type B organizations, be it with different accents. For Type A, sustainable values are to a significant part internalized in the organization, which means that Type A can rely on these values in their control structure. For Type B, sustainable values are internalized in the organization to a lesser extent, and social controls are essential tools to internalize these values in a significant part of the organization.



*S = Social and technical controls are **S**ubstitutes
C = Social and technical controls are **Complements

Figure 1: Overview of MCS for Type A and Type B companies.

For Type A companies, social and technical control function as substitutes. Here, MCS mainly focus on social controls. These MCS rely on shared sustainable values as a control mechanism, substituting technical controls. For Type B companies, social and technical controls are complementary to each other. Social controls focus on embedding a sustainable culture in the organization and are supported by technical controls to direct employees' behavior in a sustainable direction and enhance the process of embedding sustainability in the culture. These MCS focus on embedding shared sustainable value in the organization and cannot yet rely on shared values as the leading social control mechanism without the support of technical controls as complements to social controls.

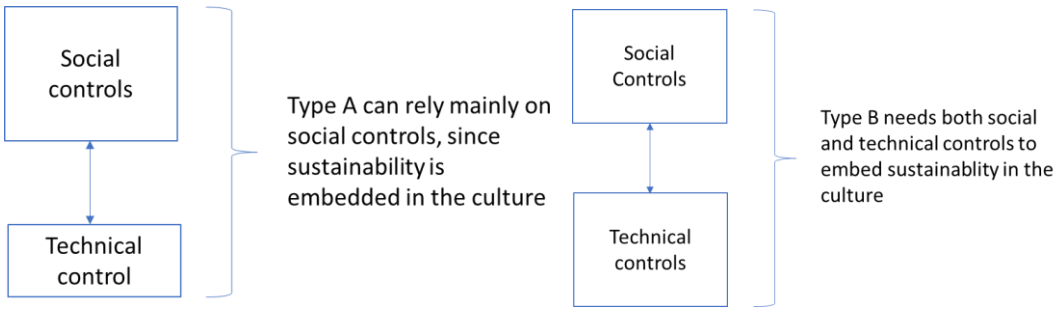


Figure 2a: Type A Culture and control Figure 2b: Type B Culture and control

Discussion and conclusions

Our study indicates that to facilitate the transition to a sustainable business model, a strong focus of MCS on embedding a sustainable culture in the organization is crucial. Although this conclusion is not congruent with current literature, our findings do not seem to contradict most studies and confirm several current literature findings. Our analysis shows that social and technical controls play a crucial role in this process, in line with Ditillo and Lisi (2016) and illustrates that social controls increase the effectiveness of technical controls confirming several studies (Durden, 2008, Norris, O'Dwyer, 2004, Tregidga, Milne & Kearins, 2014). Our analysis also points out that social controls alone are insufficient and need to be supported by technical controls, aligning with Laguir et al. (2019) and Narayanan and Boyce (2019). However, our main argument, that MCS focus on embedding a sustainable culture in the organization using both social and technical controls, is not commonly found in the literature. We found significant attention in the literature for diagnostic controls and sustainability (Guenther, Endrikat & Guenther, 2016). The main focus of most studies is on one specific control element (for example, see Guenther et al. (2016)) or on an existing control framework (Narayanan, Boyce, 2019, Laguir, Laguir & Tchemeni, 2019). However, this limits their conclusions to the boundaries of the particular control element or framework. These limits explain Traxler et al.'s (2020) findings of their systematic literature review on the topic that the existing literature does not go beyond an instrumental and functionalistic perspective instead of our more holistic approach. We argue that our GT approach, combined with a wide variety of sustainable companies in our selection being interviewed from different angles, allows this study to reveal our main argument.

This study contributes to the literature in several ways. In general terms, it provides in-depth and nuanced insights into the way companies design MCS focusing on multiple value creation, answering a call for more management accounting research in this area (De Villiers et al., 2016; Ditillo and Lisi, 2016; Gond et al., 2012; Hartmann et al., 2013; Joshi and Li, 2016; Latan et al., 2018; Ligonie, 2021; Sundin and Brown, 2017). In particular, it shows that MCS focusing on corporate sustainability are designed to embed sustainability in the corporate culture and explains how these MCS are enacted in practice and understood in empirical settings regarding this process. It also extends the theoretical conceptualization of control elements focusing on culture (Merchant and Van der Stede, 2017; Ouchi, 1979; Simons, 1995). It clarifies the distinction between cultural control, which relies on shared sustainable values (Ouchi, 1979) and cultural control, which intends to internalize shared sustainable values (Merchant and Van der Stede, 2017; Simons, 1995). The general understanding in literature is that only social controls focus on culture as a control element (Merchant and Van der Stede, 2017; Simons, 1995). However, our study shows that technical controls can also contribute to the process of internalizing shared sustainable values. Due to our GT approach resulting in a more holistic approach, our study shows the interactions between various relevant control elements rather than focusing on an instrumental and functionalistic perspective found in the existing body of literature (Traxler et al., 2020). With this approach, our research also contributes to the current discussion in the literature about interdependencies between controls (e.g. Abernethy et al., 2015; Gerdin et al., 2019; Kreutzer et al., 2016), providing evidence that social and technical controls can be built on a substitution logic (Chenhall, 2003; Govindarajan, 1984; Ouchi, 1977; Ouchi, 1979) but also act as complements (Bedford et al., 2016; De Jong et al., 2014),

depending on certain contextual conditions. We identified two types of companies in this respect. Type A companies that are founded for a sustainable purpose and companies that are in a transition process towards sustainability, called Type B companies. For Type A companies, social and technical control function as substitutes. Here, MCS mainly focus on social controls, with significant elements of clan control (Ouchi, 1979; Schein, 2010). These MCS rely on shared sustainable values as a control mechanism, substituting technical controls. For Type B companies, social and technical controls are complementary to each other. Social controls focus on embedding a sustainable culture in the organization and are supported by technical controls to direct employees' behavior in a sustainable direction and enhance the process of embedding sustainability in the culture. These MCS focus on embedding shared sustainable value in the organization and cannot yet rely on shared values as the leading social control mechanism without the support of technical controls as complements to social controls.

This study also has important managerial implications. It provides accountants and other practitioners with rich insights on examples and challenges of MCS focusing on multiple value creation. These insights are precious given, on the one hand, the paucity of empirical evidence on the topic and, on the other hand, the ever-escalating pressures companies are facing concerning the sustainability agenda and upcoming legal requirements. In particular, by highlighting the importance of various forms of control elements, our analysis reveals that different interdependent control elements are needed to deploy a sustainability strategy. In this respect, our in-depth description of how Type A and B companies design MCS will provide helpful guidance to practitioners faced with the challenge to design a MCS focusing on sustainability.

A limitation of this study is that due to the COVID-19 pandemic we were able to only physically visit a few companies, whereas most of the conducted interviews were held online. Therefore we had limited possibilities to collect and analyze field notes. Although we believe that additional fieldnotes could have contributed to our findings, we do not anticipate that these fieldnotes would have fundamentally changed our conclusions. Another limitation of our findings is that all our selected companies are Dutch. Since culture plays an essential role in our findings, this study could lead to other outcomes when performed in other countries.

To conclude, this study created some fruitful insights in the complexities of MCS for sustainability and culture. As research advances, certainly more fine-grained classifications, descriptions, and dimensions of these MCS can be developed. Future research can verify the effectiveness of identified patterns based on a quantitative research approach. We also see performing longitudinal case studies on the development of both MCS of Type A and Type B companies as relevant future research possibilities. In addition, fascinating new insights can emerge involving more blue-collar employees in the study. Also, the potential role of Accounting and Control, including the accounting system, regarding diagnostic control mechanisms could be further analyzed.

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A tool to support more sustainable circular business models

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Extended abstract

Circular business models offer a promising way to transition from the current take-make-waste, linear ways of production and consumption (Tukker, 2004, 2015). However, 'circular' business models are not inherently sustainable, and can have unintended rebound effects that offset the intended environmental gains of the new business model (Zink and Geyer, 2017; Blum, Haupt and Bening, 2020). This can be in the form of more consumption, as a result of economic savings from increased efficiency and affordability (Zink and Geyer, 2017; Warmington-Lundström and Laurenti, 2020). For example, when consumers make use of a second-hand or rental clothing platform, they might buy or rent more products than they would have before because they perceive it to be a "sustainable" alternative (Johnson and Plepys, 2021). Thus, despite the initial business goal of extending product lifetimes, the overall consumption might increase (Niessen and Bocken, 2021). Failing to create net positive environmental impacts from circular business models can inhibit companies' progress towards achieving their sustainability targets. Further, they can risk falling behind the competition in a race to comply with new regulations (consider, for example, the new anti-greenwashing laws in Denmark, UK and France) (EMF, 2021; CMA, UK, 2022; Lorenzo, 2022), and as a result might lose market share. Thus, rebound effects must be kept in mind while designing new circular business models.

The aim of this study is to provide a tool that can help ensure net positive impacts of new circular business models and avoid unintended consequences. Circular business models are not yet common in the private sector (Bocken, Ritala and Huotari, 2017), and in most cases, companies wishing to transform must discover new ways of doing business. As a result, companies often rely on business model experimentation to test and validate these new types of business models before scaling them to their entire market (Bocken, Weissbrod and Tennant, 2016; Bocken, 2021). Business model experimentation refers to the iterative process of trialing new business innovations in order to validate ideas, reduce risks and make more evidence-based decisions (Blank, 2013; Bocken, Weissbrod and Tennant, 2016). Previous studies have suggested that 80-90% of a product's environmental impact is locked-in in the design phase itself (Millet *et al.*, 2007; Bocken, Schuit and Kraaijenhagen, 2018; Konietzko, Bocken and Hultink, 2020). We suggest that this lock-in of

environmental impact is similar when designing new circular business models (Mont, 2002, 2004; Tukker, 2015). We therefore focus the tool on this early phase of experimentation with new business models. The target group is business/product designers, sustainability managers, innovators, and entrepreneurs.

Business managers and innovators that experiment with circular business models, are typically interested in creating positive environmental outcomes, in order to stand out from the competition (Baldassarre *et al.*, 2020). However, they often do not measure the impact reduction potential of these new models when designing them (Baldassarre *et al.*, 2020; Das, Konietzko and Bocken, 2022). There are two reasons for this. First, the practitioners often lack the expertise, time and resources required to measure environmental impact (Das, Konietzko and Bocken, 2022). Second, measuring environmental impact has a lower priority than making a profit (Baldassarre *et al.*, 2020). As a result, companies primarily use 'rules of thumb' to make decisions about future environmental impact, especially in the highly uncertain experimentation phase (Bocken and Antikainen, 2018; Das, Konietzko and Bocken, 2022). Since most of the environmental impact is determined in the experimentation phase, this is also where appropriate guidance on potential environmental impact is likely to have the greatest influence.

The more traditional types of environmental impact measurement methods, such as life cycle assessment (LCA) and mass flow analysis (MFA) are still quite important and useful to assess existing products and services. But we observed a gap in the experimentation phase – a phase of high uncertainty, limited data, time, and resources available to engage with these traditional measurement methods. This is also important for organizations without the operational capacity to conduct a full LCA or MFA. We propose a new tool that can help companies move towards more sustainable outcomes as they trial new circular business models. This tool combines circular business models with the principles of lifecycle thinking, waste hierarchy, and keeps in mind rebound effects; while emphasizing ease of use compared to the LCA or MFA. The tool aims to guide companies in navigating the numerous business model possibilities designers face in the experimentation phase – and nudge them towards the ideas with higher environmental impact. This tool does not aim to give concrete impact measurement numbers like the LCA, but instead adds more evidence-based qualitative guidance to the methods (rules of thumb) that are already being used by practitioners to measure impact (Das, Konietzko and Bocken, 2022).

This study uses the design science research method to develop and test the tool in practice. This method provides a problem-solving framework that seeks to solve real-life problems, by developing and validating new artifacts, like products, tools or methods. The method follows six steps: identifying the problem, defining objectives of the solution, developing the solution (in our case a tool), demonstrating it, as well as evaluating and communicating it (Peffers *et al.*, 2007; vom Brocke, Hevner and Maedche, 2020). In line with this, we first conducted a series of exploratory interviews with circular business innovators, designers and managers to determine what they need in an ideal environmental impact measurement tool, tailored for the business experimentation phase. These findings will be combined and triangulated with theoretical gaps, that were identified from literature (Bocken *et al.*, 2019; Pieroni, McAloone and Pigosso, 2019). The tool will then be tested in multiple workshops and further developed based on feedback from practitioners.

The primary contribution of this study will be a novel tool that can support businesses in exploring more sustainable circular business model opportunities during the experimentation phase.

Secondly, this study will produce an empirical understanding of the needs of practitioners regarding the support they need during circular business model innovation.

A growing number of companies are experimenting with circular business models (Bocken, 2021), however, most do not take into account the environmental impact that their business model actually might achieve in the design phase (Das, Konietzko and Bocken, 2022). This can result in unintended rebound effects that offset the positive environmental gains that they aim to achieve (Zink and Geyer, 2017). The tool this study proposes could help companies in estimating the potential environmental gains of their new business model in the design phase, where most environmental impact is determined. This would thus aid them in successfully transitioning to a more circular business model. Future research can work on developing business model innovation tools that can support innovators more accurately based on the needs reported from the empirical investigation conducted by this study.

Keywords

Circular Economy, Circular Business Models, Environmental Impact, Business Model Experimentation, Nudging Tool

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Between Two Taxonomies – Assessing Sustainable Business Model Patterns Based On The EU Green And Social Taxonomies

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Extended abstract

Climate change—or, as it is increasingly termed, the climate crisis (Kunelius and Roosvall, 2021)—has become a critical issue for businesses over the last decade. The growing pressure on companies to respond with greater urgency and substance to the climate crisis requires them to reassess and reconfigure their business models. As Larry Fink, CEO and chairman of BlackRock, wrote in his 2021 letter to CEOs, "there is no company whose business model won't be profoundly affected by the transition to a net zero economy" (Fink, 2021, para. 14). While this moment highlights the value of the sustainable business models (SBMs) discourse in supporting companies in their transition journey, it also foregrounds the challenges of utilizing SBM frameworks to assess companies' sustainability performance.

While there is no single, common definition of sustainability (Süß, Höse and Götze, 2021), the understanding of sustainability in the SBM discourse is generally informed by the Brundtland Commission's articulation of sustainable development (e.g., Schaltegger, Hansen and Lüdeke-Freund, 2016), reflecting a triple-bottom line perspective allied to the stakeholder theory. The result is a somewhat ambiguous framing of sustainability, which allows companies to have different interpretations of what sustainable value creation stands for across the ecological, social, and economic dimensions of value creation (Lüdeke-Freund *et al.*, 2020). While this approach may have helped the dissemination of the SBM discourse, it has also contributed to the difficulty in evaluating the sustainability of business models and their overall impact. As Bradley et al.'s (2020) review of SBM frameworks suggests, there is a gap in SBM frameworks in terms of clarity about what sustainability means, including social and environmental goals and impacts.

The urgency of the climate crisis and the consequent need for a more rapid transformation of businesses require that more attention be addressed to the aforementioned gaps. Already, it is evident that concerns over climate are generating sharp critique of the pursuit of sustainability practices, priorities, and frameworks in business that have for the most part produced only incremental changes (see, e.g., Bebchuk and Tallarita, 2020; Godelnik, 2021; Kishan, 2021). These

calls necessitate further clarity to allow for a better distinction between substantive and negligible efforts on sustainability, especially in the context of addressing climate change. Doing so depends, among other things, on contextualizing sustainability within thresholds (Baue, 2019). According to Brozovic (2020), the consideration of thresholds, such as the planetary boundaries, is fundamental to ensure that an SBM is in line with strong sustainability principles.

One development in response to the growing need for clarity and contextualization around efforts to make businesses more sustainable is the creation of the European Union (EU) taxonomy for sustainable activities (also known as the EU green taxonomy). Driven by the urgency of environmental and climate risks and the need to support the implementation of the European Green Deal, the EU has created this taxonomy, which is "a common classification system for sustainable economic activities" (European Commission, no date). The green taxonomy establishes clear and detailed screening criteria to determine which economic activities are environmentally sustainable and which are not (Lucarelli *et al.*, 2020). The criteria include substantial contribution to at least one of six environmental objectives (e.g., climate change mitigation and adaptation, pollution prevention, etc.), doing no significant harm to the other five objectives, and complying with minimum social safeguards and technical screening criteria (EU Technical Expert Group on Sustainable Finance, 2020). In addition, the taxonomy considers not only activities that directly make a substantial contribution but also activities that enable other sustainability activities.

The green taxonomy's focus on environmental goals presents gaps in terms of considering and assessing social objectives. To overcome this gap, a subgroup on social taxonomy in the EU Platform on Sustainable Finance has been developing a structure for a social taxonomy, which was shared in a draft report in 2021 (Platform on Sustainable Finance, 2021). The proposed structure of this social taxonomy includes a horizontal dimension, which considers the impact of activities across the value chain on different stakeholder groups (e.g., ensuring decent work), and a vertical dimension, which focuses on the contribution of products and services to promote adequate living conditions (e.g., access to food and water). Like the green taxonomy, the social taxonomy focuses on articulating substantial contribution and "do no significant harm" (DNSH) mechanisms. The draft report also considers the potential relationship between the social and green taxonomies, suggesting that there are multiple options, ranging from an integration of the two taxonomies into a single taxonomy all the way to considering them separately. "A possible relationship should respect the principle of equivalence of the social and environmental taxonomies," the report's authors suggest (Platform on Sustainable Finance, 2021, p. 53).

The work conducted so far on the green and social taxonomies offers a unique opportunity to assess SBMs based on their alignment with substantive response to critical environmental and social challenges, with consideration of the climate crisis in mind. To do so, in this paper, the author develops a model informed by the option presented in the draft report of incorporating both taxonomies into one, with a list of environmental and social objectives as well as DNSH criteria. This model incorporates the robustness and strictness of the taxonomies' assessment criteria, while creating four levels of alignment with the taxonomies' criteria, from full alignment with both environmental and social criteria to no alignment with either set of criteria. This design is intended to ensure a holistic approach to sustainability, emphasizing the urgency of addressing climate change and the need to do so in a just manner.

To test the assessment capabilities of this model, the paper presents its application to an SBM framework. The author chose the SBM pattern taxonomy, which was developed by Lüdeke-Freund et al. (2018) and includes 45 SBM patterns that are grouped into 11 pattern groups. This taxonomy is very detailed and comprehensive, with clear representations of the different sustainability dimensions (ecological, social, and economic). While it aims to serve as a design tool for businesses, it does not provide a mechanism to assess the sustainability performance of the different patterns in terms of substantial contribution and compliance with minimum safeguards. As such, the model presented in this paper can provide a complementary tool for practitioners interested in applying SBMs meaningfully.

Using the detailed description of SBM patterns and groups presented in Appendix I of the pattern taxonomy paper (Lüdeke-Freund *et al.*, 2018), the proposed model is used to assess each pattern, evaluating it according to the green and social taxonomy criteria, categorizing it into one of the four levels defined in the model, and providing it with a sustainability rating accordingly (e.g., "very high" corresponding to the first level, "high" the second level, and so on).

This paper presents the design of the model as well as the results of the assessment process, followed by a discussion of the possible advantages of applying the EU green and social taxonomies in assessing SBMs. The aim of this inquiry is to show the potential of the EU taxonomies to complement current SBM classifications, creating an effective framework to help assess which SBMs could support a just transition to a low-carbon economy.

Keywords

Green taxonomy, social taxonomy, sustainable business model, sustainability, climate change.

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A Roadmap to Future Corporate Sustainability

Findings From a Danish Multi-case Study

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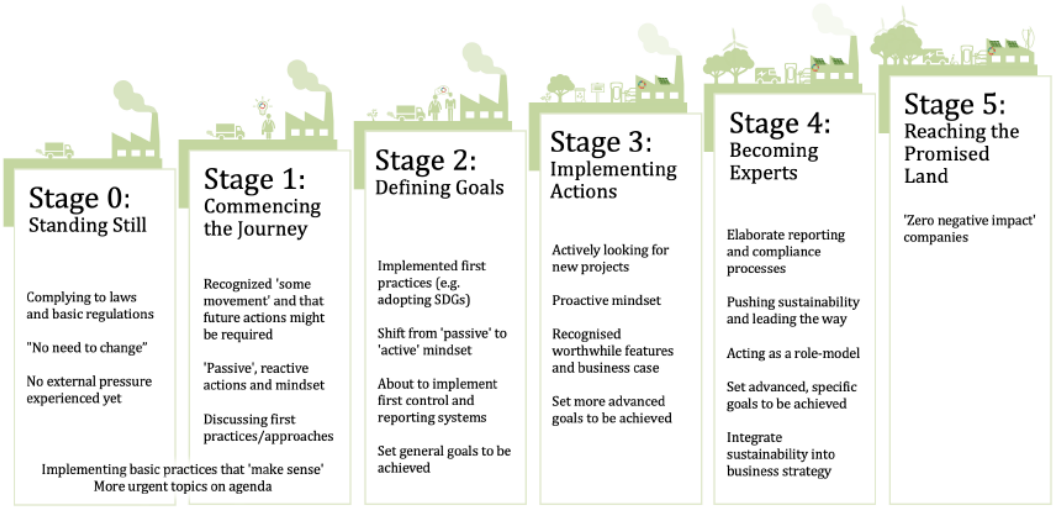
Extended abstract

The need for business models to become more sustainable is widely acknowledged nowadays (Tunn et al., 2019). There exists growing interest in developing more sustainable business models through e.g., the adoption of circular economy principles (see for example Bocken et al., 2017) or intensifying the contribution of business models towards circular economy practice (Lüdeke-Freund et al., 2019). While this and related research provides useful insights into more sustainable practice, many companies and especially small und medium-sized companies (SMEs) face difficulties in assessing their current state of sustainability (Benn et al., 2014), which represents an important step at the beginning of implementing activities for improved sustainability performance. In addition, the processes within companies that have already progressed further towards sustainable practice are oftentimes not sufficiently explicit or visible at all (Dhanda & Shrotryia, 2020). Therefore, and to support the development towards more sustainable business models, this paper aims to answer the following generic question: *how can SMEs become more sustainable and what are characteristics of this process?*

The data set comprises information from 21 companies primarily based in Southern Denmark. The Danish context is of special interest as Denmark has been a forerunner in promoting ambitious corporate social responsibility (Toft & Rendtorff, 2021) and as such contains both companies that have made significant advances towards sustainable practice as well as companies that are only at the beginning of that avenue (see also Kristensen, 2016). The data consist of 30 semi-structured interviews (suitable to develop a comparable data foundation while maintaining flexibility; see also Adams, 2015 & Gioia et al., 2013) and various company key metrics (such as size and headquarter location) and reports. The dataset was developed during 2021 and contains both high and low performing companies regarding sustainability which is conducive in a multi-case study approach (Langley & Abdallah, 2011). In following this approach, we adopt grounded theory principles in analysing primarily qualitative data (Glaser & Strauss, 1967). The data were collected and analysed in a process of iterative coding while pursuing inductive reasoning to ground emerging constructs in empirical data (Eisenhardt, 1989; see also Yin, 2018). Following the method proposed by Gioia and colleagues (2013), we developed a data structure consisting of first order codes, second order themes and aggregate dimensions as basis for the data analysis.

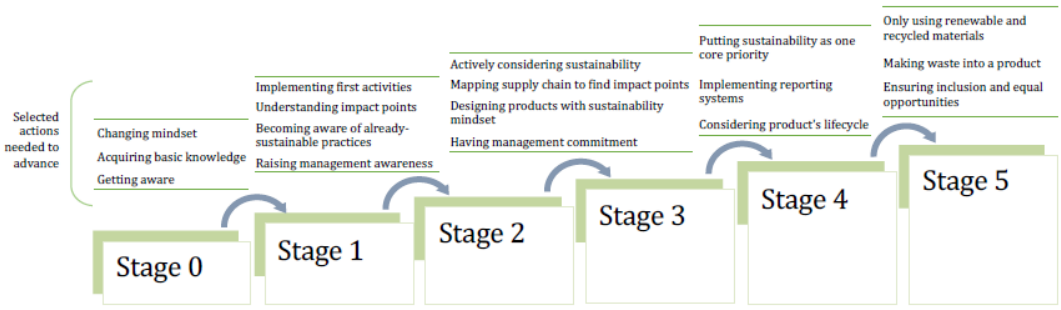
The analysis of the case companies and their efforts on the road towards improved sustainability yielded rich data that serve as the basis for the following findings. The aggregate dimensions that represent the final level of the data structure are as follows: (1) an unharmonized area of sustainability, meaning that the interpretation of what sustainability actually means to companies differs greatly and is therefore difficult to grasp as a concept; (2) external barriers to increased sustainability, e.g., through misaligned stakeholder expectations; (3) internal barriers consisting of the lack of resources and management commitment amongst others; (4) ways to lower barriers e.g., through the definition of appropriate strategies and communication efforts to align internal and external assets; (5) motives and drivers that promote sustainability efforts through legislation or active risk management i.a.; (6) direct benefits consisting of cost savings, improved marketing and branding, and employer and employee satisfaction that result in increased competitive advantage; (7) defining corporate identity. These dimensions allow a comparison of the various cases and ultimately result in defining a stage model that illustrates progress towards sustainable practice. Each stage is named in line with defining characteristics as displayed in figure 1.

Fig. 1: Six stages of increased corporate sustainability



While these stages and their characteristics are mostly descriptive, the data analysis yielded further results that address the activities that are required to progress along the stages of this roadmap towards the “promised land” of sustainable corporate practice (see figure 2 for details).

Fig. 2: Activities to progress along the stages towards improved corporate sustainability



Further, the preliminary data analysis provides detailed information about benefits, risks, challenges, minimum requirements and additional recommendations of each stage and their

respective activities. In summary, the findings consist of a detailed “roadmap” that illustrates the details of sequential stages of improving corporate sustainability.

The results contain implications for practice, research, and policy makers alike. Although these implications and conclusions are merely preliminary as of now, they promise significant contributions. Companies can utilize the roadmap to assess their current state of sustainable practice and identify steps for improvement, e.g., by recognizing and exploiting low-effort and readily available potential (also called low-hanging fruits). Furthermore, they get an idea of future steps which might serve as a basis for short and mid-term strategies to move towards more sustainable practice. Research benefits from this work as it begins to fill the gap of missing and explicit steps on the path to corporate sustainability (Dhanda & Shrotryia, 2020). As such, this work can represent a building stone for future research that enriches the details and dynamics of assessing and managing sustainable practice (and performance) of corporations and business models. Finally, policy makers gain in-depth insights into actual practice and challenges related to improving sustainable performance of businesses that can be utilized for the development of initiatives that promote corporate sustainability. Despite these promising contributions, this work is limited in terms of scope and method. There exists a context-dependency of the results which might make their use in other contexts difficult or calls for adjustment. Although the stage model includes theoretical constructs and implications, it is not yet linked to other models that serve similar purposes. Nonetheless, this work represents a useful addition to existing knowledge about tools and methods that improve the sustainability performance of corporate practice.

Keywords

Corporate sustainability, multi-case study, stage model, Danish context.

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Including Environmental Impact Considerations in the Business Model Innovation Process for Industrial Symbiosis

The GAIA model

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Extended abstract

Introduction

Industrial symbiosis (IS) is a collective approach for an exchange, sharing, or transaction of excess resources (including materials, energy, and water) between organizations of traditionally separate industries (Chertow, 2000). Considered a means of realizing a circular economy (Sommer, 2020), the concept has received increasing attention in research in recent years (Mallawaarachchi *et al.*, 2020; Vahidzadeh *et al.*, 2021). IS can be seen as a way of improving the sustainability of individual companies' business models, as well as a way of creating collaborative business models (see e.g. Albino and Fraccascia, 2015) that are widely considered an archetype of circular business models in themselves (Bocken *et al.*, 2014; Phi *et al.*, 2020).

Problem formulation

There are a variety of tools that practitioners can use during the IS development process. Much of the focus within the research field centres on the technical dimensions of IS, including digital tools (Kosmol and Leyh, 2019), process integration and mathematical optimization methods (Lawal *et al.*, 2021), as well as other methods assisting with ideation, concept development, and implementation.

For the assessment of environmental impacts, calculations using life cycle assessment (LCA) methods have been presented in several publications (Daddi, Nucci and Iraldo, 2017; Martin and Harris, 2018; Løkke *et al.*, 2020).

These calculations are, however, quite complex. Considering the time, competencies, and resources needed, LCA is perhaps more appropriate for expert use, and less suitable for practitioner use throughout the IS development process. There is currently no middle ground between a principle-based estimation, such as reuse being considered more advantageous than recycling, and conducting LCAs. This research aims to address this gap by presenting a practical tool for incorporating environmental impact considerations into the IS development process.

Methods

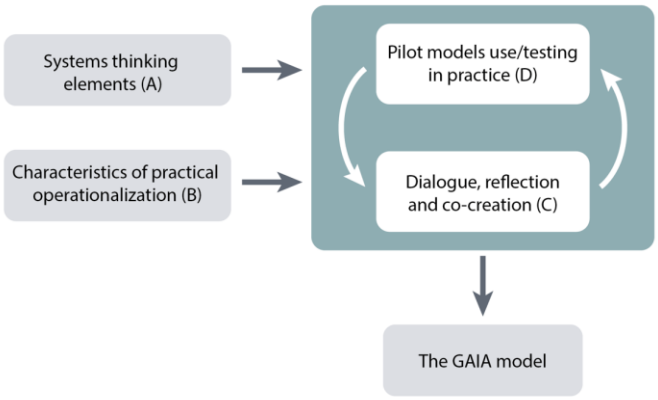

Figure 11: The process of building and testing the GAIA model.

During an IS facilitation project, the project team engaged in an iterative and co-creating process to develop a tool for pre-LCA environmental impact considerations.

Systems thinking elements (A)

The model for Green Business Development through Industrial Symbiosis, hereafter `The GAIA model'[30], incorporated literature on systems thinking, both on a conceptual level and regarding the methods for mapping and analysing environmental impacts (Kørnøv, Lyhne, Nors, *et al.*, 2020). The three key concepts the model building process relied upon were: interdependency, feedback, and adaptation. The system modelling framework in consequential LCA formed the foundation for the model. With the question in focus being *"how will flows change in response to decisions?"* (Weidema *et al.*, 2018, p. 308), impacts of a decision within one system on a wider system were analysed.

Characteristics of practical operationalization (B)

[30] To highlight both the analogy with nature that the concept of IS emerged through and the systems thinking principles that underlie our developed model, the name was inspired by the GAIA hypothesis. This hypothesis states that living organisms interact with their surroundings to form a synergistic and self-regulating and complex system (Lovelock and Margulis, 1974).

Inspired by the work of Alter (2011) and his recommendations for practitioner tools, the model was built with the intention to help: businesses *"organize and explore their own understanding"; "provide guidance"*; develop an understanding *"regardless of whether technical experts are available";* reduce the need for *"extensive data or new data collection"* (p. 1-2). In addition to *"typical business terminology"* (p. 1) being included in the model, the model was also designed to resemble the structure of the BM canvas (Osterwalder and Pigneur, 2010), which many practitioners are familiar with.

Dialogue, reflection, and co-creation (C)

The elements from systems thinking and Alter's characteristics listed above were the building blocks for the authors' iterative process, anchored in dialogue, reflection, and co-creation of the model. The authors' experience and expertise within LCA, sustainability science, and business development was then used to develop an initial model of GAIA. Next, participatory action research involved working and co-creating with companies to explore the environmental impacts of BMs during the innovation process via use of the initial model. Special attention was paid to the relations and interactions between researchers (i.e., the authors) and the corporate representatives, as well as their potential implication regarding the validity and reliability of the study (Kørnøv *et al.*, 2016).

Pilot models use and test in practice (D)

The use and test of the GAIA model in practice was an integrated element of an IS facilitation project in Aalborg, Denmark, with a focus on small and medium-sized enterprises. In total, 42 business model innovation processes were undertaken, spanning 16 different industrial symbioses in collaboration with 24 companies (Kørnøv, Lyhne, Schlüter, *et al.*, 2020). Informal feedback on the model was given during the collaboration. While the model was tested on all symbioses, its usability is highlighted in the present abstract through its application to two selected cases.

Results

The GAIA model acts as a tool for considering the impacts of closing resource loops through an IS collaboration. The model is adopted at points in the process, where ideas regarding the potential application of excess resources emerge. Throughout the process of IS development, the tool is then populated by each party participating in the symbiosis.

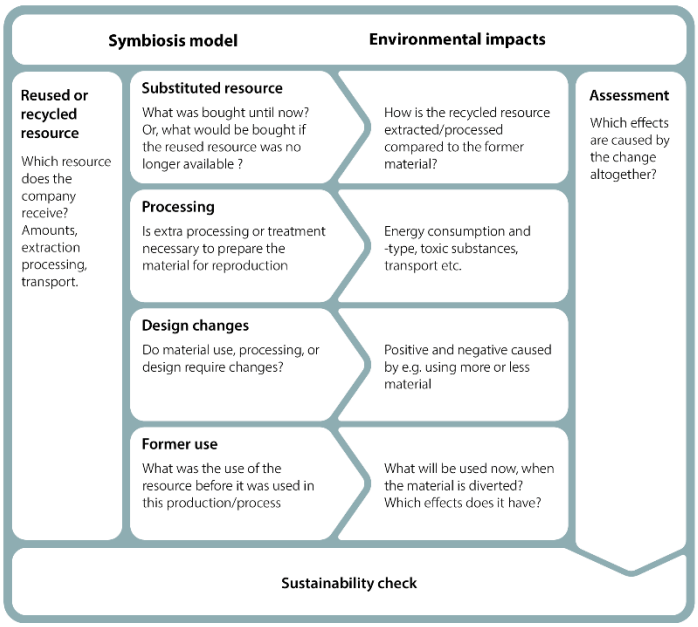

Figure 12: The GAIA-model (Kørnøv, Lyhne, Nors, et al., 2020).

The effects of using the GAIA model are exemplified through the following two symbioses:

Case 1. Symbiosis between steel companies in an industrial area for the recycling of plastic sheets

Minor plastic waste fractions, comprising corrugated polypropylene sheets, are used as a protective layer separating steel plates and sent for incineration at a local waste-to-energy plant. A shared logistical solution was designed to enable the collection of the fractions from multiple sites and their transport to a recycling facility.

Case 2. Symbiosis between farms within the region for the recycling of agricultural foil

Agricultural foils (agri-foils) comprise high-density polyethylene sheets primarily used to protect crops. The foil is rolled into bales up to 1km in length following use and sent for local incineration, with minor quantities recycled abroad. The IS concept describes a collection and recycling model for these fractions.

The application of GAIA to these cases highlighted several important interconnections and feedback mechanisms, and further illustrated the need for an adaptive system when implementing and assessing circular business models:

Impacts

Local recycling and re-entry into the system will not only substitute another, possibly virgin, material, but will also help reduce the environmental impacts of transporting virgin plastic from a plastic producing company further afield (case 1 and 2). However, the sustainability of the business

model depends on how the newly collected waste plastic is recycled and what material it substitutes within the system.

Feedback loop

A local logistical solution for both plastic types may reduce the economic barrier among companies within the area, thus positively impacting the sustainability of the wider system (case 1 and 2).

Burden shifting

As plastic is diverted from local incineration plants, it is replaced by coal in the local energy system, which negatively impacts the sustainability of the business model. However, as the share of renewable energy in the energy system increases, the sustainability of the BM will improve. Another potential burden shifting occurs when multiple phases of processing results in increased energy and water consumption, both impacting the sustainability of the business model.

Adaptations

The collected agri-foil must be cleaned before it is recycled. One adaptation identified by the use of the GAIA model, is that the weight of the foil can be minimised by rinsing the agri-foils on-site prior to collection, which helps to reduce the burden on fuel consumption during transportation to the recycling facility. Another adaptation relates to the fact that the foil requires further processing at a facility. Presently, there are no sites in Denmark which can recycle 1 km long agri-foil sheets. Thus, capital investment in new technology, additional staff, and the adaption of existing policies are needed.

Conclusions

The uses of the GAIA model showed that a practical tool based on systems thinking and the consequential LCA paradigm can support the IS development process and give users a better understanding of environmental impacts, where feedback loops, burden shifting, and potential adaptations are considered.

Future research avenues lay in a better integration of the industrial symbiosis and circular business model concept and in the development of systems thinking principles for circular business models more generally.

Keywords

Industrial symbiosis, circular economy, business model, environmental impact, systems thinking tool

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Developing a qualitative circularity assessment tool for pilot-scale projects

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Extended abstract

The transition towards a more sustainable circular socio-economic model requires solutions at micro, meso and macro scale. Many initiatives argue their contribution to circularity on the basis of more or less intuitive arguments about circularity principles. However, orienting the innovation of actors and the system towards circularity with the objective of achieving a systemic transition in the long term requires more consistent instruments to measure or assess with some degree of confidence their contributions to that goal.

Measuring levels or degrees of circularity has become a fundamental requirement for initiatives at different levels, from micro solutions to macroeconomic transitions. In fact, the tools developed to measure or evaluate the achievements of circularity from the introduction of changes and innovations are very varied (Saidani et al., 2019). Indicators oriented towards user needs are the most numerous at the micro level. In this sense, the aim of this article is to develop a circularity assessment tool for experimental initiatives, which start from R&D developments and first need to be pilot tested. While life cycle analyses can provide an approximate footprint and estimation of relevant environmental impacts of these initiatives, the complexity of their calculation may limit their applicability in practice. Therefore, it is essential to develop other complementary tools, oriented towards measuring circularity, that allow a quicker overview of the potential contribution of these experiments to the Circular Economy (CE).

In this paper we develop a qualitative circularity assessment tool for innovative technological solutions. Previous literature suggests that there are different actions for CE; however, a tool to measure the potential circularity of these type of projects is missing. We specifically focus on for the water mining sector. Smol et al (2020) propose a framework of water CE actions: 1) Reduction - Prevent wastewater generation by the reduction of water usage and pollution reduction at source; 2) Reclamation (removal) - Application of effective technologies for the prevention of inclusion of hazardous pollutants and removal of pollutants from water and sewage; 3) Reuse - Reuse of treated wastewater as an alternative source of water supply for non-potable usage; 4) Recycling - Recovery of water from wastewater for potable use; 5) Recovery of resources as nutrients and energy from

water-based waste; 6) Rethink - Rethinking how to reuse resources to create a sustainable water economy which is free of waste and emissions. The International Water Association (IWA, 2016), built a framework for CE-supportive water utilities, considering three pathways (water, materials and energy). The European Environment Agency (EEA, 2016) also established a set of CE requirements that are examined and considered for the design of the circularity assessment tool. Building upon these proposals and the resource circulation from the perspective of elements, molecules or materials (Blomsma & Tennant, 2020), we design a circularity assessment tool (Table 1). The tool is multidimensional, comprising 18 items grouped into five categories, according to the EEA CE requirements (EEA, 2016), which in turn link to the circular economy loops (narrowing, slowing, closing, regenerating) (Konietzko et al., 2020). The tool is designed with the purpose of assessing the intrinsic circularity potential of the innovative technological solution focused on water mining.

					If yes, how important is the achievement? (Please, estimate a percentage)					
Circularity assesment items		N/A	No	Yes	Very low	Low	Medium	High	Very high	Observations
Reducing inputs and the use of natural resources (per unit of output)										
1	Reduction of fresh water use/consumption (water extraction from aquifers, natural sources)									
2	Reduction of energy use (all sources)									
3	Reduction of fossil energy use									
4	Reduction of the use of resources (minerals, chemicals,...)									
5	Reduction of infrastructure (land use, construction materials,...)									
Increasing the share of renewable and recyclable resources (per unit of output)										
6	Increased share of renewable energies									
7	Reuse of materials in closed loop									
8	Energy recovery from water-treatment processes									
Reducing emissions levels (per unit of output)										
9	Reduction of wastewater discharges									
10	Reduction of greenhouse gas emissions									
11	Reduction of hazardous pollutants within the processes									
12	Increased removal of pollutants from wastewater									
Reducing valuable materials losses (per unit of output)										
13	Reduction of water losses due to leakage									
14	Reduction of water-based waste (sludge, brine)									
15	Reduction of water-based waste incineration									
16	Reduction of losses of valuable resources (minerals,...)									
Increasing the value durability of resources (per unit of output)										
17	Increased volume of reclaimed water (allowing for its reuse for different purposes)									
18	Recovery of valuable resources from water waste (create new value from minerals, nutrients,...)									

The tool is tested through a case study. Specifically, the tool is used to analyse a project to obtain secondary materials from waste - sewage sludge. To do this, the evaluation exercise is presented to a committee of experts, who are asked to rate each item on a scale of 1-5 and to quantify the improvement expected from the base case. The final assessment, although based on the subjective perception of each individual expert, should reflect the overall assessment of the group. To this end, a group discussion is organised to reach a consensus. The different items will be aftwerwards ranked, also based on expert judgement, in order to set a semi-quantitative ranking.

The results of the analysis show that the tool is valid and comprehensive. It allows for a systematic and consistent assessment of the intrinsic circularity potential of pilot experiments. It is quicker to implement than other more sophisticated and complex analyses that require data that are not always available.

The result of this circularity assessment can become a key criterion for policy and business decisions and facilitate access to the funding needed to carry out a full-scale project. The tool also has certain limitations. The result does not take into account the economic and social dimensions, nor does it address systemic impacts for circularity. This last point will be addressed in a subsequent phase.

Keywords

Circularity assessment, circular business models, water mining, wastewater treatment.

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Integrating and Measuring Sustainability in the Business Models of Universities

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Extended abstract

Higher education (HE) has a special role in building a sustainable future. In fact, universities have the moral responsibility to lead the change in mindset necessary for achieving the vision of a healthier, more equitable and sustainable world (Cortese, 2003; UNESCO, 2004). Then they have the resources and knowledge to develop ideas and technical solutions to implement this vision (Calder and Clugston, 2003; Ramísio et al., 2019). Finally, as 'entrepreneurial universities', they are generators and platforms of the economic growth of society (Etzkowitz, 2008).

However, despite the increasing number of initiatives taken by individual universities, they are still lagging behind companies in promoting sustainable development (SD) (Boks and Diehl, 2006). In particular, most universities have integrated sustainability by focusing on specific areas of their activities, such as education, research, outreach, partnerships and green practices on campus (Wals, 2014), without embedding it in the system's strategies and activities as a whole (Bautista-Puig and Sanz-Casado, 2021).

Definitely, there is a lack of studies investigating how universities can systematically reorient themselves to help society become more sustainable (Lozano et al., 2013; Ramísio et al., 2019). Furthermore, a lack of a systemic framework for evaluating performance in the existing SD approach in education has been observed (Fuchs et al., 2020; Lin et al., 2016), as well as a deficit in studies measuring the outputs of sustainability initiatives across HE institutions (Mader, 2012; Vaughter et al., 2013). Finally, a gap also exists between the theoretical and practical research into sustainable innovation in HE, which prevents university management from systematically rethinking their traditional models.

This paper addresses these gaps by proposing a conceptual framework for the diagnosis of the integration of sustainability in universities from a strategic perspective. In particular, the concept of a sustainable business model for interpreting the core logic through which universities create

value for themselves, society and the environment is adopted (Lüdeke-Freund, 2010; Bocken et al., 2013). The high level of consistency linking the different elements of a business model (Magretta, 2002) is, in fact, in line with the systemic changes relating to sustainability through which HE institutions are simultaneously re-orienting curricula, research, operations and community outreach activities. Drawing from the strategic management literature and university sustainability literature, the conceptual framework includes the multiple areas in which sustainability can be implemented in HE, which are recombined following the business model logic. The following five categories identified by Vaughter et al. (2013) are considered: integration of sustainability into curricula, integration of sustainability into the management of institutions (governance), engagement in research focused on sustainability topics, institutional involvement in community engagement with sustainability issues and integration of sustainability into operations. In addition, 'assessment and reporting' is considered as a further category of university sustainability (Lozano, 2006). This paper is in line with some recent studies that have identified three main elements that explain a company's business model: the structure, the value proposition and the market (Rotondo et al., 2019). The structure includes all assets, resources and processes through which a company prepares a value proposition, therefore answering the question 'How is a value proposition built?' The value proposition explains the type of product or service offered to customers and the value network involved in the creation of value, i.e., the suppliers, partners, distribution channels and customers. Therefore, the value proposition definition answers the two questions: 'What is offered?' and 'With whom does a company create value?' Finally, the market is concerned with the target market of a company's value proposition and answers the question 'Who are our customers?'.

This framework is applied in the context of Italian state universities to identify business models with different degrees of strategic orientation towards sustainability. Then, the business models of universities strongly oriented towards sustainability are in-depth analysed in order to examine the processes and tools used and the challenges faced when implementing sustainable innovation. This addresses the research gap highlighted by Geissdoerfer et al. (2018), who carried out a comprehensive review of the literature and found that the main problem that firms face when trying to incorporate sustainability into their business is the 'design-implementation gap'. In particular, they set out a central question for future research, i.e., understanding how firms move from a BM to an SBM in practice.

From a methodological point of view, this research uses an explanatory sequential mixed method. During the first stage, a quantitative analysis is carried out to identify the SBMs adopted by universities using the conceptual framework for investigating the ways and level to which sustainability is integrated into the different elements of a university's business model. The university sample includes all 61 Italian state universities. Key indicators are selected to measure the four categories that compose the three elements of a university's sustainable business model, and then used as inputs in a cluster analysis. During the second stage, a qualitative approach is used to investigate the process, tools and challenges involved in implementing sustainable innovation by some significant cases (Eisenhardt, 1989).

To triangulate data and build a chain of evidence, interviews with key stakeholders involved in university strategic management and sustainability management, document analysis of universities' official websites, strategic plans and performance reports, mandatory disclosure documents and national datasets are used as main sources of information. From the cross-case

analysis, the inferences regarding the process and tools used and the challenges faced by universities when implementing sustainable innovation are drawn. Based on these inferences, some theoretical propositions are set out.

From a theoretical perspective, the findings contribute to filling gaps in knowledge and empirical evidence relating to strategies developed by universities to re-orient themselves towards sustainability. By using the concept of a sustainable business model for the first time in the context of HE, this study sheds new light on the relationships between the elements and areas in which sustainability can be strategically incorporated into university activity to enhance value creation at a system level.

This paper contributes to the session to which it is submitted and to the overall conference theme by proposing a framework to assess sustainability integration into the business models of universities. In regard to managing the sustainability performance, it also advances research on sustainable innovation by adopting a BM perspective and contributes to filling the gap in the literature on the implementation of the process, the tools that should be used to pass from design to implementation and the main challenges that may hinder this transition. This study has also important implications for practitioners. First, it presents a categorization of SBM archetypes, providing an understanding of how SBMs can be developed in practice. This can help university management to identify alternatives, select the most applicable one and then innovate the BM in relation to a university's type, mission, history and core competences. Finally, it supports policymakers in building a more sustainable HE system by highlighting areas and activities to be addressed by specific regulations, guidelines, and incentives aimed at fostering sustainability in universities.

Summary

Higher education (HE) has a special role in building a sustainable future. However, despite the increasing number of initiatives taken by individual universities, they are still lagging behind companies in promoting sustainable development (SD). There is a lack of studies investigating how universities can systematically reorient themselves to help society become more sustainable as well as a deficit in studies measuring the outputs of sustainability initiatives across HE institutions.

This paper adopts the concept of a sustainable business model for interpreting the core logic through which universities create value for themselves, society and the environment, and proposes a conceptual framework for the diagnosis of the integration of sustainability in universities from a strategic perspective.

From a methodological point of view, an explanatory sequential mixed method is used. First, a quantitative analysis is carried out to identify the sustainable business models adopted by the Italian State universities. Then, a qualitative approach is used to investigate the process, tools and challenges involved in implementing sustainable innovation.

The findings contribute to filling gaps in knowledge and empirical evidence relating to strategies developed by universities to re-orient themselves towards sustainability and shed new light on the relationships between the elements and areas in which sustainability can be strategically incorporated into university activity. It also advances research on sustainable innovation and

contributes to filling the gap in the literature on the process and the tools that should be used to pass from design to implementation, and the main challenges that may hinder this transition.

Keywords

Sustainability, sustainable business model, sustainable innovation, higher education, Italian state universities.

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Role of eco-labels in implementing sustainable circular business models

Perspectives of textile companies in Finland

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Extended abstract

Introduction

The textile sector is complex and resource intensive, leading to various significant environmental impacts upstream and downstream of the globalized value chains (Watson and Wiedemann, 2019; Pal and Gander, 2018; Pedersen *et al.*, 2018). Fast fashion provoked shortened lifetimes of textiles have accelerated environmental problems and amounts of textile waste (Niinimäki *et al*., 2020; Dahlbo *et al*., 2021). The sector is among the largest in terms of consumption of raw materials and water, chemical pollution and GHG emissions (Dahlbo *et al.*, 2021). Efforts to improve the sustainability of textile production and consumption have relied on single organisations, consumers and producers (Virta and Räisänen, 2021). In the fashion industry sustainable business models based on upcycling, recycling, and sharing have emerged but are still in the minority, and a more systemic change is needed (Pedersen *et al*., 2018). As a response, a coherent set of actions for a circular textile ecosystem along textile value chains, incentivizing sustainable consumption and business models, was proposed by the European Commission (EC, 2022). A growing literature on sustainable business models identifies the ways businesses operate as part of the solution to address sustainability challenges (Geissdoerfer *et al.* 2018). Although there remain conceptual ambiguities in the definition of a sustainable business model (Dentchev *et al*., 2018; Geissdoerfer *et al.*, 2020), it is suggested that by integrating ecological, social and economic value creation and involving stakeholders beyond customers and shareholders business models can be designed in a way that they advance sustainable development (Schaltegger *et al.* 2016). Further, how companies design and remodel or design their business models in sustainable way is about how they capture, create and deliver value in ways that significantly reduce negative impacts on the environment and society and create positive societal and environmental impact (Bocken *et al*., 2014; Pedersen *et al*., 2018; Kraaijenhagen *et al.*, 2016). Circular business models can be defined as a way of doing sustainable business which, in particular, creates, delivers and captures value from resource efficiency, longer life times and recycling of resources. Realizing circular business models require collaboration and communication between different actors and stakeholders in the value

chain. (Bakker *et al*., 2014; Bocken *et al.,* 2016; Bocken *et al*., 2018 Nußholz, 2017; Antikainen and Valkokari, 2016).

Recent literature reviews have noted the lack of understanding on the role that eco-labels can play in advancing a circular economy and related business models (Marrucci *et al.*, 2019; Meis-Harris *et al.*, 2021). As the environmental benefits of circular business models are complex to verify and sometimes not investigated (Manninen *et al.* 2018; Das *et al.* 2022), the role of eco-labels in implementing and advancing sustainable circular business models should be understood better. Eco-labels are adopted by companies on a voluntary basis to differentiate products based on environmental properties (Yokessa and Marette, 2019). There are over 450 eco-labels in use globally (Meis-Harris *et al.,* 2021), and over 90 eco-labels and certifications are available for textiles (Textile Standards, 2022; Textile Exchange, 2022), many commonly used in the Nordic countries (Althoff *et al.*, 2019). Previous research describes eco-labels as tools for eco-design and eco-innovation (Prieto-Sandoval *et al.* 2016; Salo et *al.* 2020) and as a benchmark for environmental improvements (Bratt *et al.* 2011). They have a growing influence on company strategy (Prieto-Sandoval *et al.* 2016) and product stewardship along the value chain. By analyzing these factors we can explore whether eco-labels create sustainable value when applied in the context of circular business models.

This paper explores the perspectives of companies on the relationship between the use of eco-labels and implementing circular business models. Namely, the research question addressed by the study is: *How do Finnish textile sector companies exploit eco-labels to implement and advance circular business models?* The rest of the paper is structured as follows: First we present the interview sample and interview protocol as well as an analytical method. Then we present some preliminary results and offer preliminary discussion items, which will be further expanded for the conference presentation, as the analysis advances.

Materials and Methods

This paper presents the findings from interviews with Finnish textile sector companies. The sample included companies representing different parts of the apparel value chain (fibre and fabric producer, manufacturers, online and physical retailers, textile service and textile recycling). Various types of companies were selected for interview to explore the range of different views on potential applications of eco-labels. Some of the interviewed companies applied circular economy principles in their business models or product concepts, whereas others followed mainly traditional linear business models (fabric manufacturer, retailer etc.). In-depth details about the companies are not disclosed here due to the identifiability resulting from the small market of the target geographic area.

Semi-structured virtual interviews carried out with company representatives (Sept. 2021- March 2022) covered the following themes: Business model; sustainability and circularity; consumer demand for sustainability information; eco-label use and added value; eco-label impacts on business operations in practice; managing value chain sustainability; and future needs and solutions. The transcribed interview data is qualitatively analyzed, with the assistance of the *Nvivo* software As suggested by thematic analysis approach, the data will be coded and organized under themes (Nowell et al. 2017) to understand the relationship between the business model circularity (Geissdoerfer *et al.* 2018; Bocken *et al.* 2016, etc.) and their exploitation of eco-labels in companies.

Results and discussion

This study presents perspectives of Finnish textile companies on the use of eco-labels in implementing circular business models and aims to understand the reasons. Although the analysis is ongoing, and a systematic analysis has not been made at the time of writing the abstract, some preliminary results can be presented. The following is a descriptive summary of preliminary results, which does not yet differentiate eco-label use practices in the context of different sustainable/circular business models.

The interviews showed that companies exploit certifications on the sustainability of materials (e.g. Textile Exchange standards) to improve sustainable value chain management. Eco-labels are a supply chain risk management tool applied to improve transparency. GOTS for organic cotton and Öeko-tex standards were described as a basic characteristic of quality fabrics used by companies producing sustainable products. While companies did not always specifically request these standards, interviewees explained that quality fabrics often came with these certifications.

The interviews showed that while certifications on materials (fabrics, threads etc.) were commonplace, it was scarce that companies would be eco-labelling or certifying their entire operations or product lines. Motivations for those that did, related to requests from clients: either as requirements in public procurements or from clients that were Type1 eco-labelled (Nordic Swan) themselves.

It can preliminarily be summarized that the interviewees mainly identified the use of Type 1 -like eco-labels in the context of organic cotton and elimination of chemicals. Less commonplace is certifying recycled raw material. Many company representatives emphasized the quality of fabrics and products. However, no eco-labels or certifications there is currently no certifying applied to indicate overall quality, or in other words the “slowing loops” business models.

The decisions on the uptake of eco-labels, certifications and standards related to balancing the added value from gained transparency, clients, or possibilities to communicate sustainability efforts, with the actual demand, cost and other resource needs. Further analysis will produce a typology of aims of eco-label use in the implementation of circular business models and explore the role of eco-labels in creating, delivering and capturing sustainable value.

The results are interesting in the context of the textile sector transition to a circular economy. Empirical insights on the use of eco-labels as part managing sustainability of business models fills a research gap. However, the sample size is limited to a narrow geographic focus limits making generalizable conclusions. The study furthermore does not take a stand on the effectiveness of eco-label use towards circular economy, which has been questioned in previous research (Meis-Harris *et al*., 2021). Nevertheless, the analytical approach and empirical study add to the existing literature that has pinpointed to the need to better understand the topic.

Keywords

Circular business models, eco-labels, sustainable value creation.

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Linking Doughnut Economics and Sustainable Business Model Research

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Extended Abstract

Research on sustainable business models (SBM) is a young and dynamic stream of research that is essential for exploring how companies propose, create, deliver and capture value (Bocken et al., 2014; Lüdeke-Freund & Dembek, 2017; Lüdeke-Freund et al., 2018; Stubbs & Cocklin, 2008). Recently, scholarly interest has moved towards the question of how SBM fosters broader sustainability transitions and, in turn, how such transitions spawn novel SBM (Aagaard et al., 2021; Proka, Beers & Loorbach, 2018). Scholars refer to this field of research as 'business models for sustainability transitions' and understand 'sustainability transitions' as "fundamental change at a societal level" (Aagaard et al., 2021, p.2). This is particularly important in face of worldwide social-ecological challenges like climate change or environmental degradation.

Such societal challenges in rapidly changing environments make traditional approaches to solving problems ineffective (Casarejos et al., 2018; Ramos et al., 2020). Scholars stress the need to develop new ways of thinking to design sustainable business models that profoundly foster broader sustainability transitions (Aagaard et al., 2021; Madsen, 2020; Shakeel et al., 2020). Such a new way of economic thinking has been proposed by Doughnut Economics (Raworth, 2017). This novel concept holistically considers planetary boundaries and social needs as the basis for economic and social activities, as the British economist Kate Raworth developed DE in response to current societal challenges. She argues that DE is an economic mindset suitable to tackle 21st-century challenges. The concept comprises seven principles: 'change the goal', 'see the big picture', 'nurture human nature', get savvy with systems', 'design to distribute', 'create to regenerate' and 'be agnostic about growth' (Raworth, 2017).

We argue that merging SBM and DE may be vital to comprehensively push forward business model innovation for sustainability transitions. The seven principles of DE foster innovative SBM that move beyond environmentally friendly production and eco-efficiency towards acting within planetary boundaries and considering social needs. Moreover, applying DE to business models and SBM research fundamentally questions the current understanding of growth and bears the potential to transform the way businesses manage resources and their distribution. In turn, DE might profit from

SBM research as the latter provides the degree of details required to describe crucial design issues necessary to implement DE. In doing so, SBM research might help DE overcome the pitfall of 'cockpit-ism', that is, the idea that top-down actions alone can solve worldwide challenges (Hajer et al., 2015). Our study of the state of research shows neither explicit research at the intersection of DE and SBM, nor a conceptual link between the two concepts. Nevertheless, we assume that SBM research has implicitly applied some of the principles of DE in their conceptual understandings and research. This article lays the foundation for explicitly linking SBM research and DE.

We analyse whether and how SBM research has implicitly applied DE principles by conducting a systematic literature review as presented by Tranfield and colleagues (2003). The literature review encompasses the three stages 'planning the review', 'conducting the review' and 'reporting and dissemination'. Within this first stage, we identified the need for a review at the intersection of SBM and DE research as outlined in the previous parts. Building on that, we developed a review protocol containing information on the research question, sample, search strategy and criteria for inclusion and exclusion of articles. In the second stage, 'conducting the review', we identified relevant SBM literature by searching for the terms 'sustain*' AND 'business model' in the topic OR abstract OR keywords in the database Business Source Complete (via EBSCO Host). This led to 3,043 results in total. Thereof we identified 2,139 journal articles. We filtered for English journal articles and screened the remaining 2,062 articles by checking whether the business model concept constituted a core issue. Moreover, we checked the understanding of sustainability applied in the articles. We excluded articles if they only referred to economic sustainability. Our screening led to the exclusion of 1,562 articles, resulting in a sample of 500 articles. As we aimed at analysing the articles with the most significant impact among SBM research, we intentionally reduced the number of articles. To do so, we first sorted our list of 500 papers by the number of citations. Then we identified 'key authors' among our sample, i.e. authors with more than five publications. Finally, we selected those publications by key authors that were among the 100 most cited ones. As more novel publications are typically not among the most cited ones, our sample would have lacked those. Hence, we repeated the process explained above for the SBM literature of 2020 and 2021. In line with sample sizes of comparable literature reviews (see, for example, Araújo and Franco, 2021; Bouzzine, 2021), our final sample consisted of 40 most cited articles by key authors from SBM research published between 2005 and 2021. As we intended to merge DE and SBM research, we used the seven principles of Raworth's book Doughnut Economics (2017) as our analytical framework. After completing stage two - conducting the review - we carried out stage three, 'reporting and dissemination'. Based on the insights gained from the literature review, this research paper puts forward our findings.

Our findings show that all principles have been implicitly applied to varying degrees in SBM research. However, none of the principles has been implicitly applied in all articles. The principles 'create to regenerate' and 'change the goal' have been integrated by nearly all publications in our sample. However, we identified potential for a more explicit application of this principle, as only about a quarter of the articles in our sample mentioned regenerativeness as a normative requirement on SBMs. Similarly, the principle 'change the goal' bears the opportunity for a more in-depth application, as nearly all articles built their argumentation on rather broad categories of goals. The principles 'get savvy with systems' and 'see the big picture' have been normatively addressed by more than half of the articles in our sample. Yet, considerably fewer articles dealt with more concrete processual or architectural paths integrating these principles in SBM research.

We identified the greatest potential for a more in-depth application of the principles 'design to distribute', 'nurture human nature', and 'be agnostic about growth' in SBM research. These principles were normatively, processual and architecturally addressed to the least extent.

Based on our findings, we suggest seven avenues that inspire future SBM research to integrate the principles of DE holistically. These avenues might broaden scholarly horizons and foster SBM innovation. If we, as SBM researchers, take these avenues seriously and gradually integrate DE principles into SBM research explicitly, there might be considerable potential to fundamentally transform basic business assumptions. For example, integrating the principle 'nurture human nature' into SBM research might not only foster a new narrative of social and cooperative human behaviour. It might also inspire business model innovation for sustainability and initiate a revision of SBM theories. This may lay the ground for SBM research to increase business' impact towards societal sustainability transitions.

Keywords

Doughnut Economics, ecological economics, business model innovation, business models for sustainability transitions

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	Identified paths how SBM research has integrated DE principles	1. Change the goal	1.1 environmental, social and economic goals as normative requirements on SBM	1.2 SBM tools and frameworks encompassing environmental, social and economic goals	1.3 SBM performance measurement and reporting of environmental, social and economic goals	2. See the big picture	2.1. stakeholder perspective as a normative requirement on SBM	2.2 multi-dimensional flows between a focal SBM and its stakeholders	2.3 analysing the business environment as part of SBM	3. Nurture human nature	3.1 cooperative, social view of human nature as a normative requirement on SBM	3.2 trustful relationships in SBM	3.3 relational SBM leadership practices and capabilities in SBM	4. Get savvy with systems	4.1 embeddedness in a wider system as normative requirement on SBM	4.2 systemic SBMs modelling	4.3 systemic SBM evolution	5. Design to distribute	5.1 distributism as normative requirements on SBM	5.2 distributive financial SBM mechanisms	5.3 stable SBM networks	6. Create to regenerate	6.1 regenerativeness as normative requirements on SBM	6.2 sharing and collaborative SBM	6.3 circular economy, closed loop and life cycle thinking in SBM	6.4 sustainable resources or renewable energy in SBM	6.5 product-service SBMs	6.6 'sufficiency' SBM	7. Be agnostic about growth	7.1 growth agnosticism as normative requirement on SBM	7.2 sufficiency SBM
1	Baldassarre et al. (2017)		✓	✓			✓	✓						✓	✓	✓														
2	Baldassarre et al. (2020)		✓	✓										✓	✓				✓				✓	✓	✓					
3	Bocken et al. (2013)		✓	✓			✓	✓	✓					✓	✓	✓								✓					✓		✓
4	Bocken et al. (2015)		✓	✓			✓	✓			✓			✓	✓	✓		✓					✓	✓	✓	✓					
5	Bocken et al. (2016)													✓	✓	✓								✓	✓	✓	✓		✓		✓
6	Bocken et al. (2018)		✓	✓			✓						✓	✓	✓	✓								✓	✓	✓	✓				
7	Bocken & Geradts (2020)		✓		✓									✓	✓	✓								✓	✓	✓	✓		✓		✓
8	Bocken & Short (2016)		✓	✓			✓					✓			✓				✓				✓	✓	✓						
9	Bohnsack et al. (2014)														✓			✓						✓							
10	Boons & Lüdeke-Freund (2013)		✓	✓	✓		✓				✓				✓				✓												
11	Carayannis et al. (2015)		✓	✓																				✓							
12	Christensen et al. (2012)						✓								✓			✓								✓			✓		
13	Curtis & Mont (2020)		✓	✓					✓						✓	✓								✓	✓	✓	✓				
14	Di Vaio et al. (2020)		✓				✓								✓									✓	✓						
15	Dreyer et al. (2017)		✓				✓	✓							✓				✓					✓							
16	Evans et al. (2017)		✓	✓	✓		✓	✓				✓							✓		✓				✓						
17	Ferasso et al. (2020)		✓			✓	✓								✓									✓	✓		✓				
18	Freudenreich et al. (2020)		✓	✓			✓	✓			✓				✓	✓							✓	✓	✓	✓					
19	Gall et al. (2020)		✓				✓					✓													✓						
20	Gao & Li (2020)		✓	✓			✓		✓						✓			✓						✓	✓						
21	Geissdoerfer et al. (2016)		✓	✓			✓	✓							✓	✓									✓						
22	Geissdoerfer et al. (2018)		✓	✓			✓																✓	✓	✓						
23	Henry et al. (2020)		✓	✓			✓								✓								✓	✓	✓		✓				
24	Kurucz et al. (2017)		✓	✓			✓						✓		✓	✓		✓					✓	✓		✓					
25	Luedeke-Freund et al. (2018)		✓																✓	✓			✓	✓	✓						
26	Luedeke-Freund & Dembek (2017)						✓								✓				✓	✓				✓			✓				
27	Manninen et al. (2018)		✓	✓			✓	✓							✓	✓			✓				✓	✓	✓		✓				
28	Pedersen & Netter (2015)																							✓							
29	Ritala et al. (2018)		✓												✓	✓		✓					✓	✓	✓	✓	✓	✓			
30	Schaltegger et al (2012)		✓	✓																					✓	✓	✓				
31	Schaltegger et al. (2016)		✓						✓						✓			✓	✓				✓	✓		✓	✓				
32	Stubbs & Cocklin (2008)		✓	✓	✓		✓	✓			✓	✓	✓		✓	✓			✓	✓				✓		✓					
33	Todeschini et al. (2017)		✓				✓								✓								✓	✓	✓	✓					
34	Tunn et al. (2019)		✓				✓								✓									✓	✓		✓	✓			
35	Urbinati et al. (2017)														✓									✓	✓	✓	✓				
36	Vasileiadou et al. (2016)		✓				✓	✓							✓									✓			✓				
37	Velter et al. (2020)		✓	✓			✓					✓			✓	✓							✓	✓	✓		✓				
38	Wells & Seitz (2005)		✓																												
39	Yang et al. (2017)		✓	✓											✓	✓			✓					✓	✓		✓				
40	Yip & Bocken (2018)		✓	✓																								✓			

Table 8 Identified paths how SBM research has integrated DE principles

Prosperity or Peril? Consumer Adoption of PSS Business Models and Influence on Sustainability

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Extended abstract

New business models are increasingly billed as a means to shift production and consumption onto more sustainable paths (Dentchev et al., 2018). In recent years, an entire field of research has emerged under the rubric of "business models for sustainability" (Schaltegger, Hansen & Lüdeke-Freund, 2016). Within this field, business models have been denoted as, among other things, key mechanisms for the diffusion of sustainable energy technologies (Jolly, Raven & Romijn, 2012), electric vehicles (Budde Christensen, Wells & Cipcigan, 2012), and for the realisation of a circular economy (Linder & Williander, 2015). In particular, business models that centre on servitised product offers (product-service systems, or PSS) are seen as an opportunity to reshape production and consumption processes, with the potential for significant gains in resource productivity (Tukker, 2013). While a multitude of existing studies outline principles, typologies, archetypes, and patterns associated with business models for sustainability (Bocken et al., 2014; Lüdeke-Freund et al., 2018) three broad archetypes are specifically associated with PSS – use, access, and result-oriented models – and are each depicted as a means to promote sustainability (Tukker, 2004).

Environmental impacts of PSS are influenced by how such patterns are deployed in practice. When designed in the right way, PSS can lead to environmental impact improvements (materials, energy, CO2) of up to 90% compared to 'just selling a product' (Tukker, 2004). However, no studies so far have been identified that come close to evidencing these figures. Moreover, research suggests that consumer interaction with the PSS determines the actual positive and negative impact of PSS (Mont &Tukker, 2006; Mont, 2002). For example, previous studies have shown that life-cycle impacts are significantly influenced by the behaviour of consumers of product-services (Verboven & Vanherck, 2016). Therefore, one key aspect to assessing these business models' resulting environmental impacts is to understand how user behaviour is influenced for each PSS type.

Better understanding of PSS-consumer interactions could help drive sustainable behaviour in PSS models. Previous research suggests PSS should ideally be developed via close interactions with consumers according to user-centred design approaches such as the lean start-up methodology (Blank & Dorf, 2012). However, there is a lack of knowledge regarding customer needs and preferences in the PSS field (Viciunaite & Alfnes, 2020). The omission of consumers within PSS

research is also evident in a paucity of studies that examine sustainability impacts using multiple perspectives. That is, despite several case studies that present environmental impact analyses for various scenarios at a product level e.g. (Lindahl, Sundin & Östlin, 2006), few studies consider the actual impacts of business models. Moreover, it is possible that when the impact of a business model is considered at a systems-level, reduced consumption is not achieved due to rebound effects (Zink & Geyer, 2017). One way to resolve these issues is to bring consumers into focus through studies that examine how the development of PSS encompasses user-centric design and investigate consumer behaviour.

Social practice theory offers a possible lens to explore consumer behaviour in PSS. Used within the field of transition studies to explore elements of sociotechnical change (Shove & Walker, 2010), social practices are defined as 'patterns of doing' that transcend individual habits and routines; social practice theory depicts individuals as 'carriers' (Reckwitz, 2002) or 'practitioners' (Shove & Watson, 2005). As 'practitioners', individuals are key to the stability and enduring character of practices, whose pattern-like quality is a manifestation of the sustained reproduction of individual performances, 'incidences of doing' (Watson, 2012) or 'enactments' of a practice (Shove, Pantzer & Watson, 2012). Hence social practice theory can also serve to elucidate why behavioural change among customers and users is a challenging task. Recently, scholars have begun conceptually exploring how to synthesis insights from literature on business models with social practice theory, claiming that business model innovation can bring about changes to user practices (Kemp, Loorbach & Rotmans, 2007). Presently there is a lack of empirical research to validate or falsify these claims.

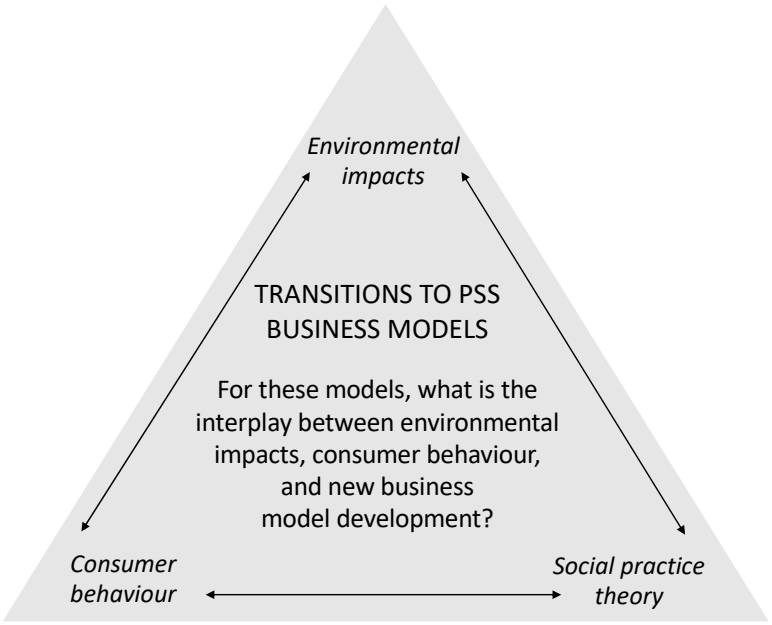
The deployment of a practice perspective to investigate the way in which PSS are deployed and used among individual consumers can illustrate aspects that are commonly overlooked in traditional life-cycle assessments of products more generally and product-services in particular. From a practice perspective, consumers that utilise product-services are the main unit of enquiry, along with patterns of use and how these intertwine with various aspects of daily life. This type of qualitative understanding is typically absent from quantitative assessments and can elucidate how consumers actually use, experience, and adapt to product-services, especially in contexts where reconfigurations of more traditional product ownership logics are required. By examining the interplay between different types of user practice (e.g., commuting, grocery shopping, leisure activities), this approach can illustrate pain points and rebound effects that may result as consumers transition to product-services. This type of knowledge can generate insights into service design and guide quantitative environmental assessments via qualitative reasoning.

Our research therefore examines how PSS can compel consumers to adopt consumption patterns that promote resource efficiency and the reduction of climatic impacts by merging perspectives on business models and social practice theory. The interplay between users of product-services, environmental impacts, and activities related to business model innovation are analysed through a review of empirical PSS cases selected from four manufacturing sectors that produce consumables in the B2C segment (furniture, textiles, mobility and energy-using appliances). This focus was selected due to high environmental impacts that are a direct result of resource-intensive modes of production and consumption within the EU (Tukker et al., 2016).

By generating knowledge on the dynamics between new PSS business model development, environmental impacts, and user practices, our research is expected to be relevant for the design, assessment, and implementation of sustainable business models. The findings suggest that the environmental impacts of PSS business models are strongly related to the uptake and use of these

models. Gaps in existing empirical knowledge are highlighted and an agenda for future research is presented, including a reflection on the suitability of using social practice theory to study business models' abilities to change user practices.

Graphical abstract



Keywords

Product-service-system, sustainable business model, business model innovation, consumer behavior, social practice theory

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Track 3.2 - New Business Models in Times of Crisis

Track chairs: *Urtzi Uribetxebarria Andres Dorleta Ibarra Zuluaga, Leire Markuerkiaga Arritola (Mondragon University)*

Crises are source of profound human loss, tragedy and agony and as such they give rise to events that pose threats to organizations. In this context, resilient structures (sectoral, organizational, group) based on new frameworks, fostering multi-stakeholder cooperation and innovative capacity, might become a sustainable competitive advantage.

Thus, this track welcomes studies on new business models or sustainable business practices in time of crisis which reveal different practices to ensure resilience on multiple levels (e.g. individual level employee well-being, team level innovation absorption capacity, organizational level social responsibility, firm level financial performance).

Innovative business model implementing Value-Based Healthcare

The case of Medtronic Core Clinical Solutions (MC2) Study & Scientific Solutions

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Abstract

The pressure on the health system due to the pandemic situation has enhanced the main criticalities of healthcare sector. In this complex system, value transformation is pivotal for creating a sustainable framework built around the patients' needs. This research aims at analysing how an innovative business model is pursuing a patient-centric approach implementing the Value-Based Healthcare model.

Keywords

Innovative business model; Value-Based Healthcare; Patient-centricity; Service innovation; Value transformation

Introduction

The pressure on the health system due to the pandemic situation has enhanced its main criticalities. Healthcare sector worldwide is facing common challenges due to rising demand and increasing financial restrictions which encourage to increase cost-efficiency while offering broader service (Pereno and Eriksson, 2020).

The COVID-19 pandemic has transformed everyday life with impacts on the personal and professional sides. In time of crisis organizations cannot operate as they did so far since users' interactions with services adapted to the new scenario (Am et al., 2020).

In order to ensure sustainability, it is relevant understanding how the healthcare system can react to this time of crisis. The actual scenario is characterized by a growing demand of health services due to the extension of life expectancy and the increase in chronic diseases. The marked fragmentation among system, the lack of interconnections and networks, the limited resources and the necessity to minimize costs pave the way for opportunities in order to improve the system from a multidisciplinary perspective. There is a need of rethinking the health system's management and monitoring in order to achieve sustainability reconciling the growing demand with the available resources in a system affected by fragmentation. On this purpose innovative business models are proposing solutions in order to contribute to healthcare sustainability. Indeed, digital transformation not only refers to the improvement of technologies related to existing process and service, but it is also related to new business models (Liu et al., 2022).

In healthcare one crucial aspect is the pursuit of patient-centricity and Value-Based Healthcare (VBHC) (Porter, 2013) that is based on value/outcome rather than volume/performance. This approach focuses on maximizing value for patients, aiming at optimizing outcomes and minimizing costs. Healthcare organizations serve six distinct purposes: treatment, diagnosis, prevention, education, research and outreach. In serving these purposes, healthcare organizations have to effectively manage quality, costs, safety, efficiency and outcomes; moreover, they have to balance the needs of several actors such as patients, healthcare practitioners and providers who deliver care. In this complex system is crucial overcoming the silos structure, building a network around the patients' needs and the related outcomes. Patient-centricity is defined as 'putting the patient first in an open and sustained engagement of the patient to respectfully and compassionately achieve the best experience and outcome for that person and their family' (Yeoman et al., 2017). This change implies the shift from a healthcare system organized around physicians role (supply-driven), towards a patient-centered system organized around patients' needs (Lee & Porter, 2013), moving the focus from the volume/profitability of services provided to the patient outcomes achieved.

Innovative solutions for managing these issues are arising. However, it has to be noted that from the patient perspective, providing innovative health service does not only imply new treatment and medicines, but also new way in delivering care or improving quality of life. Hence, in order to achieve patient-centricity also innovation has to go beyond firm-centered vision generating new knowledge and practical solutions (Lusch & Nambisan 2015; Vargo, Wieland & Akaka 2015).

This research aims at analysing the VBHC and patient-centricity implementation illustrating the case of an internal provider of clinical and scientific services for Medtronic worldwide: Medtronic Core Clinical Solutions (MC2) Study & Scientific Solutions (S&SS) organization with a specific focus on LeanScientia service.

Theory

Service Innovation in healthcare sector

Innovation is crucial in healthcare sector for managing the complexity of the context in terms of fragmentation. Opportunities for innovative business model are emerging in order to fill the existing gaps.

The COVID-19 pandemic has caused huge disruptions to the healthcare sector, with marked impacts on businesses and society (Liu et al., 2022). In time of crisis technological innovation and

collaboration are at the center of interest (Hou and Shi, 2021; Shi et al., 2021). Innovation strategies, shared efforts and collaborative approaches are essential in crisis for resilience, in order to guarantee real-time decision making and business continuity (Vermicelli et al., 2020; Verma et al., 2020; Bem et al., 2019)

In time of crisis organizations have to react rapidly to challenges (Verma et al., 2020) and to accommodate new needs considering existing and emerging barriers. Hence business models have to adapt to new market conditions (Am et al., 2020). New business models have to face the multifaceted concept of innovation in healthcare, in which proposing only a new offering is not enough; indeed, innovation should include an improvement of customer value cocreation (Rubalcaba et al., 2012), beyond traditional output and process-based archetypes to a more experiential/systemic understanding of value creation (Karpen, Bove & Lukas, 2012; Prahalad & Ramaswamy, 2003). The systemic archetype is particularly suitable for healthcare system because it embeds a holistic approach based on the assumption that 'the whole is more than the sum of the parts' (Sheth, Gardner & Garrett, 1988). Different existing actors integrate resources and organizations need to connect with multiple actors to sustain the network (Helkkula, Kowalkowski & Tronvoll, 2018). The definition of service ecosystem can be particularly suitable in describing healthcare context: it is a "relatively self-contained, self-adjusting system of resource-integrating actors connected by shared institutional logics and mutual value creation through service exchange" (Lusch & Vargo, 2014). A service ecosystem has a twofold role: enabling value cocreation and fostering service innovation (Edvardsson & Tronvoll, 2013). By merging these two concepts, instead of focusing on processes, innovation in healthcare should be directed towards creating as much value as possible for the patient in relation to cost (Porter & Teisberg, 2006; Lee & Porter, 2013). The overall aim is to develop high quality healthcare, reduce patients' suffering, improve patient safety and achieve better cost-effectiveness (Porter & Teisberg, 2006). Pursuing this transformation is an overarching strategy that will require restructuring how healthcare delivery is organized and measured.

Value-Based Healthcare

The Value Agenda enlightens the potential ways to address the transformation of healthcare system. Porter and Teisberg (2006) introduce the 'value agenda' in which they state that 'achieving high value for patients became the overarching goal of healthcare delivery'. The authors present also the concept of VBHC and the related multifaceted definition of value: from accountability perspective value is defined as the health outcomes achieved per dollar spent; from a managerial perspective it concerns processes and organization changes. Teisberg, Wallace and O'Hara (2020) define a framework to guide organizations in building VBHC systems. This transformation requires several steps that are described following.

1. Understand shared health needs of patients: healthcare should be organized around segments of patients with a shared set of health (clinical needs and nonclinical) needs and with a particular medical condition. In this way, care shifts from treating to solving patients' needs. It allows to meet and anticipate patient needs in an effectient way.

2. Design a comprehensive solution to improve health outcomes: on the basis of the previous step, teams design and deliver care consistently. Optimizing care by providing health services in an integrated way, overcoming fragmentation and duplication of care. Patient

care needs to be integrated managing the full care cycle and removing obstacles that undermine patients' health.

3. Integrate learning teams: this new approach changes the way clinicians are organized to deliver care, moving from silos organization to a different structure based on patient's medical condition. In these integrated structures there is a multidisciplinary (clinical and non clinical) team that manage the entire pathway.

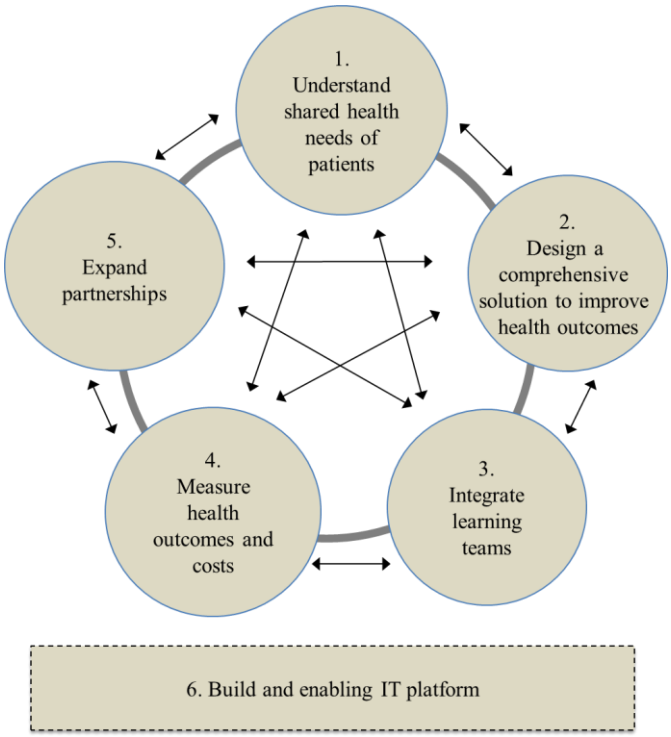
4. Measure health outcomes and costs: outcome should track the patient status/progress and cover the entire care cycle. It is possible to divide the outcome in clinical outcome (evaluating whether the therapies are consistent with the expectations) and functional outcome related to quality of life (informing about the patient functional ability after the treatment).

5. Expand partnerships: Partnerships can create opportunities for integrating patient care needs across locations and sites with the shared goals of creating high value and achieving better health outcomes. This action should be focused on improving value rather than only volume. Two potential mode of geographical expansion is the Hub&Spoke (with satellite facilities established for each integrated unit) and the clinical affiliation (sharing the facilities of community providers).

Porter and Teisberg (2006) state that building and enabling an effective information technology platform is necessary for pursuing VBHC. An integrated IT system allows the achievement of the previous five dimensions, by allowing the tracking of the entire care cycle, the sharing of information and communication across facilities and locations. An IT platform needs to be centred on patients, to manage and record different type of data, to be easily accessible and comprehensible to all stakeholders involved. The infrastructure has to be rearranged in order to follow the patient journey (patient pathway) across services, departments and facilities.

By merging the contribution of Teisberg, Wallace and O'Hara (2020) with the one of Porter and Teisberg (2006), the figure below illustrates the strategic framework for VBHC implementation.

Figure 1. Strategic framework for Value-Based Healthcare implementation



Van der Nat (2021) observes some best practices, noticing that healthcare providers that adopt the principles of VBHC, are implementing one or some of these dimensions. Thus, opportunity to accomplish the transformation from volume to value is reinforced if multiple dimensions are simultaneously implemented.

Methodology

This research aims at analysing the implementation of VBHC framework in an international healthcare organization. On this purpose this study is part of a research project developed in cooperation between the Department of Business Studies (University of Roma Tre) and Medtronic Core Clinical Solutions (MC2) Study & Scientific Solutions (S&SS), with the aim to apply the VBHC conceptual framework. The choice of this healthcare organization is due to the fact that Medtronic Core Clinical Solutions (MC2) Study & Scientific Solutions is an international well-known healthcare organization characterized by flexibility and adaptation on the basis of context and stakeholders' needs. S&SS offers a full range of services grouped into: "Scientific Solution" and "Study Solutions". This research focuses on Scientific Solutions, and particularly on one specific scientific service that is comprises in the Scientific Solutions for Hospitals (SS4H) macro-area: LeanScientia Service (LSS). LeanScientia is particularly suitable for this objective because it is brand agnostic and it is applicable to all Medtronic and non-Medtronic therapies. Furthermore, it is a transversal service, allowing a deep understanding of the VBHC application.

In order to achieve our objectives, two different sources of data have been integrated: interviews and secondary data with the twofold scope of deepening the general knowledge and understanding how the organization is embracing a VBHC vision. Managers and employees, responsible of the specific LeanScientia service, have been interviewed and the information extracted have been integrated with insights from documents and archival sources. The data has been analysed and the

information extracted allow to link each activity of LeanScientia past, current and future projects to the related VBHC dimensions. Data have been analysed through content analysis with the four phases of coding, categorizing, thematizing and integrating (Mayan, 2009; Thompson, 1997). The content analysis is a research method with the purpose of providing knowledge, new insights, a representation of facts and a practical guide to action (Krippendorff, 1980). Data analysis facilitates the description of how S&SS contribute to each aspect of VBHC through LeanScientia and future potential evolution.

Results

S&SS is a global internal provider of clinical and scientific services for Medtronic worldwide. S&SS develops fully customizable solutions across Medtronic operating units, therapeutic areas and geographies. Founded in 2012, it is composed of a multidisciplinary team of biomedical engineers, scientists, statisticians, legal, economists.
LeanScientia is the service on which this research is focused and it is comprised in the macroarea of Scientific Solutions for Hospitals. This macro-area aims to support healthcare providers to improve their clinical practice, therapy knowledge and enhance patient care. LeanScientia is a consultancy service that provide evidence-based scientific support on patient therapies & pathways, and clinical practices' costs/benefits through a brand agnostic approach. Hence, with this service, S&SS assists hospitals by analyzing current patient pathways, identifying and tracking the deviation from the best-practice pathway, supporting implementation of guideline-based pathways, improving connection with referrals.
In the next paragraphs, the actual implementation of VBHC and the future development are illustrated.

LeanScientia and VBHC

LeanScientia pursues VBHC by changing the way clinicians are organized to deliver care overcoming the silos organization to improve patients' outcome.
On the basis of the document analysis and the managers/employees interviews the results are illustrated below by categorizing and merging them in the VBHC dimensions.
In the text below it is possible to observe how S&SS is actually implementing the VBHC through LeanScientia service. Thereafter, potential further development will be highlighted.

- *Dimension 1*
  This phase allows the creation of a structure built around the patient's medical condition. The patients' needs and the related medical condition is identified through a screening check list. Thereafter, patients are stratified on the basis of the level of risk (low, medium, high) and they are directed to the suitable diagnostic pathway. This phase puts the patient at the centre and is crucial for the subsequent phases related to the outcome measurement.

- *Dimension 2, Dimension 3 and Dimension 4*
  LeanScientia has a dedicated multidisciplinary team that maps the process which describes the care delivery cycle for each patient. Clinical and nonclinical activities are integrated to cover the entire pathway for the patient's condition. The team meets with clinicians on a regular basis firstly to analyse the patient pathway and define the KPIs and secondly, to

discuss progress and periodic summary reports. Consistently with this dimension, S&SS measures and demonstrates value of delivered care based on VBHC principles. On the basis of the previous phase, each step in a process map delineates an activity required for the delivery of patient care. The resources (personnel, equipment and supplies) associated to each step are identified. Implementation of value-based initiatives depends on cost-assessment methods and, in order to evaluate costs, S&SS adopts Time-driven activity-based costing (TDABC) developed by the Harvard Business School (HBS) that calculates the costs of healthcare, the resources consumed as a patient moves along a care process.

- *Dimension 5*

  By integrating different facilities S&SS optimizes care, overcoming fragmentation and duplication of efforts. Patients' flow is organized and managed also creating pathways among different facilities. Indeed, patients can be directed to different wards. An IT platform supports LeanScientia in facilitating communication between facilities, automatization and standardizing of data transmission, increasing adherence to a specific predefined pathway. This integration has an impact on both patients and healthcare organization in terms of improving the patient experience (reduction of the waiting list, improving the accessibility and the possibility to perform all the exams in a specific time range), reduction of hospitalization and increasing the capacity in the ward.

- *Dimension 6*

  The IT platform represents a supporting tool for the previous dimensions. S&SS provides scientific and analytic consultancy for setting digital tools. A digital platform has been developed to evaluate the patients' outcome according to the International Consortium for Health Outcomes Measurement (ICHOM). The platform provides information and data visualization about patient pathway and outcome.

In order to asses services quality in each stage of the process, there are internal procedures an annual audit ensures compliance to these procedures. An online tool validated for clinical use is used for managing and collecting data.

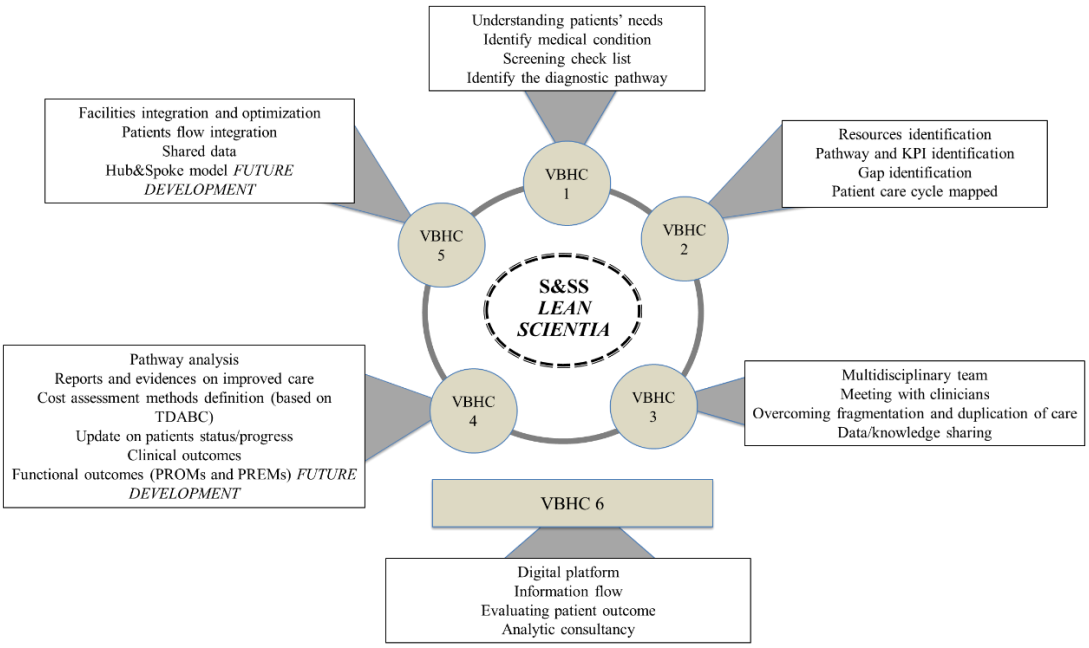
Future Development

In order to continuously implement the VBHC approach, LeanScientia will provide further services that will answer the main need in terms of overcoming fragmentation and moving towards a patient-centricity.

Hence, the *dimension 4* will be enriched in terms of functional outcome related to quality of life. Indeed, Patient-Reported Experience Measures (PREMs) and the Patient-Reported Outcome Measures (PROMs) will be collected through a survey administered by using multiple channels (email, mobile app, telephone) in order to inform about the patient health status after the treatment. The *dimension 5* will be developed since the clinical pathway will be implemented in a Hub&Spoke digital platform by providing scientific and statistical advice. It implies a collaboration between a Hub centre and several supporting Spoke facilities. The Hub is represented by an highly specialised hospital in which patients that require complex care are directed.

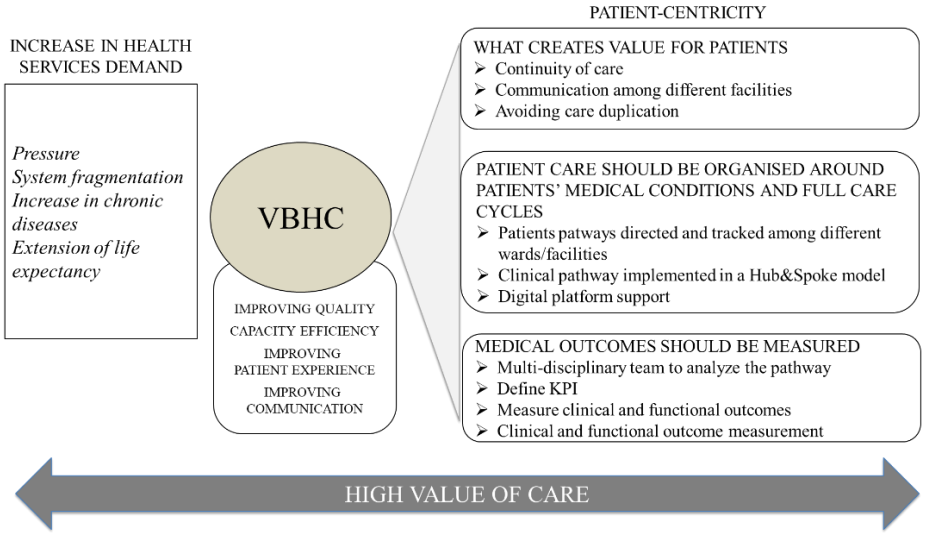
The figure 2 represents the implementation of VBHC of the specific S&SS LeanScientia service, considering all the dimensions that will be included in the future scenario.

Figure 2. Implementation of VBHC dimensions in S&SS LeanScientia



On the basis of Andersson et al. (2015) contribution, we develop a general framework of VBHC for S&SS LeanScientia service (Figure 3). A VBHC approach allows to focus on what creates value for patients, improving their experience of care; this approach allows also to organise the care around patients' medical conditions and entire pathway, following and tracking the patient's journey. At last, following this approach, medical outcomes need to be measured in order to improve the health of the population and cost efficiency. Implementing the full components of VBHC means working on improving patients' outcome and optimize patient pathway to deliver high-value care.

Figure 3. General framework of VBHC in S&SS LeanScientia



Conclusions

The strategic Value Agenda aims at moving from a fragmented system to an integrated one that is focused on creating value for patients, by understanding, analysing, measuring and improving the related clinical and functional outcomes. It requires rethinking the model and tracking the patients'

pathways overcoming the silos structure.

Instead of focusing on processes, efforts should be directed towards creating as much value as possible for the patient in terms of high quality healthcare, reducing patients' suffering, improving patient safety and achieving better cost-effectiveness (Porter & Teisberg, 2006). In a network perspective all the stakeholders cover a key role, especially clinicians, in implementing VBHC and create value for the patients.

VBHC is composed of several dimensions, even though in practices their implementation is often partial with the adoption of one specific dimension rather than integrating more components simultaneously. On this purpose LeanScientia is working to enlarge its contribution towards VBHC by implementing as many dimensions as possible, in order to achieve a more comprehensive application.

The transformation towards a value-based organization involves all the stakeholders: clinicians, services providers, patients, employees, suppliers that can all jointly enable and benefits from the potential scenario. On this purpose, it is necessary to highlight the importance of creating awareness about leadership and change management topic with training and education for developing new competences. This action will be essential to build a common framework in which all the stakeholders' network will be aligned towards a patient-centricity vision.

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Holistic and Inclusive Business Models in the Age of COVID-19

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Extended abstract

Since the year 2020, the World has been suffering from unexpected and horrific impacts of COVID-19. Millions of people died in isolation and many are still dying. People have been faced with lockdowns, curfews, isolations, mask mandates, vaccines, school and business closings, and shortage of essential goods and services. COVID-19 has been a "punctuation", a sudden and unexpected change, in the evolution of our systems as described in Punctuated Equilibrium (PE) Theory. Punctuated Equilibrium (PE) Theory was originally developed in the field of paleobiology to conceptualize that the evolution of animal species is irregular and not based on a continuous evolution and development. PE theory conceptualizes two periods of times, equilibrium periods and revolutionary periods. Equilibrium periods are longer and stable, where revolutionary periods are shorter and are caused by sudden punctuations that will change a system and its direction (Eldridge & Gould, 1972). PE theory was conceptualized as a response to Phyletic Gradualism (PG) Theory which suggests animal species evolve and follow a gradual pattern of progression without any interruption (Eldridge & Gould, 1972).

This article views COVID-19 as an example of a "punctuation" in the (PE) Theory, which has created an unexpected punctuation period since the year 2020 and for many years to evolve, with global financial crises, devastating healthcare crisis, massive supply chains interruptions, and dramatic reductions in the supply of essential goods and services. The authors of this paper examine the impact of COVID-19 in the context of PE Theory in the field management and organizational change (Gersick, 1991). In organizations, there is undisputed evidence that both equilibrium periods and revolutionary periods exist. During equilibrium periods, organizations enjoy a relatively long period of stability, growth, and prosperity with somewhat a predictable business environment. During this time, organizations make needed adjustments to their operations on a reactionary basis. On the other hand, during revolutionary periods and for a relatively short time, a sudden and unexpected punctuation disrupts organizations with a completely unpredictable business challenge. During the revolutionary periods, many organizations and economies will not survive and many will go through drastic transformations in order to survive (Gersick, 1991). COVID-19 has been an unexpected and sudden punctuation and has affected all organizations and economies globally.

To recover from the aftermath of COVID-19, nations have begun developing new business models. Traditional business models are not applicable. New business models must be holistic and inclusive. United Nation and United Nation Global Contact have developed two sets of principles that can be adapted and be used in the recovery efforts toward COVID-19 – UN Corporate Social Responsibility and Ten Principles of UN Global Compact (Mattera, et. al., 2021). Research suggests that there is a link between the three "Ps" of CSR and foundation of sustainable business model during very difficult economic times such as those created by COVID-19 (Mattera, et. al., 2021). In addition to CSR, another model that has been found as the basis of sustainable business models is UNGC (2020), which is linked to enhancing reputation and financial performance of organizations (Mattera, et. al., 2021). Adoption of ten core principles of UNGC and the three "Ps" of CSR have shown to produce long term financial value and reputation for organizations globally during crisis such as COVID-19 (Mattera, et. al., 2021).

Corporate Sustainability Framework (CSF) is another important research to be adapted for COVID-19 recovery. CSF conceptualizes a holistic and sustainable business model by integrating company system, stakeholders, approach, and sustainability such as communication with stakeholders, enhanced supply chains, innovative management and strategy, and lean operation and production (Lozano, 2018). Inclusive business models are also examples for policy makers and economies to use to engage in COVID-19 recovery. Inclusive businesses used seven creative business models to recover from COVID-19 by helping the poorest and smallest distributors to provide essential goods and services to the neediest in underdeveloped countries (Geaneotes, A. and Mignano, K., 2020). Seven creative business models are, (1) reorganization of their employees and new communication channels, (2) reliance on existing technology-based communication, (3) innovative distribution channels, (4) flexible payment methods, (5) modified goods and services, (6) enhanced benefits to distributors, and (7) donated to the most vulnerable and poorest (Geaneotes & Mignano 2020).

Digitalization and digital transformation are the most essential components of COVID-19's economic recovery and return to norm (OECD 2020a). Successful digital transformation of economy must take into account trust of end users, end users' access to technology in an inclusive manner, ability to be innovative, ability for new entrepreneur to enter the market and compete, encourage the use of technology, and opportunity for employment. Perhaps, the most important set of action items and visions were articulated by 699 CEOs of 67 nations (Sethi, B. et. al. 2020). These CEOs represented 67 countries with 42% of them from Western Europe. They represented a diverse set of industries – aerospace, automotive, consumer markets, energy, engineering, construction, financial services, forest, packaging, government, healthcare, hospitality, leisure, industrial manufacturing, insurance, pharmaceuticals, private equity, technology, media, communication, transportation, and logistics. Their actions items could be summarized in twelve area - digitizing core business operations and processes; digitizing products and services; and using virtual business model, Economic recovery has to be broad enough to reenergize COVID-19 full recovery and to ensure that inequalities of the past are not added to the current challenges (OECD, 2020b).

In conclusion, The authors examine the impact of COVID-19 in the context of Punctuated Economy (PE) Theory in the field of management and organizational change and considering COVID-10 as an example of "punctuation". They argue that new business models must be holistic and inclusive and that the adoption of United Global Compact 10 principles and the three Ps of Corporate Social Responsibility in order to produce long term financial value and reputation for organizations

globally during crisis such as covid-19. They point out that digitalization and digital transformation are the most essential components of COVID-19's economic recovery. For that purpose, they believe economic recovery could be achieved with seven creative business models (1) reorganization of their employees and new communication channels, (2) reliance on existing technology-based communication, (3) innovative distribution channels, (4) flexible payment methods, (5) modified goods and services, (6) enhanced benefits to distributors, and (7) donated to the most vulnerable and poorest. They believe these holistic and inclusive business model could pave the way for economic recovery. The recovery has to be broad enough to ensure that inequalities of the past are not added to the current challenges (OECD, 2020b). The true economic recovery must be holistic and inclusive.

Keywords

COVID-19, Punctuated Equilibrium Theory, Inclusive, economic recovery, digitalization

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Employee Engagement and Well-Being in Certified B Corporations: Can B Corp Certification Be a Resilient Structure for Employee Engagement and Well-Being?

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Extended abstract

A philosophical and cultural shift in society's definition of the purpose of a corporation has taken place over the last several decades. Organizations are expected to offer valuable products and services using socially and environmentally conscious approaches while also producing a profit (Marquis, 2020). While profit is necessary for all successful businesses to continue to operate, business leaders are being compelled to go beyond a myopic focus of shareholder primacy and think about how their organizations are intimately connected with their employees, their communities, their consumers, and the environment.

One movement that has shown promise in creating such an integrated sustainable business model is the certified B corporation movement. Certified B Corporations are for-profit organizations that are committed to a high standard of socially and environmentally responsible business practices (B Lab, n.d.-a). The first 82 B Corps were certified by B Lab in 2007, and as of this writing, there are over 4,300 certified B Corps in more than 77 countries and 153 industries (Alexander, 2018; B Lab, n.d.-c). Certification is accomplished through a rigorous and transparent evaluative process conducted by B Lab, the nonprofit that oversees the certification. Becoming a B Corp has been compared to achieving a Leadership in Energy and Environmental Design (LEED) certification for a green building or a Fair-Trade certification for coffee (Honeyman & Jana, 2019).

While a variety of interventions and measurement tools have been created, no one social and/or environmental measurement tool has emerged as the standard benchmarking tool (Grieco et al., 2015). Nevertheless, B Lab's measurement tool, the B Impact Assessment (BIA), has become one of the most recognized and prominent tools in the social impact measuring and reporting space. The BIA is a multi-impact area, multi-step certification process overseen by an independent Standards Advisory Council that regularly evaluates the best practices in the five areas of the certification: governance, workers, community, customers, and the environment (B Lab, n.d.-b). One concern

that has been expressed however, is whether the policies and standards of practice rewarded in the BIA to benchmark an organization's societal impact can be relied upon to effectively measure a company's competency at being "good" for workers, the environment, their community, etc. To initiate further study of this concern, a comparative correlational case study of the Workers area of the BIA was completed for a small group of certified B corporations.

Specifically, the study examined if the Workers Impact Score (WIS) could be relied upon to measure a company's effectiveness at being "good for workers." Scholars have long demonstrated that there are advantages to both the individual and the organization when companies develop cultures and implement policies, practices, and incentives that simultaneously strengthen employee engagement and well-being (Diener & Seligman, 2004; Huppert & So, 2013; Keyes, 2005, 2014; Robertson & Cooper, 2010). Therefore, in this study, "good for workers" was analyzed using a combination of employee engagement and well-being instruments. A Model of Employee Flourishing was also created and used to supplement the data analysis.

Engagement was grounded in social exchange theory (Saks, 2006), engagement theory (Kahn, 1990), the job-demands-resources model (JD-R) (Bakker & Demerouti, 2007, 2018) and the high employee involvement model (Lawler, 1986; Riordan et al., 2005). Social exchange theory describes how employees who feel valued and are treated respectfully by their employers reciprocate that behavior with higher levels of performance and engagement and other positive corporate citizenship behaviors (Bailey et al., 2017; Ilies et al., 2007). Engagement theory suggests three psychological conditions need to be met before engagement can occur: meaningfulness, safety, and availability (Kahn, 1990). The JD-R model divides working conditions into two general categories: job demands and job resources (Bakker & Demerouti, 2007). Research surrounding JD-R indicates that job resources are positively related to employee engagement and negatively related to burn-out (Maslach et al., 2001; Schaufeli et al., 2009). High-involvement work practices (Lawler, 1986) are characterized by employees perceiving their work environment to include participative decision making, information sharing, training, and performance-based rewards.

Well-being was theorized using self-determination theory (Deci & Ryan, 2000) and the PERMA framework of flourishing (Seligman, 2011). Self-determination theory (SDT) names three psychological needs (autonomy, competence, and relatedness) that are vital for healthy human functioning and development (Ryan & Deci, 2001). PERMA is a framework that incorporates five elements, each of which contribute to the overall measure of well-being or flourishing. The five elements are positive emotion, engagement, positive relationships, meaning, and accomplishment (Seligman, 2011). The PERMA model used in this study was extended to include the negative side of the mental health spectrum as well as physical well-being (Kern et al., 2014).

The employee engagement variable (BEE; $\alpha = .96$) used the Utrecht Work Engagement Scale (Kahn, 1990; Schaufeli et al., 2006), the Employee Involvement Climate Scale (Lawler, 1986; Riordan et al., 2005; Vandenberg et al., 1999), and four B Corp best practices (transparency, mission accountability, work/life balance, and diversity, equity, and inclusion). The well-being variable (BWB; $\alpha = .93$) integrated Seligman's well-being theory by using the PERMA Workplace Profiler (Kern, 2014; Seligman, 2011). The sample for the study was a convenience sample of eight certified B corporations gathered from personal and professional contacts within the certified B corporation community as well as snowball sampling from those contacts. There was good variability in the industry, sector, number of employees, and the WISs of the participating companies. Notably, it appears this research is the first study ever to gather data directly from employees, not just leadership, from a variety of certified B corporations.

The results of the study showed that even though many of the 427 respondents self-reported they were on average experiencing high levels of engagement and well-being, there was no significant correlation between the participating companies' median engagement (r_s= -.19, p = .651, n = 8) and well-being (r_s = -.57, p = .139, n = 8) scores and the participating companies' WISs. Nor was there any relationship between the engagement and well-being scores and the participating companies' number of employees, years in business, and number of times they have been certified. There was, however, a significant positive relationship (r_s = .762, p < .028, n = 8) between the constructs of engagement and well-being in the eight participating certified B corporations.

While the small sample size of the study limits its findings, the lack of correlation does raise several questions worth investigating further. Are there concepts missing from the model used in this study that could be added in future studies? Are there any concepts in the BIA that B Lab should consider refining to improve the certification? And did the external societal events (COVID-19, social unrest, and political unpredictability) during the data collection period influence the data collected? Still, even with this study's limitations, its future implications for practitioners such as B Lab's Standards Advisory Council as well as academics are notable. Future research recommendations include conducting longitudinal studies, surveying additional certified B corporations, using a mixed-methods study design, and continuing to operationalize the Model of Employee Flourishing.

Keywords

Certified B Corporations, B Impact Assessment, Employee Engagement, Employee Well-Being, multi-stakeholder cooperation

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Sustainable business model and organisational resilience: some evidence from the agri-food sector

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Extended abstract

During times of continuous and increasing dynamics, organisational resilience, defined as a firm's capacity to withstand environmental changes, has become a cornerstone for organisations (Meyer, 1982). Measuring resilience is a substantial challenge for analysts, and multiple definitions have been proposed. These have underlined the need for the organisational ability to react to the environment's changes through flexibility and adaptation, thereby often triggering an innovation process (Hardwick and Anderson, 2019). At the same time, innovations - which can be intended to react to external variations - are a substantial guiding factor toward sustainability transactions (Carraresi and Boring, 2021). In a broader sense, sustainability is the ability of a firm to survive and be successful over the long term (Golicic et al. 2017). Following this more comprehensive view, an organisation is sustainable when meeting the needs of the present without compromising the future (UN Documents, 1987), which is the crux of business survival in a complex market. In other words, companies' survival cannot fail to depend on safeguarding the future.

In a world where the shock caused by the Covid-19 pandemic was only the latest in a long line of disruptions (see, for example, the September 11th terrorist attacks and the recession period between 2007 and 2013), organisations face several challenges. A way to overcome these challenges and survive can be found in companies' innovating business models (BM) that represent a specific innovation trajectory towards sustainability (Bröring et al., 2020). Indeed, innovations can also be a process that allows organisations to respond to the call to change towards sustainability, requiring them to change some elements of their BMs (Bocken et al., 2013). A BM oriented toward sustainability, differently from a traditional one, embraces the economic perspective and the social and environmental aspects (Geissdoerfer et al., 2018), laying the groundwork for the firm's survival.

In summarising, it is possible to refer to resilience as a dynamic capability that enables firms to react to various external challenges (Teece, 2018; Carayannis et al., 2014), sometimes by reconfiguring their BMs, while sustainability represents a chance to face external challenges, seize opportunities,

and follow them by reorganising the BM. Sustainability transitions can trigger changes in the business, for example, concerning the products or services offered to consumers, the raw materials adopted in production, or how a process is carried out. These types of firms' reactions reflect the critical capacity to sustain a competitive advantage (Carayannis et al., 2014).

These issues are examined in the recent studies that have sought to grasp the connection between resilience and sustainability, but the results are discordant (Negri et al., 2020). Some studies assert that sustainability and resilience affect each other (Fahimnia et al., 2019). Some others consider resilience a separate concept from sustainability and involve a change in structure, process, or functions to increase the ability to persist (Flint et al., 2011). Some authors sustain that sustainability and resilience can be tied to joint synergistic activities or viewed from a trade-off perspective, while others have shown both positive and negative relationships (Ruiz-Benıtez et al., 2018).

This study tries to answer this research call by clarifying if a potential synergy between sustainability and resilience exists. In other words, the study attempts to offer a first broad answer on if and how sustainability could stimulate and promote resilience. Thus, the main research question is: How could sustainability help activate dynamic capacities that allows the organisation to be resilient and innovate its BM frequently?

This work considers the agri-food sector a pivotal one since an essential part of the challenges in modern society are linked with agricultural sustainability and food production. Research and innovation on food security and sustainable agriculture are among the "Horizon 2020" program. The United Nations' sustainable development goals underline that the agri-food sector must become more productive, more resource-efficient, more resilient, and less wasteful (Griggs et al., 2013). In particular, the study considers two companies: the first one is specialised in canned fish, while the second one is a winery enterprise. These cases are relevant for several reasons. Firstly, these businesses call for increased sustainability in BMs to safeguard marine habitats and the land (Peattie and Belz, 2010). Secondly, both the companies operate with social responsibility and attention to sustainability while simultaneously contributing to economic and cultural community development.

From a methodological point of view, this research uses a qualitative research design adopting the case study method (Yin, 2018). This approach offers the possibility of better understanding contemporary events (Neuman, 2014) and, in this case, the company's propensity to provide adequate solutions to adverse challenges due to changes in the external environment

The main adverse challenge of the last twenty years is the Covid-19 pandemic which represents one of the most catastrophic events for almost everything, including the global economy. In this scenario, the agri-food sector was among the hardest hit due to the immediate Ho.Re.Ca. market closures. For this reason, the firms targeted were interviewed immediately following the first Covid-19 waves (first half of 2021) compatibly with (and in respect of) companies' commitments, also considering the situations they were going through. Key-informant stakeholders operating at different organisational levels were involved in obtaining different viewpoints of the investigated phenomenon and building a chain of evidence. They were asked to answer questions about the company profile, types of products offered, types of clients, key activities, certifications, innovations, and sustainability and resilience propensity. Additionally, document analysis of companies' official websites and reports was used as supplementary information sources.

The proposed draft framework mixes the two different SBMs that the authors rebuilt after interviews.

As with every empirical analysis, especially in his early stage, the work presents some limitations, mainly attributable to the methodological choice. Although the use of a few cases (two in this work) has made it possible to sketch a first framework for the link between resilience and sustainability, it is deeply conditioned by the peculiarities of the case firms. In other words, the results obtained cannot be appropriately generalised, but they represent a starting point for a more comprehensive analysis. In this sense, multi-case studies (Eisenhardt, 1989) and subsequent comparative analyses would be helpful to complete/strengthen this first attempt at building a framework as proposed in the present study.

This paper contributes to the conference's overall aim by proposing an interpretation of the link between sustainability, resilience, and BM. In particular, this study represents a first exploratory step for understanding if and how sustainability activates dynamic capacities that allow the organisation to be resilient and innovate its BM.

Keywords

Sustainability, sustainable business model, organisational resilience, agri-food sector.

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COVID-19 and evaluation of institutional resilience

The framework of preparedness, agility, robustness, and impact in the society

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Extended abstract

Early January 2020 marks the starting point of the coronavirus outbreak in many countries around the globe. This outbreak embeds risks on various level, ranging from individual risk to risks on systemic and existential levels (Cook and Johannsdottir, 2021; Johannsdottir and Cook, 2019; Thurm et al., 2018). The first registered COVID-19 infection in Iceland was on February 28th, 2020, followed by meeting limitations, with limits set at 100 people, and closing of colleges and universities (The Directorate of Health and the Department of Civil Protection and Emergency Management, n.d.).

Scholars from Croatia, Iceland, Lithuania, Spain, and Romania taking part in an international ERASMUS+ team, leading a project titled *Teaching Institutional Resilience and Prompt Reaction to Crisis: Good Governance Experiences in Europe (TERRAGOV)*, have employed a specific framework for recognizing, through case studies, both inward and outward institutional or corporate resilience, and by evaluating preparedness, agility, robustness, and impact in the society during the COVID-19 epidemic. The evaluation of inward resilience was for instance based on risk management, capacity to react to crisis, capacity to adapt to change, etc. and outward resilience on the institutional contribution/impact in society, capacity to reach intended goals, collaborative activities, etc. This was then followed by expert evaluation governance performance in the crisis context, were each of the factors, preparedness, agility, robustness, and impact in the society, was graded on the scale 1-5.

One of the Icelandic cases was the main higher-education institution in the country, the University of Iceland (University of Iceland, n.d.). The argument for selecting the University of Iceland as a case is based on its societal impacts, as it is by far the biggest university in the country with more than 13,000 students, around 1,650 employees, and growing number of foreign students (University of Iceland, 2020a), therefore very important in societal context. It enjoys great trust in the society, according to Gallup survey in 2021, and the trust has been growing (Gallup, e.d.). Furthermore, the

University ranks high in international comparison, both in case of Times Higher Education World University Rankings and Impact Rankings (THE World University Rankings, n.d.). This makes the University an interesting case to explore.

In this case study announcements from the Rectors office were analyzed, as well as the content of a specific COVID-19 website created, https://english.hi.is/covid, providing information on the epidemic effects on students, advises from the psychologists at the Student Counselling and Career Centre, information for staff regarding working and teaching during COVID-19, effective restrictions, and more. The first announcement from the Rector was issued on February 27th, 2020, around the same time as the first case of COVID-19 infection was confirmed in the country, resulting in meeting limitations, with limits set at 100 people, and closing of colleges and universities (The Directorate of Health and the Department of Civil Protection and Emergency Management, n.d.).

The analysis revealed various measures that the University implemented in response to the COVID-19 epidemic in Iceland. This includes University of Iceland emergency response plan stating for instance the "*needs to make changes to operations and teaching arrangements without a new emergency level being announced, e.g. due to significant numbers of absences*" (University of Iceland, 2020b, p. 1). Rector announcements served the purpose of encouraging students and/or staff, such as providing flexibility regarding students learning, teaching, researching, and other staff working arrangements. The inward resilience had to do with the whole learning and teaching environment, which was reorganized and digitalized in a very steep learning curve. Three themes surfaced through the analysis of rector announcements, namely health and wellbeing, social implications, and technological and infrastructure implications.

Outward resilience refers to the instrumental role of the University in the society during the epidemic. Given increased unemployment in the society, an extended deadline was granted for application to undergraduate and graduate programs, offering of summer courses, temporary summer jobs for students, cancelling of events that could spread the virus, in addition to instrumental role of academics, scientists, and students in combatting the epidemic, such as through solutions or research in collaboration with the national university hospital, Landspítalinn. Based on the overall analysis, and with further arguments in each category the preparedness of the University was rated as (4/5), agility (5/5), robustness (5/5), and impact in the society (5/5).

The presentation proposed at the conference connects to the overall conference theme of sustainable business model challenges, in terms of economic recovery and digital transformation, given the major transformation needed to perform quality education, societal support, and research in a higher-education institutions during the COVID-19 epidemic. It furthermore associates with the subtheme of exploring organization impact, especially how preparedness, agility, robustness, and impact in the society contribute to institutional or organizational resilience.

Keywords

COVID-19, agility, preparedness, robustness, impact.

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New Business Models for Strong Sustainable Consumption in the Fashion Industry: The Case of SKFK

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Extended abstract

In recent years, sustainability has begun to acquire a significant prominence in the fashion industry (BOF and McKinsey & Company, 2020; Pedersen et al., 2018; UNECE, 2018). Currently, the fashion industry can hardly be said to meet the requirements of sustainable development and sustainable consumption (UNECE, 2018). The dominant business model of fast-fashion is leading the industry towards a state of unsustainability as consequence of constant demand for new regularly, changing fashion trends at an affordable price, a process that is facilitated by lower production costs in developing countries where multinational fashion companies have delocalized their production processes due to less stringent social and environmental standards (Ritch and Schröder, 2012). This approach contributes to overconsumption since the combination of low prices and latest trends increasingly encourage consumers to buy more garments than they need, resulting in premature disposal and fashion waste (Kozlowski et al., 2012). This consumption pattern is a major cause of fashion industry's negative impacts on the ecological and social environment along the entire supply chain (Pedersen et al., 2018). Today, it is estimated that more than 90 billion garments are sold and 15 million tons of garments are discarded annually across Europe and North America (Ellen MacArthur Foundation, 2013). The magnitude of this expanding global industry offers fashion businesses an outstanding opportunity to make a positive impact both on the environment and in global society. Having these numbers in mind, the fashion industry can play a major role in reaching the Paris agreement´s goal of climate neutrality by 2050 and the United Nations Sustainable Development Goals (SDGs), specifically SDG 12 aimed at ensuring sustainable consumption and production patterns.

Sustainable consumption can be pursued via two principal pathways: "weak" and "strong" sustainable consumption (Fuchs and Loreck 2005; Loreck and Spangenberg, 2014). The former argues that sustainable consumption can be achieved improving the efficiency of production-consumption through technological innovations. The latter, focused on sufficiency, is based on the pursuit of fundamental shifts in consumption patterns and reductions in consumption levels. To date, endeavors to minimize the detrimental impacts of fashion production have been supply-side driven through strategies centered on increasing the environmental efficiency of production processes and products –weak sustainable consumption-, instead of demand-side driven to

confront continuous (over)consumption levels –strong sustainable consumption-. While important, these efficiency improvements often lead to rebound effects in which increased efficiency results in more consumption (Bocken and Short, 2016), thereby not preventing the mass-manufacturing of clothing and its detrimental environmental impacts. Hence, it is not merely about redesigning the business on the supply side, but also about reconceiving how businesses operate on the demand-side by seeking more sustainable ways of delivering value to their customers (Bocken and Short, 2016; Tunn et al., 2019). In this light, sustainable business models from a demand-side perspective offer a potential pathway to deliver greater social and environmental sustainability through re-conceptualizing the purpose of the firm and value. However, despite its importance, extant literature has not sufficiently addressed how to implement this type of business models aimed at promoting sustainable consumption behavior (Bocken and Short, 2016; Tunn et al., 2019), i.e., aimed at reducing or moderating rate and volume of consumption (Bocken et al., 2014). This absence of role models for succeed implementation constitutes a significant impediment for fashion companies to more widespread adoption of this imperative approach.

In this context, the aim of this study is to investigate how companies can change consumer behavior through their business model and practices, this is, how organizations can implement a business model aimed at curbing clothing demand. For this purpose we carried out an exploratory case study of a Spanish fashion brand –SKFK to illustrate how fashion brands can effectively embed the strong sustainable consumption approach into their business model. The company was the first GOTS and Fairtrade certified fashion brand in Spain. Since the study of this type of sustainable business models is a new phenomenon, our research takes an exploratory, qualitative approach. Empirical data are collected through a semi-structured interview with the manager of the Marketing and Communication Department, as well as reports, news articles and other materials regarding the company. The study reveals that sufficiency can be embedded within the business model through multiple mechanisms including, among others: encouraging customers to do not buy more than necessary and prioritizing quality garments designed to last in the company communication; offering a repairing service to prolong the life-cycle and durability of its products; in-store collection of used garments in collaboration with Koopera, a Spanish cooperative, in order to be resold or upcycled into other SKFK products; and offering a totally innovative Circular Closet service founded on the idea of leasing clothing. Moreover, considering SKFK 20 year history, the business case shows that profitability and sufficiency-based business models are possible. This finding was particularly significant as it demonstrates that sufficiency-driven business models can be economically viable, while contributing to curbing over-consumption. Thus, this real world case study of strong sustainable consumption exemplifies how to effectively embed sustainability into business practices which will result in more sustainable production and consumption patterns.

Keywords

Sustainable consumption; strong/weak sustainable consumption; business models for sustainable consumption; fashion industry

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Sustainable business model and understanding the sustainable value framework

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Extended abstract

What sustainability can do for the businesses? What is the benefit of being a sustainable business? How a business can be sustainable? These are the questions that have arisen by many of academic and practitioners since the last decade (Santos, Pache and Birkholz, 2015; Joyce and Paquin, 2016). One approach these questions is sustainable business model (SBM) that emerged from the expansion of business model (BM). BM is the logic of the companies for creating, delivering, and capturing value for the customers, while SBM encompasses the holistic view of the value and goes beyond customer value. This means that SBM is the BM which creates, captures, and delivers value not only for the customers but also other key stakeholders (See., e.g., Lüdeke-Freund and Dembek, 2017; Dentchev *et al.*, 2018). By this definition, it is clear that the concept of value in BM and SBM is different. In the literature of SBM, the concept of SV is discussed instead of value. SV is creating value for the key stakeholders. It includes social, environmental, and economic value (Bocken *et al.*, 2013; Evans *et al.*, 2017). Many scholars have mentioned that the core of SBM is creating SV (e.g., evan 2017).

Despite the growing interest in the concept of SV, the knowledge of sustainable value creation (SVC) remains limited (Aagaard and Ritzén, 2020; Lüdeke-Freund *et al.*, 2020). Therefore, this research addresses this research question: how the key stakeholders perceive the SV, and how this perception helps the organizations create SV? And the main objective of this research is to better understand the concept of SVC.

To answer the above research questions, the exploratory sequential mixed methods approach was applied. Understanding SV and SVC is complex, and there is a lack of holistic meaningful understanding of this complex issue in the literature. Since one type of research is not enough to understand the problem, I used the mixed method to better understand the problem compared to using only one of the qualitative or quantitative approaches (Creswell, 2015). To answer the research question, I needed a qualitative study because it focuses on human perception and understanding (Stake, 2010), and the qualitative research is needed when there is a lack of "holistic and meaningful" understanding of how complex, real-life system of process works (Yin, 2011). In

another word for confirming the extracted result from the qualitative study and generalization of the result, a quantitative study is required. Therefore, mixed method approach fits this study as it can "simultaneously address a diverse range of confirmatory and exploratory questions, while a single approach study often addresses only one or the other" (Teddlie and Tashakkori, 2010, p. 9). In terms of data collection methods, qualitative data was generated through semi-structured interviews while the survey was used to collect quantitative data.

By studying the SV from the stakeholder perspective, this study is expected to contribute to the SBM and SV literature, particularly to sustainable value creation. Moreover, the majority of the studies explained the relationship between social, environmental, and economic value in the concept of the SV, while this study expects to add to this understanding by introducing the other concepts that can explain the linkage between social value and environmental value with economic value. In another word, this study expects to explain the bridge between social and environmental value with economic value creation.

Keywords

Sustainable value, Sustainable value creation, Sustainable business model, Qualitative study, Survey

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The Role of Organisational Trust and Leadership Attitudes in Adaptation to the Post-Pandemic New Normal in Workplaces

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Extended abstract

Problem statement and questions

The COVID pandemic had a significant impact in the workplace; ways of working, communication channels, and line-manager – line report relationships have changed swiftly and dramatically (Carroll & Conboy, 2020). In early 2022 the previously evident personal and face-to-face relationships in most workplaces are not entirely present anymore (Ahrendt et al., 2021); digital work and remote / home office are part of business as usual (Galanti et al., 2021). Several scholars and practitioners suggest that these practices will stay with us in long term as 'the new normal' (Bonacini, Gallo & Scicchitano, 2021; Caligiuri et al., 2020).

Organisations, employees, and leaders could benefit from a wider and deeper understanding of the adaptation process to the new normal. We adopt organisational psychology approach, considering the COVID-era for organisations as a crisis event-induced change management process (Komodromos, Halkias & Harkiolakis, 2019; Pearson & Clair, 1998).

Several research underpin, that leaders play a key role in organisational adaptation to a crisis situation (Mumford et al., 2007), in particular, transformational leadership appears to be the most effective across different organisational cultures (Bowers, Hall & Srinivasan, 2017; Pillai, 2013). Besides, leaders' information management and decision making, considered as crisis management is substantial (Hadley et. al., 2011). The shift from personal to virtual relationships affects organisational trust (Breuer et al., 2020; Fiol & O'Connor, 2005), that is connected to effective crisis

management (Mishra, 1996) and also serves as a mediating mechanism between transformational leadership and organisational performance (Katou, 2015).

Considering the above, our research investigates how the challenges and solutions due to the increasing proportion of digital and remote / home office work are related to organisational trust, crisis management and transformational leadership style in public, for-profit, and non-profit types of organisations and different organisational cultures. Our research questions and hypotheses are:

Q1: What are the outcomes of remote work experienced by leaders in different types and cultures of organisations during the COVID-era?

We hypothesise that

H1: There are differences in the outcomes among public, for-profit, and non-profit organisations.

H2: There are differences in the outcomes among organisational cultures.

Q2: How are those outcomes connected with organisational trust, crisis management, and transformational leadership style among different organisational cultures?

We hypothesise that

H3: Higher level of organisational trust, effective crisis management and transformational leadership are connected with more positive outcomes in all cultures.

Q3 What are the differences across the COVID-waves from outcome, organisational trust, crisis management and transformational leadership perspectives, that can be used as learnings for building future business models of adapting to crisis?

We hypothesise that

H4: The relationships between the outcomes and examined variables (organisational trust, crisis management, transformational leadership style) differ wave by wave.

Method

We asked leaders via questionnaires during the four waves of the COVID-pandemic in Hungary about their leadership and organisational challenges and solutions connected with remote work. Additionally, we have measured their crisis management (Hadley et. al., 2011), leadership style (Bass & Avolio, 1992), and organisational trust (Shockley-Zalabak et. al., 2000).

Participants

Organisational leaders completed our questionnaires at three points in time: after the first wave of the pandemic (March-June 2020; 300+ responses), during the joint second-third wave (Nov 2020–Jan 2021; 300+ responses), and during the fourth wave (Oct-Dec 2021; 700+ responses). Although the sampling was not longitudinal, all three samples show similar characteristic: consisted mainly of experienced leaders (Mdn = 9 years in leadership role), distributed almost equally among lower-, middle and executive-level managers. Our respondents worked for for-profit, non-profit and

public types of organisations of all sizes, and in diverse organisational cultures, including 'hierarchy', 'market', 'team', and 'adhocracy'-type cultures (Cameron & Quinn, 1988).

Initial results and preliminary findings

Q1: Based on preliminary data analysis, leaders' main challenges were related to establishing a partnership with their team in the new circumstances. Specific issues included communication problems, monitoring performance, motivating staff, and maintaining team cohesion and employees' organisational identity. Respondents were also affected by longer working hours and the blending of work and non-work times. They addressed these challenges mainly by new forms of interaction, and additional time dedicated to communication and digital cooperation solutions. Our initial results suggest that these measures were not sufficient in addressing all the challenges.

H1: Leaders' experiences and difficulties differed by organisational type. The daily work of managers in the for-profit sector was the least affected by the pandemic situation compared to public and non-profit sector managers. Leaders in the public sector had the hardest time, experiencing the highest increase in both volume and variety of tasks, which may be explained by our finding that this sector was the least prepared for digital remote work. These results are consistent with previous research findings that digital transformation, as a prerequisite for remote work, poses a significant organisational challenge to the public sector (Edelmann, Schossboeck & Albrecht, 2021).

H2: We have found differences in the first wave of the pandemic among organisational cultures: 'adhocracy' and 'team' cultures experienced more negative outcomes compared to 'hierarchy' and 'market' cultures.

Q2, H3: Additionally, we found that leaders' crisis management and transformational leadership style are closely related to organisational trust: they exert their impact on the organisation through formation of trust. These leadership attitudes differ by organisational culture in favour of person-centered ones, also explaining the advantage of these cultures in the long-term adaptation to the pandemic and post-pandemic situation. The above findings suggest that organisational trust, transformational leadership and effective crisis management contribute to the (re-)establishment of partnership between leaders and their team, which can serve as a basis for the post-pandemic new normal.

Q3, H4: Organisational trust was affected by pandemic-related restrictions, which showed different patterns across waves by organisational culture. Trust in person-centered 'team' organisational cultures remained the highest, although the first wave affected this culture the most. On the other hand, regulation-centered cultures like 'hierarchy' and 'market' scored lower in organisational trust: despite reporting fewer operational problems, they experienced an increasing loss of confidence wave after wave, which might be explained by their slower adaptation to their employees' needs during the new normal.

Our preliminary findings are in accordance with previous research results regarding the positive organisational effects of transformational leadership (Lowe, Kroeck & Sivasubramaniam, 1996) and organisational trust (Dietz & Den Hartog, 2006) in the organisational adaptation process.

Further analysis may allow us to create a model of organisational and leadership adaptation to the post-pandemic situation, informing new business models from an organisational psychology perspective.

Keywords

new normal, organisational culture, organisational trust, remote work, transformational leadership

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Track 3.3 - Entrepreneurship for social inclusion: business modelling for impact

Track chairs: *Filippo Giordano (LUMSA University) and Alessandro Lanteri (Hult International Business School), Lucia Marchegiani (Roma Tre University)*

It is a common knowledge that entrepreneurship can boost social inclusion by allowing marginalized people (such as the very poor, women in many contexts, minorities, disabled and disadvantaged, refugees, convicted and former convicted) to engage actively in productive economic activities. The ability of this kind of entrepreneurial initiative to have an impact is strictly linked with the necessity to set sustainable business models.

The track aims at attracting scholars to present research and business cases to discuss the link between sustainable business modelling and impact generation.

Hybrid partnerships in the system of International Development Cooperation

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Abstract

The International Development Cooperation system has recently been enriched by opening the possibility for for-profit enterprises to contribute to achieving sustainable development goals through inclusive and sustainable entrepreneurial projects in the target countries of cooperation. However, the entrepreneurial system does not yet seem ready to take up the organizational challenges implicit in the "Profit for Development" paradigm: the creation of inclusive businesses and/or hybrid organizations to create shared value. Through the analysis of the projects presented to the Italian Agency for Development Cooperation, the article highlights the reality, rather distant from the myth. In particular, traditional enterprises still lack the mindset and required competencies to engage and manage hybrid partnerships that put together for-profit and not-for-profit organizations at both national and international levels. This is also testified by the conservative approach in human resources management (HRM) strategies and policies. The paper discusses the empirical results while offering a novel interpretation and a theoretical contribution to the stream of research on hybrid partnerships.

Keywords

Development Cooperation, Inclusive Business, Inclusive Business Model, Human Resources, Sustainability

1. Introduction

International Development Cooperation (IDC) has undergone a significant change over the last decades due to economic and political pressures (Degnbol-Martinussen and Engberg-Pedersen, 2003). The original concept of international aid based on a vertical transfer of financial and

knowledge inputs from developed to poorest countries has gone out of date. Human rights have a positive economic effect (Blume and Voigt, 2009), and sustainability is the north star to stimulate transformational processes in advancing societal wellbeing and creating positive social change – PSC (Stephan et al., 2016), thanks to a *coopetitive advantage* (Morioka et al., 2017). The relationships between business, society, and the environment have finally been recognized as interdependent (Porter and Kramer, 2006; 2011), and the Creation of Shared Value is considered even more necessary within Developing Countries (Cafferata, 2009): businesses are being expected to fill a widening leadership vacuum in society in achieving the Global Goals (Ghosh and Rajan, 2019), being trusted more than government (Deloitte, 2018). Moreover, global competition and the need to find new customers have recently led to research on disruptive innovation in radically different or new markets for future competitive advantage (Hart et al., 2016). As a result, the market is shifting on the periphery with "sustainability-driven" business models (Haigh and Hoofman, 2012), stressing the importance of corporate citizenship (Deloitte, 2018).

An increasing global understanding envisions the private sector as part of the global IDC system to reduce inequalities (Deloitte, 2018b) and alleviate social and environmental issues (Santos et al., 2015, Haigh et al., 2015). Private for-profit firms have been increasingly engaged in pursuing sustainable development, which "could not be externally directed but requires local ownership and sufficient capacity to guide the process" (Fowler, 2013, p. 3). The acknowledgment of this new sentiment has led to several supranational and national innovations, such as the Agenda 2030 (UN, 2015), the new European Consensus on Development (EU, 2017), and national legislation.

In this vein, the Italian reform law 125/2014 of the international development cooperation system has introduced the concept of "Profit for Development." Coherently, the Italian Agency for the Cooperation and Development (Agenzia Italiana per la Cooperazione allo Sviluppo, hereafter AICS) has launched a program in 2017 to fund entrepreneurial projects that are in line with the Agenda 2030. This has led to an annual bid to foster the engagement of the private sector in IDC.

To be noted that the concept of profit-for-development, which is inspired by theories on inclusive business (IB) and inclusive business models (IBM), should be investigated from the perspective of hybrid organizations (Schoneveld, 2020) with particular reference to cross-sectoral (Austin and Seitanidi, 2012) or hybrid partnerships (Zhu and Sun, 2020). Thus, this paper aims at investigating the response of the Italian private sector to the challenges envisaged by the institutional changes in IDC towards the Profit for Development.

The piece of research presented in this paper focuses on the outcome of the AICS bids of 2017, 2018, and 2019. In particular, this paper analyses the projects that were submitted and those that were selected. We focus on the organizational challenges linked first to the capacity of firms to participate in the bid and then to the development of the project if selected. As part of the AICS team that collaborated in managing the bids, the authors had premium access to the call documentation. Thus, the analysis presented in this paper is based on primary and original data. The results show a limited response to the AICS call for action and a lack of capability to balance HR practices in dealing with the domestic and local workforce. Nevertheless, increasing attention of the private sector for the IDC is detectable, and some of the projects correctly target the sustainable development goals. This paper also discusses several limitations that should be addressed in the future while offering a novel interpretation and a theoretical contribution to the stream of research on hybrid partnerships.

2. Theoretical background

2.1 International Development Cooperation

We distinguish two major groups of actors that have been involved in the different stages in the evolution of IDC, namely: 1) Governments and Non-Governmental Organizations (NGOs); and 2) firms and private actors, both not-for-profit organizations (NPOs) and for-profit firms (FPOs). While the two groups have pursued independent actions for decades, the boundaries between the two streams have slowly blurred and converged in 2015, opening up opportunity spaces for hybrids (Holt and Littlewood, 2015). These may be defined as organizations "combining different logics of operation [...] for the bridging and blending of logics, traits, and ideas from the different organizational 'ideal types' they reflect" (Alexius and Furusten 2019, p. 549). As stressed by Austin et al. (2006, p. 372), "the distinction between social and commercial entrepreneurship is not dichotomous but rather more accurately conceptualized as a continuum ranging from purely social to purely economic. Even at the extremes, there are still elements of both". Moreover, it is possible to distinguish between 'organic hybrids' and 'enacted hybrids' (Doherty et al., 2014). This institutional change is due to two phenomena: 1) a pro-business *zeitgeist* (Dees, 1998); 2) the marketization of the non-profit sector (Eikenberry and Kluver 2004; Liu and Ko, 2012; Mullins et al., 2012). We may synthesize this process as follow: Efficiency for NGO, "Humanization" for Private for-profit Enterprises, and it emerged as shown above.

Started after WWII, International Development Cooperation (IDC) in the beginning and until the 1970s was essentially a public action, devised, planned, funded, and implemented mainly by governments, state agencies, and intergovernmental (i.e., multilateral) institutions. Private for-profit organizations (FPOs) had a secondary and limited role in IDC during that period, usually as contractors or providers. Later, since the 1970s, national and international civil society –private not-for-profit organizations (NPOs) entered the stage (Wegner, 1993), often with humanitarian concerns and approaches, and with strong governmental support and sometimes direction.

FPOs, especially large corporations, did engage –and do increasingly nowadays– in philanthropic initiatives (which partially overlaps with charity) in the so-called developing countries. However, we will not consider philanthropic initiatives in this paper as they should not be confused with genuine corporate social responsibility (Zamagni and Bruni, 2013).

From a theoretical perspective, although ethical issues were embedded at the dawn of political economy (Smith, 1790), it is only since the 1980s that business ethics attracted increasing interest among corporations and scholars. This produced several concepts and approaches (Corporate Social Responsibility, Triple Bottom Line, Corporate Social Entrepreneurship, Shared Value Creation, Global Corporate Citizenship) that highlight the opportunities that emerge from the engagement of the private for-profit sector in IDC.

The increased awareness of firms' social responsibility and other theoretical approaches suggested that FPOs could, and should, contribute to sustainable and inclusive development –besides economic growth– in the Global South while making profits. During the 2000s, thanks also to the UN Millennium Agenda and related MDGs, the two aforementioned factors converged to shape a widespread international consensus about the potential and possible positive role of FPOs in IDC. Some milestones of this process were (Knutsson, 2009): A) the UN Global Compact, a voluntary initiative launched in 2000, based on CEO commitments to align strategies and operations with

universal principles on human rights, labor, environment, and anti-corruption, and take actions that advance societal goals; B) the 2002 UN World Summit on Sustainable Development in Johannesburg, where the *Type 2 Partnership Initiatives* were created; these initiatives, unlike traditional UN intergovernmental cooperation, include private companies; C) the Second High-Level Forum on Aid Effectiveness held in Paris in 2005, where, beyond ministers and officials from donor and recipient countries, also representatives of private companies participated.

Finally, in 2015, at the end of the Millennium Agenda, the UN *2030 Agenda for Sustainable Development* recognized the role of FPOs explicitly: *"Private business activity, investment, and innovation are major drivers of productivity, inclusive economic growth, and job creation. We acknowledge the role of the diverse private sector, ranging from micro-enterprises to cooperatives to multinationals, and that of civil society organizations and philanthropic organizations in the implementation of the new Agenda."*[31]

2.2 Inclusive and sustainable business and Social Entrepreneurship for SDGs

Prahalad and Hart (2002) clarified that FPOs have the opportunity to unlock the business potential through technological innovations that allow producing affordable products for the poor, untapping the fortune at the Base of the Pyramid (BoP). In other terms, FPOs may pursue globalization strategies pushing for inclusive growth, which "diminishes trade-offs between growth and inequality because the poor become enfranchised as customers, employees, owners, suppliers, and community members" (George et al., 2012, p. 662).

Parallel with the *Washington Consensus*, the idea of inclusiveness in business emerged in the 1990s with Structural Adjustment Programs (SAPs) in developing countries (Likoko and Kini, 2017). MNCs are nowadays invited to look at globalization strategies through a new lens of inclusive capitalism (George et al., 2012; Yunus et al., 2012; Prahalad, 2009) capable of generating inclusive growth via Inclusive Business (IB) and Inclusive Business Model (IBM). The "inclusive business model" is defined by the UNDP «Growing Inclusive Markets» initiative as a commercially viable business model that benefits low-income communities by including them in the company's value chain as consumers, producers, entrepreneurs, or employees (UNDP, 2008). IB embraces shared value creation. Diminishing trade-offs between growth and inequality (George et al., 2012; UNDP, 2010), successful IBM are commercially viable business ventures that engage BoP populations, such as poor, disenfranchised people (Halme et al., 2012), or *wasted* human resources (Ranjatoelina, 2017). They are direct to those in social exclusion or vulnerability who cannot transact with commercial firms under standard commercial terms (Eldar, 2017).

In light of the aforementioned peculiarities, the UNDP (2010) relates the concept of IB to two other concepts: Social Enterprise / Social Business (SE/SB) and Corporate (Social) Responsibility (CR/CSR). Even if the latter may boost development (Hopkins, 2012), it does not influence the core business; companies do not have to consider "inclusive businesses" just as peripheral CSR-projects but as a vehicle to future markets (UNDP, 2010). Au contraire, the common characteristic of SE and SB is that they have a transactional relationship – which can also be considered as a good measure of impact - with their beneficiaries, which can be either purchasers of the firms' goods/services or suppliers of inputs (including labor) to the firm (Eldar, 2017).

[31] (Paragraph 67 of the Declaration of Resolution A/RES/70/1)

Both SB and IB contribute to the creation of shared value. However, scholars and practitioners define and use the concept differently (Likoko and Kini, 2017). The two kinds are sometimes seen as opposing since they differ in some aspects, such as economic sustainability and value proposition. It is possible to consider Social Business as a Business for the Low Income Sector (LIS), while inclusive business is for the Low Income Community (LIC) (Michelini and Fiorentino, 2012).

From the organizational point of view, SB and IB can be read from hybrid organizations' perspective (van der Byl and Slawinski, 2015). In fact, the IB experiences strategic and organizational tensions in an attempt to fairly balance social, environmental, and economic objectives (Schoneveld, 2020).

Recent research has highlighted the positive nexus between Social Entrepreneurship, SDGs, and some related topics (e.g., Wang et al., 2020; Günzel-Jensen et al., 2020; Eichler and Schwarz, 2019; Littlewood and Holt, 2018; Quiroz-Nino and Murga-Menoyo, 2017; Doherty, 2018). There is also evidence that Hybrid Organizations play a relevant role in achieving the SDGs in domestic (Horne et al., 2020) and foreign issues (Conway et al., 2019). However, SDG applicability is still challenging for enterprises since it depends on quantifiable outcomes that reach SDGs targets and indicators. Not all firms can measure the plethora of benefits they bring to society (Tabares, 2020). As George et al. (2012) mentioned, a central question concerns its impact on the lives of the poor. Prahalad and others have argued that the main issue for reducing poverty is bringing the BoP into the market, regardless of the services or products sold. Research shows that this is not necessarily true (Karnani, 2007; Banerjee and Duflo, 2011). Moreover, we lack a theory that identifies the structural and functional elements that make hybrid organizations more effective than others (Eldar, 2017). The construction of partnership appears to be paramount to seize the cross-sectoral (Austin and Seitanidi, 2012) or hybrid (Zhu and Sun, 2020) opportunities and overcome limits in the inclusion of the BoP in the value creation process, coordinating activities with various stakeholders present in different countries and effectively share information and knowledge about best practices with local partners (Brugmann and Prahalad, 2007). Therefore, in IDC, partnerships are crucial to implementing IB models and responding to a wide range of social problems while benefiting partner organizations. However, the use of these forms of collaboration is generally not widespread (Murphy et al., 2015), and the role of partnerships, given their importance for the development and implementation of IB, deserves to be further problematized (Schoneveld, 2020). In light of these trends, we posit the following research propositions:

RP1: *"What is the Italian trend towards the Profit for Development concept?"*

RP2: *"Are the inclusive and sustainable business projects in the IDC comparable with hybrid models, and how effective are they?"*

2.3 Human Resource Management in Inclusive and Sustainable Business

Internationalization and globalization and the emergence of the knowledge society make Human Resource Management (HRM) pivotal for companies' success and performances (Chlivickas, 2014). Three key dimensions – 1) human capital acquisition, 2) human capital development, and 3) human capital retention – are a measure of coherence and effectiveness of the company's operations and its missions (Harris and Kor, 2013). These aspects have to be respectful of exogenous factors such as laws and regulations, language, and cultural barriers that vary from region to region (Forbes, 2011). Therefore, companies may face strategies and methodologies of doing business very

different from those they are accustomed to. Therefore, an effective combination of local and global knowledge is needed since financial capital is not enough to innovate inclusively; it is inadequate to improve the human condition in resource-scarce settings (George et al., 2012).

Diversity and an inclusive workforce are crucial drivers of innovation and critical components of global success. Enterprises have to be culturally sensitive (Forbes, 2011) since there are many specific human resource system development characteristics in various countries and under different conditions (Chlivickas, 2014). Human capital development policies require culturally sensitive and creative solutions designed for specific contexts. For instance, Asia-Pacific companies are much more likely to have diversity programs related to age or nationality; European companies look at disability or sexual orientation (Forbes, 2011). Demographic factors cannot be overestimated: the global workforce is getting younger, older, and more urbanized. Millennials "don't want a career; they want an experience" (Deloitte, 2014, p. 3). The wellbeing of the worker, and therefore his commitment and loyalty, does not depend on a single characteristic of the activity but on a set of elements that must be integrated into the design of work itself rather than being addressed with adjacent programs (Deloitte, 2021).

This shift toward a "human-centered approach" (ILO, 2019) requires a more flexible career management model, more oriented to the person than the organization. Success will reside in the psychological perception of the individual (Pelaez, 2019).

Indeed, the HRM style will change accordingly to the enterprise we are looking to. Research on the private sector is abundant, but knowledge of social enterprises as a context of study for HRM is limited (Newman et al., 2015). Researchers have started inquiring about the applicability of frameworks developed from examining HRM in for-profit organizations (Roumpi et al., 2019). Even if essential human and financial capital inputs are pretty comparable between social and commercial entrepreneurship (Austin et al., 2006), in the former, the traditional employer-employee relationship is replaced by the emergence of a diverse workforce ecosystem (Deloitte, 2018). Moreover, the involvement of multiple stakeholders is a frequently occurring feature of governing social enterprises (Royce, 2007). Hybridity creates both challenges and opportunities, which, in turn, influence mission and resource mobilization (Doherty et al., 2014), shapes and goals that may reflect a tension between the social and commercial soul of the organization (Borzaga & Solari 2001; Dees, 1998). This may also be reflected in a more problematic definition of needed profiles because the tasks are difficult to standardize (complexity of relational and social work), and soft skills may be more important than hard skills.

In some instances, IB may still use traditional frameworks of HRM, while SB/SE cannot. Borzaga and Solari (2001) stress the importance of HRM in SEs because of the existing internal management challenges. Companies need to build effective ongoing relationships with every segment of the workforce ecosystem (Deloitte, 2018). There is not one HRM system that applies to all situations; it is critical to pursue efficiency via enhancing people's preferences and the quality of intersubjective relationships (Amendola & Troisi, 2004). Therefore, depending on the workforce segmentation, organizations should use multiple systems of HRM practices simultaneously (Roumpi et al., 2019).

Good recruitment is crucial, but it is only the starting point to be supplemented by significant internal development efforts: formal and informal training, which play complementary yet distinct roles in human capital development (Harris and Kor, 2013). Since "the power of teams comes from their ability to connect people with each other to unleash their collective capabilities" (Deloitte,

2021, p. 16), practices and training – formal and informal – aimed at developing a "Team reasoning/we-thinking" (Bacharach, 1995; Sugden, 1993) for a human focus enterprise able to reinvent itself on the back of perpetual disruption continually (Deloitte, 2021) seems more than necessary. As Dees (1998) pointed out, engineering a new organizational culture is anything but easy.

All considered, this paper also sets the following research proposition:

RP3: *What HRM practices are used in the new inclusive business projects to account for the need for qualified human capital?*

3. Empirical context and methodology

Italy undertook a reform of its development cooperation in 2014 (law 125/2014). Law 125 anticipates the primary objectives and principles evoked in the 2015 Un Declaration, especially concerning the role of the private profit sector. In line with other important donor countries, the reform introduced the new Italian Agency for Development Cooperation (AICS), established in 2016. Also, the new law "recognizes and supports firms' contribution to the development process of partner countries" (art. 27). Based on this critical institutional change, in 2017, AICS published its first call for development projects by private companies. The data presented in this paper have been collected through a thorough examination of the documents submitted by each applicant.

Although the resources allocated to this call were relatively small compared to traditional cooperation channels (e.g., NGOs, Local Governments, Multilateral Organizations), the call represented a significant innovation in the Italian cooperation and Italian business environments. In fact, until 2017 –excluding a handful of firms– the Italian private for-profit sector had not shown a widespread interest in such projects. Furthermore, there is no well-established customary collaboration between Italian FPOs and NPOs in developing countries beyond philanthropy.

Consequently, the 2017 AICS call for FPOs was an innovation and a great challenge, as the Italian context does not seem to be a breeding ground for such initiatives. In line with international best practices, the call showed a co-funding ratio required to the applicants (except start-up firms) of at least 50% of the project's total value. The call was formally launched by a public bid released at the end of July 2017; 25 projects were submitted in response to the call, and 13 were considered eligible for financing. Subsequent bids were issued in 2018 and 2019. The 2018 bid elicited 40 proposals and selected 23 projects; the 2019 bid received 52 proposals and selected 15 projects (Figure 1).

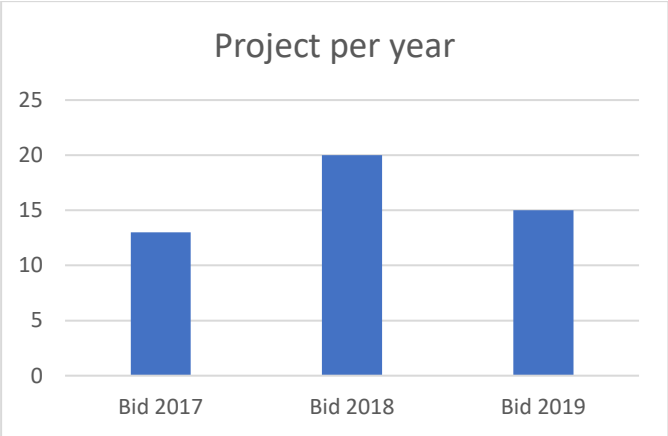

Figure 1: trends of projects eligible per year

The study was articulated in two phases. First, the author performed a desk analysis of all the project proposals submitted to the bids through text analysis and descriptive statistics. As a second step, the authors performed a quali-quantitative case study of the projects of the first bid that have already kicked off. The selection was justified by the need to collect data about the implementation of the projects, which in the case of the 2018 and 2019 bids has also been delayed due to the Covid-19 pandemic outbreak.

The primary data were collected through telephone semi-structured personal interviews with the managers responsible for the companies that participated in the bids. Seven out of the thirteen companies that started an inclusive business project following the first call of 2017 were included in the qualitative analysis. They represented a wide range in size and age, including big corporations and start-ups. The interview protocol focused on the general status of the project, with a specific focus on the balance of power, decision-making, and procedures between the organization in the home country and the establishments *in loco*.

4. Discussion of the results

First, it is interesting to discuss the projects that have been submitted in response to the call. To this end, the following section provides a brief overview of all the projects submitted, with a particular focus on those that were selected and funded.

In response to the first public bid, AICS received proposals by 25 firms, of which two did not pass the administrative checks. Although the number of proposals is not high in absolute terms, in the light of previous caveats about the Italian environment and being this the first call of this type in the country, the number can be considered fair. A technical commission evaluated the 23 proposals and selected 13 of them. The fact that only 60% of submissions were selected depends mainly on most proposals' poor technical quality. The average technical score of the 23 proposals was 45.9/100; nine proposals got a score below 50/100 –the minimum requirement– and therefore were not selected. Even the general quality of the chosen proposals was relatively low, as their average score was 60.4/100. Consequently, the Agency devoted great effort to communication activities to raise awareness of the potential benefits of the inclusive business projects for prospective applicants. These communication activities resulted in a higher number of projects submitted to the second bid and also a greater quality level of the projects. In fact, the average score of all the eligible projects raised to the value of 86,87/100.

The third bid was delayed due to the outburst of the Covid-19 pandemic, which could have caused a lower number of submissions. In fact, the first deadline was initially set on January 31, 2020, but it was postponed to June 15, 2020. The average score of the 15 projects that received positive assessments was 79,01.

The detailed composition of these scores reveals the great difficulties of proponent firms in building good partnerships with both Italian and local organizations in designing inclusive projects that are economically sustainable and innovative. In turn, these problems reveal widespread insufficient expertise and capability of most Italian FPOs to formulate development cooperation projects and, therefore, catch emerging opportunities in low-income countries. As far as the destinated countries are concerned, Figure 2 shows the distribution of the funded projects considering all the bids.

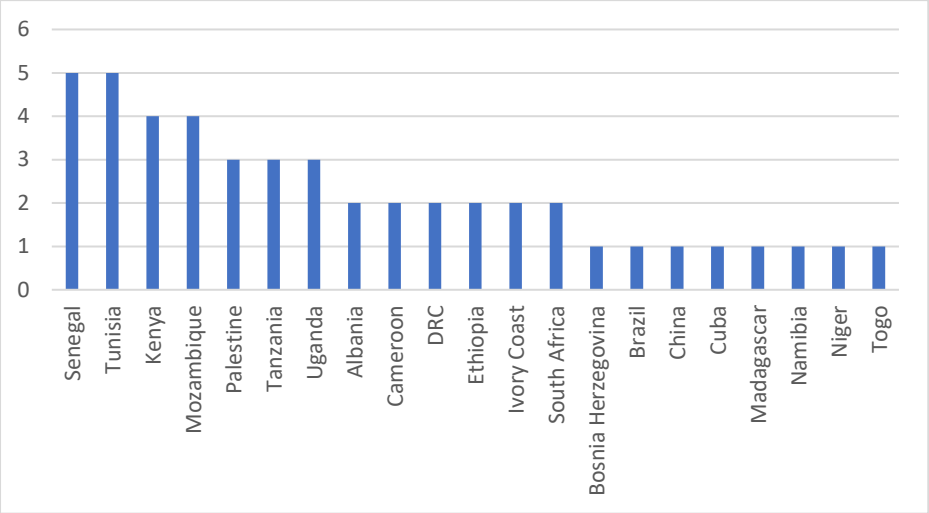

Figure 2: distribution of the projects per country, all bids

It is also interesting to focus on the sectors represented by the funded projects (Table 1).

Table 1: Description of the funded projects per type of applicants and per sector

	Bids			Total
Sector per types of applicants	2017	2018	2019	
New projects proposed by established firms	2	10	9	21
Agriculture		2	2	4
Agrifood		1	3	4
Cosmetics			1	1
Healthcare			1	1
Pyrethrum supply chain		1		1
Renewable energy		2		2
Social entrepreneurship support	1			1

Tourism			1	1
Waste management		1		1
Water purification	1			1
na		3		3
Training			1	1
Start-ups	4	7	3	14
Agriculture	2		1	3
Agrifood		2	1	3
Childhood accessories		1		1
Fashion		1		1
Fasshion			1	1
Renewable energy		1		1
Social entrepreneurship support	1			1
Tourism		2		2
Training	1			1
Scaling-ups	7	6	3	16
Agriculture	1			1
Agrifood		1	1	2
Agroforestry	1		1	2
Climate change	1			1
Energy		1		1
Healthcare		1	1	2
ICT		2		2
Renewable energy	1			1
Social entrepreneurship support	1			1
Tourism	1			1
Waste management	1	1		2
TOTAL	**13**	**23**	**15**	**51**

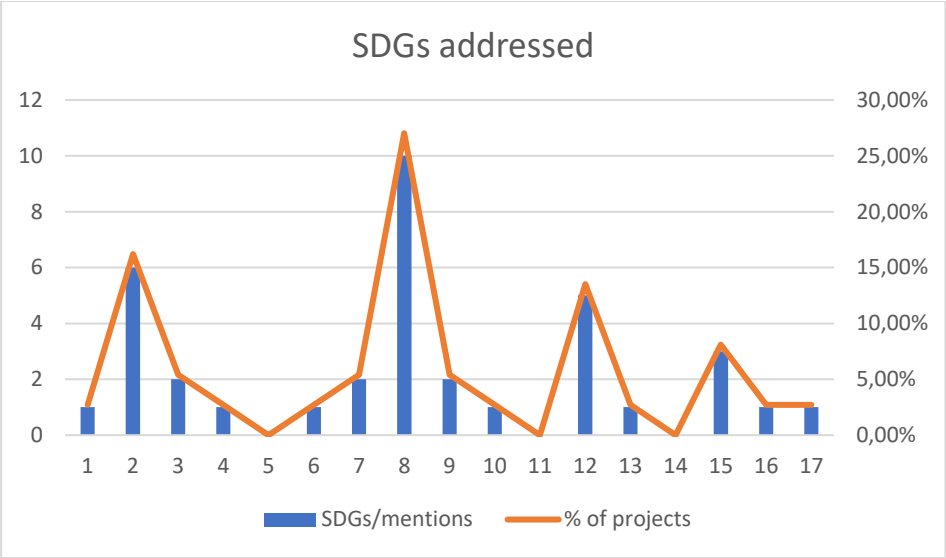

Figure 3: SDGs addressed by the applicants of the Bid 2019

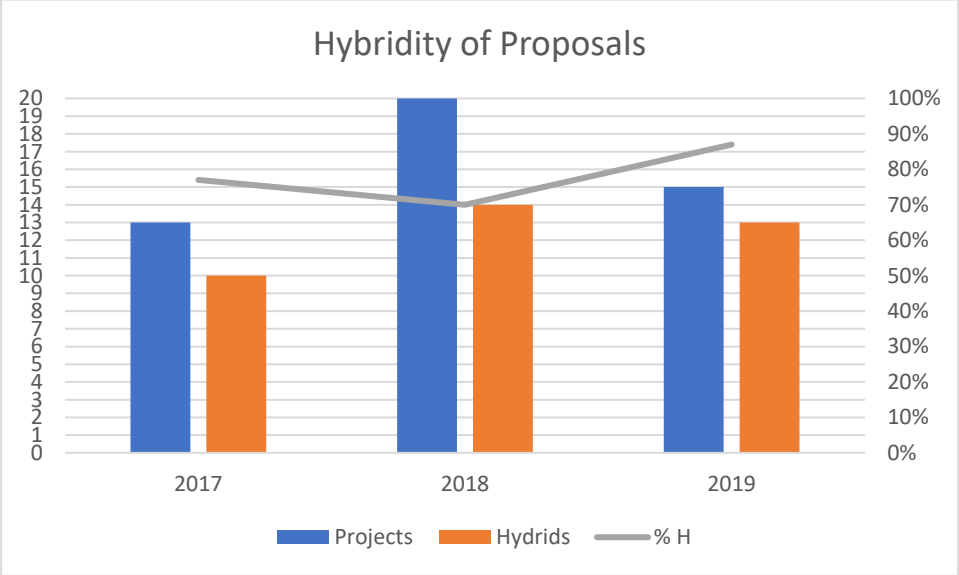

Figure 4: the hybridity of the proposals in the three years

Since the peculiarity of international development cooperation projects is the construction of partnership both vertical (value chain perspective) and horizontal (civil society organizations), a further analysis concerns the level of organizational hybridization that the selected companies of the Bids have demonstrated through the proposals presented.

From an organizational point of view, it is possible to analyze this ability to finalize positive business relationships, such as the ability to develop hybrid business models capable of pursuing business purposes, typical of for-profit companies, with holistic and positive sustainability impacts, typical of not-for-profit organizations.

With an average score of 78% across the three calls, the partnerships built by the candidates show a mixed composition in which public, private and third sector parties play different roles, as shown in Figure 4 and Table 2.

With an average score of 78% in the three bids, partnerships built by the applicants show a mixed composition in which public, private and third sector parties play different roles (Table 2).

Table 2: Hybridity of partnerships within the three years.

Bids	*Projects*	*Hybrids*	*% H*	*Public actors*	*Private actors*	*Third sector*
2017	13	10	76,92	3	0	7
2018	20	14	70,00	3	14	14
2019	15	13	86,67	6	10	10

The bid 2017 shows a clear dichotomy in partnership construction between private, public, and third sectors. However, this was reduced in the following bids, where most proposals further mixed and enriched types and number of partners (table 3).

Table 3: composition of partnerships in the three years.

BID	*Project*	*type of partner*			*N. of Partners*
		Public	private	third sector	
2017	1	X			2
	2	Not declared			
	3			X	1
	4			X	1
	5	Not declared			
	6	X			1
	7			X	1
	8			X	1
	9			X	1
	10	Not declared			
	11	X			1
	12			X	2
	13			X	1
2018	1	X	X	X	6
	2			X	2
	3		X	X	5

	4			X	2
	5		X		1
	6		X	X	3
	7	X		X	4
	8		X		1
	9			X	2
	10		X		2
	11			X	1
	12		X		1
	13		X	X	2
	14		X	X	2
	15			X	2
	16	X	X	X	6
	17		X	X	4
	18		X	X	2
	19		X		1
	20		X		1
2019	1		X	X	2
	2		X		1
	3	X	X		2
	4	X	X		6
	5			X	1
	6	X	X	X	3
	7	X	X	X	9
	8	X		X	3
	9		X	X	2
	10			X	1
	11		X		1
	12		X	X	2

	13			X	2
	14			X	1
	15	X	X		2

The co-funding rules of at least 50% led to another significant result in terms of private resources that have been allocated to the projects, and therefore to IDC, as shown in fig. 7 and 8.

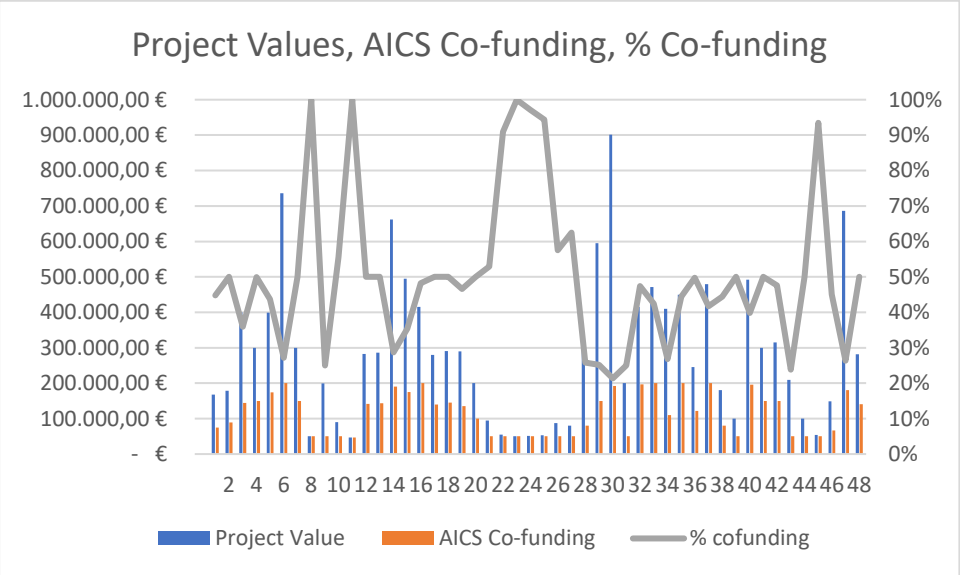

Figure 7: Project Values and Co-funding

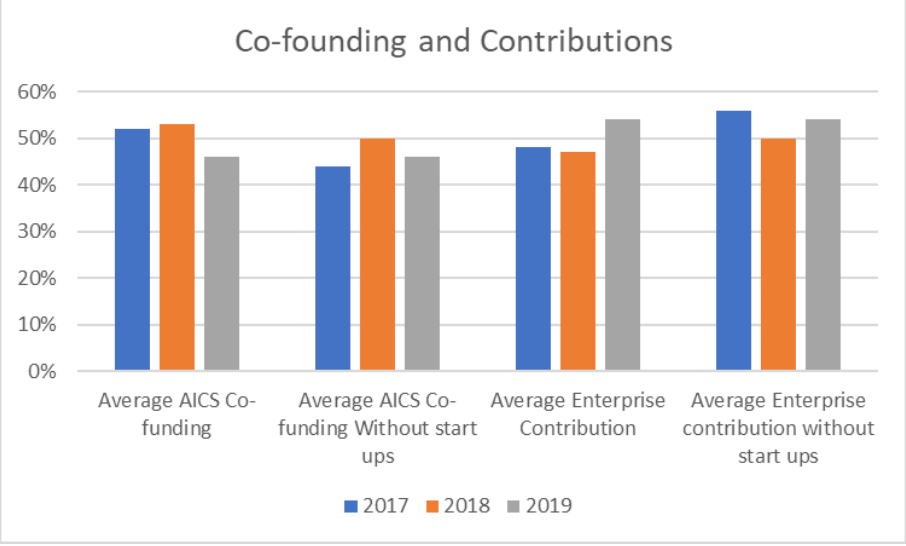

Figure 8: the differentiation in enterprises contribution and AICS co-funding in the presence or not of start-ups that are entirely funded.

4.2 Qualitative analysis of the HRM practices

With regards to the involvement of the local workforce in the different phases of the value chain, all the activities not strictly linked to the physical production of the goods were planned and developed in the domestic offices, and in several cases, the ad hoc opening of a local office of the

company to manage more closely all the logistics or bureaucratic activities, therefore relating to contracts or those concerning marketing and advertising maneuvers, as well as social communication. All tasks were assigned and carried out by the Italian staff or others by the company's project manager, who had received training in Italy.

Regarding the recruitment and selection of personnel, in cases where the activity was large enough not to allow the company to work with part of its personnel by transferring them from Italy, the companies have primarily relied on local staff search intermediation services. After providing a list of the profiles and jobs they needed, they were contacted with a list of potential candidates, followed by face-to-face interviews, aptitude tests, and other tools that companies in traditional business activities usually use.

In many cases, the training and retraining process of the personnel was managed directly by the companies. In most of the projects examined, the local workforce was unable with previous skills to carry out the task that would have been assigned or due to lack of methodological knowledge or knowledge of using, for example, the appropriate machinery. In general, the level of specialization has rarely been rated satisfactory by companies. Also, in this context, the practices and tools of training activities did not differ much from the usual ones of domestic businesses, if not in the very difference in the specialization of workers and farmers, in the different work culture, and conceiving an economic activity.

As far as the human resources practices are concerned, it is worthy of focusing on recruitment.

The recruitment process should consider both the needs of the company and the expectations of the candidates. In traditional business, the criterion for selecting workers is satisfied mainly by objective data (curricula vitae, letters of presentation, previous experience, technical skills acquired, etc.). In the inclusive business, the candidates' technical-productive skills should be pondered along with their psychological profile and how congruent this is with the company's needs and culture. Therefore, the method used in most cases, curricula screening (which assesses the suitability of candidates according to objective requirements such as the languages known or the level of education), was integrated with other evaluation methods. One of these, among the most used, is the motivational interview. During the recruitment phase, it makes it possible to simultaneously provide the organization and the person involved with precise information on their propensities, expectations, and beliefs. Other selection tools used are similar to the realities of the first and second sector, such as presentations, references, psycho-attitudinal tests.

5. Conclusions

Although it is not possible to assess the actual sustainability outcomes of the projects funded by AICS, the discussion of the preliminary data opens up to some conclusions. First, the relatively small number of applicants suggests that the private sector mostly neglects the business opportunities paired with international cooperation (RP1). According to Deloitte (2018b), even if a vast majority of businesses publicly support the SDGs, only a few believe the current programs and initiatives their businesses have set are capable of helping achieve the goals of the Agenda 2030.

Second, not all the projects were in line with the principles of IDC, and in some cases, they were instead projects of internationalization (RP2). This implies that some private actors are not fully aware of the modern approaches to CSR principles, not to mention IDC principles. This is reflected by some proposals of the bids for 2017 and 2019. The last bid taken into consideration could have

also suffered the pandemic's effects on shrinking partnerships compared to the bid 2018. Notwithstanding, the hybridity of proposals is an increasing factor in terms of proposals and partnerships' heterogeneity (in number and type), overrunning an initial dichotomy (private/public/third sector) shown in the first bid. However, even if data show an increasing interest in the engagement of FPOs in IDC, proponents in most cases were not familiar with some peculiarities of hybrid models. For instance, there is still a managerial gap to be solved, especially when creating hybrid organizations and workforce management, which cannot be recruited and trained with traditional frameworks (RP3).

All considered, our study shows that private sector engagement in IDC should be pursued both by raising the awareness of the market opportunities and by educating the private actors about the core principles of responsibility and international development cooperation to increase the quality level of such initiatives.

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Plastic Household Waste Valorization in Developing Countries:

critical design elements for a sustainable and circular business ecosystem

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Keywords

Waste valorization; sustainable business models; ecosystem perspective; circular economy; bottom of the pyramid; informal sector; developing countries

Extended abstract

Transitioning from a linear 'take-make-dispose' economy to a sustainable and circular economy focused on renewable resources and circular pathways, requires new business models valorizing what is currently considered as waste (Donner et al., 2021; Leder et al., 2020). Waste valorization does not only play an important role in the transition to a circular economy, it can also provide significant opportunities for improving livelihoods, generating jobs and improving living conditions in least-developed countries. As an example, Africa's urban population is expected to double from now until 2050. This growth would be mainly concentrated in informal settlements, which is already the home to about 63% of urban population in least-developed countries (Bauer, 2020). New business models focused on valorization of waste can stimulate both informal and private sector involvement, relieving the pressure on local authorities to provide basic services such as waste management, which is already quite challenging because of insufficient resources and lack of managed disposal sites (Godfrey et al., 2017).

Business models exist within (business) ecosystems. Stakeholders in the ecosystem have a large influence on an organization's business model and often determine an organization's success (Gradl & Jenkins, 2011). This study addresses the multifaceted problem of household plastic waste valorization in least-developed countries from a holistic ecosystem perspective. An ecosystem perspective is necessary to prevent partial solutions for waste valorization that do not address the root causes and to involve dynamics between actors in the ecosystem as an integral part. An ecosystem perspective on business models for the transition to are more circular waste management system has recently been applied by Kanda et al. (2021) who show that "ecosystems are a more appropriate concept to describe the high-level coordination between stakeholders

necessary to implement circular systems", increasing the suitability to analyze, plan and communicate circular systems on an organizational level. We extend this knowledge by deriving important design factors for such circular business ecosystems, therefore adding towards the practical use of the insights of Kanda et al. (2021), by analyzing two waste business ecosystems in least-developed countries.

The research objective is to derive important design factors that need to be taken into account to develop a socially and economically viable circular business ecosystem for *plastic* household waste valorization. To derive such design factors we build on business ecosystem research, which acknowledges several interconnected stakeholders, value networks, social and environmental issues as well as the local context (Peltola et al., 2016), to derive root causes for the current state of low waste valorization in least-developed countries and distill design elements for sustainable business models addressing plastic household waste valorization. To do this, we qualitatively examine the structure and process of plastic household waste value retention and capture in the current waste business ecosystems in urban areas in Malawi and Zambia. For each country extensive data collection consisting of questionnaires, interviews, focal group discussions, and stakeholder meetings, are conducted (many by the first author herself), to provide input for a thorough root cause analysis. Data collection is visualized in table 1. Qualitative data coding was used to analyze the data and to derive common themes and patterns to uncover root causes. The data could be grouped into four categories: infrastructural challenges, policy challenges, processor challenges and others. Malawi and Zambia were chosen, due to their close proximity, similar demographics (although Zambia is ahead in terms of economic development). Additionally, both have expressed their interest to work towards a circular waste management system and were willing to contribute in-kind to this study.

The root cause analysis showed that for both countries plastic waste valorization seems stuck due to three root causes. First, policy focuses on regulation, i.e. "sticks" such as prohibitions and limitations, limiting options for plastic remanufacturers and recyclers to develop a profitable business case, instead of providing "carrots", positive incentives throughout the value chain to stimulate plastic reduction, separation, collection and valorization. Second, it is challenging to secure sufficient volumes needed for profitability in remanufacturing or recycling. There is hardly any separation of waste in both countries, due to lack of incentives for households to separate, insufficient resources to engage in collection in general, let alone separated collection (in Malawi 20% of waste is collected in urban areas, in Zambia 45% is collected in urban areas, while in either country there is hardly any collection in rural areas), and most waste is dumped at open or illegal dumpsites. Plastics get contaminated at the households, during transport or at the dumpsite (mainly by decaying organics), decreasing their value, and plastics that still have value are buried quickly under new waste. Thus, at this moment, the only way that plastic waste can still be valorized is through collection by informal waste pickers at dumpsites, who account for 97% of all collected plastics. However, these only choose high-value easy-to-collect products and there is only a small collection window until the waste gets buried or contaminated beyond repair. Third, margins on recycled plastic products are low, due to high electricity prices, absence of available technology within the country and high cost of securing enough plastic waste (Dijkstra et al., 2020).

Application of a business ecosystem perspective on the root cause analysis, results in the following design elements for a sustainable business ecosystem addressing plastic household waste valorization in developing countries: (i) the role of the informal sector should not be

underestimated and should be properly incorporated in the value chain, (ii) a new actor is needed between collection services and waste disposal sites in the form of collective facilities to arrange for separating, aggregating and transferring waste to the recycling industry (Barnes et al., 2021). Only waste that has insufficient value is then transferred to disposal sites. (iii) an open dialogue is needed between the private and public sector in which policy not only regulates but also stimulates the private sector via synergistic carrots and sticks, and (iv) upstream value chains should have a decentralized character, stimulating communities to invest in waste separation and collection.

Insights from this study show that an ecosystem perspective on circular waste valorization leads to meaningful results in least-developed countries and concrete implications for business model design to create circular ecosystems. Additionally, our insights can help entrepreneurs by defining and adapting their waste valorization strategies within the local context and help them shift from linear value chains to a circular system, it can also help policy makers in understanding barriers experienced with valorization in the sector, thus stimulating them to streamline policy with private sector needs. We conclude that individual businesses need to evolve towards a more dynamic and integrated business model in which separation, collection and valorization are closely connected.

TABLE 9: DATA COLLECTION METHODS FOR MALAWI AND ZAMBIA

STAKEHOLDERS	Tools used	Malawi	Zambia
Local Authorities	Questionnaires and interviews	10	2
Government Departments/ Institutions	Interviews/ Questionnaires	3	2
NGOs	Interviews/ Questionnaires	5	4
Academia	Questionnaires	3	0
Companies + Business Council for Sustainable Development in Zimbabwe	Interviews/ Questionnaires	15	10
Household Waste Samples collected and characterized (* Used Data Collectors)	Sampling kits (e.g scales, gloves, waste bags)	180	90
Household questionnaires administered (*Used data collectors)	Questionnaires	300	273
Learning visits to companies active in waste valorization	Learning visits	4	8
Focal group discussions with companies active in waste valorization	Focal group discussion	0	2
Stakeholder meetings with 20+ private and public parties	Stakeholder meeting	2	2
TOTAL		**522**	**393**

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Community-supported business models

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Extended abstract

In the face of worldwide societal challenges, exploring resilient and sustainable ways of doing business becomes increasingly important. Community-supported businesses[32] (CSB) gradually attract scholarly attention as a sustainable alternative to conventional businesses (Bazzani et al., 2013; Bolton et al. 2016; Cristiano, 2021; Francis et al., 2005; Medici et al. 2021; Salladarré et al. 2018; Soley et al. 2019).

However, little is known about CSB's underlying business models. Understood as sustainable business models (Aagaard et al., 2021; Lüdeke-Freund et al. 2018; Lüdeke-Freund, 2010; Stubbs & Cocklin, 2008), community-supported business models (CSBM) describe a businesses' core architecture. This architecture encompasses three elements: value proposition, creation and capture (Bocken et al., 2013; Fielt, 2013). A blend, fit, or balance between these elements is crucial for a business model's success (Fielt, 2013; Mahadevan, 2000; Payne et al., 2020; Sjödin et al., 2020). In this research, we explore CSBM by analysing how CSB propose, create and capture value.

To do so, we apply a four-stage process: sampling (Saunders et al., 2009; Saunders & Lewis; 2017), data collection (Glaser & Strauss, 2010; Glaser, 2001), data analysis (Gioia, 2021; Gioia et al., 2013; Kuckartz, 2020; Mayring & Fenzl, 2019), and typology formation (Kelle & Kluge, 2010; Kluge, 2000). First, we identify 24 initiatives from two major CSB networks in Germany: MYZELIUM and CSX Netzwerk. The 24 CSB stem from various business fields like food, health, or energy. Second, we collect secondary material for each CSB by screening their websites, newspaper, magazine and blog articles, as well as transcribed podcast records. Third, we work through the 67 documents with

[32] Community-*supported* businesses are not to be confused with community-*based* businesses (CBB). In CBB, a group of people mutually establishes a business, usually to revitalise regions (Peredo & Chrisman, 2006). Consequently, CBB are found *by* a community of people (Bacq et al., 2020). In contrast, CSB are found *for* a community of people. Usually, single entrepreneurs or small teams create CSB (Löbbering 2018; Rommel 2017). Similarly, CSB are not to be confused with cooperatives. Cooperatives are democratically owned by their members (Boone & Özcan, 2014; Schneiberg, 2013). Again, these are controlled *by* a community of people (Bacq et al., 2020).

qualitative content analysis to analyse how CSB propose, create and deliver value. Fourth, we empirically develop a typology of CSBM (Kelle & Kluge, 2010).

We identify eight dimensions in which value proposition, creation and capture in CSBM differ: the role of community, impact orientation, participation of members, key activities, process transparency, financial contribution, financial transparency, and needs orientation (see figure 1). Moreover, we develop a typology encompassing three types of CSBM: utilitarian, relational and hybrid CSBM (see figure 2). Utilitarian CSBM understand community as a means to achieve a specific value in value proposition. This type of CSBM creates value under low participation of members and captures value through a fixed or staggered contribution. Relational CSBM understand community as an end in itself, create value under high participation of members and capture value with a solidary contribution. Hybrid CSBM possess utilitarian and relational attributes in equal parts. In value proposition and value creation, this type is rather similar to relational CSBM, whereas value capture resembles utilitarian CSBM.

Case	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Value Proposition																								
Role of community																								
Means			✓			✓					✓	✓	✓		✓	✓	✓		✓	✓			✓	✓
End	✓	✓		✓	✓		✓	✓	✓	✓				✓				✓			✓	✓		
Result orientation																								
Output											✓	✓											✓	
Outcome	✓	✓	✓	✓	✓		✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
Impact		✓	✓		✓	✓	✓	✓	✓	✓			✓	✓		✓	✓	✓	✓	✓	✓			
Value Creation																								
Participation of members																								
Passive		✓	✓		✓	✓					✓	✓			✓		✓	✓	✓				✓	✓
Active	✓			✓			✓	✓	✓	✓			✓	✓		✓				✓	✓	✓		
Key activities																								
Purely creating products			✓			✓					✓	✓	✓		✓	✓							✓	✓
Building community	✓	✓		✓	✓			✓	✓	✓				✓			✓	✓	✓	✓	✓	✓		
Creating spaces	✓				✓		✓	✓						✓			✓		✓	✓	✓			
Relevance of process transparency																								
Low			✓		✓	✓			✓			✓						✓		✓			✓	
High	✓	✓		✓			✓	✓		✓	✓		✓	✓	✓	✓	✓		✓		✓	✓		✓
Value Capture																								
Financial contribution																								
Fix											✓												✓	✓
Staggered			✓			✓						✓	✓		✓					✓				
Solidary	✓	✓		✓	✓		✓	✓	✓	✓				✓		✓	✓	✓	✓		✓	✓		
Relevance of financial transparency																								
Low			✓			✓			✓		✓	✓	✓		✓					✓	✓	✓	✓	✓
High	✓	✓		✓	✓		✓	✓		✓				✓		✓	✓	✓	✓					
Relevance of needs orientation																								
Low			✓			✓					✓	✓	✓		✓					✓			✓	✓
High	✓	✓		✓	✓		✓	✓	✓	✓				✓		✓	✓	✓	✓		✓	✓		

Figure 1 Dimensions and attributes of the 24 CSB in our sample

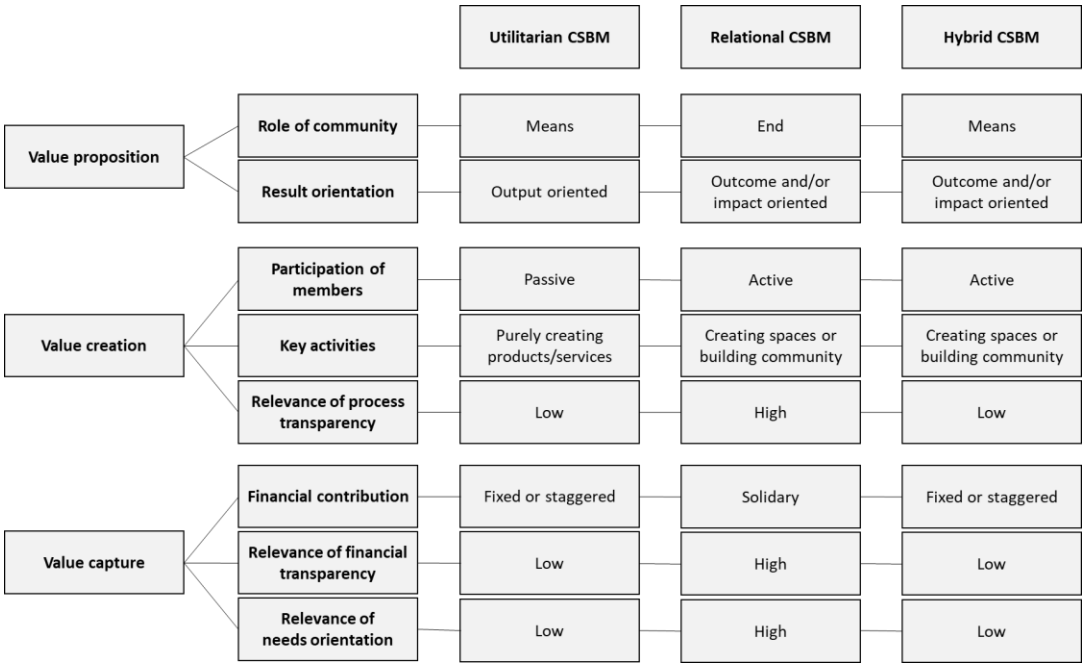

Figure 2 Typology of community-supported business models

Our findings indicate that utilitarian and relational CSBM possess a 'balance' or 'fit' (Fielt, 2013; Mahadevan, 2000; Payne et al., 2020; Sjödin et al., 2020) between value proposition, creation and capture. For example, relational CSBM put the community at the heart of each business model element. They understand community as an appreciated goal in value proposition, put community building at the core of value creation and conduct a solidary pricing model in value capture that might depend on mutual trust and a feeling of belonging. Similarly, utilitarian CSBM noticeably intertwine value proposition, creation and capture. They focus on creating products and services in each business model element. As community building plays a minor role, they get along with lower levels of process and financial transparency. As hybrid CSBM combine attributes from both utilitarian and relational CSBM, it seems that there is a mismatch or imbalance between the sustainable business model elements. For example, hybrid CSBM put effort into community building and actively integrate their members into value creation. However, they possess low levels of process and financial transparency in value capture. Although they have the potential to conduct bidding rounds for solidary contributions, they work with fixed contributions. Further analysis would be valuable to understand this phenomenon.

We contribute to the current research debate on sustainable business models by spotlighting CSBM as sustainable business models. Moreover, we contribute to the research discussion on CSB by showing that there is not only one type of CSBM but three types that differ in value proposition, creation and capture: relational, utilitarian and hybrid CSBM. By presenting these three types, we enable scholars to be more precise and define their research subject more clearly. Becoming aware of the underlying type of CSBM allows scholars to explore the outcomes of CSB in terms of sustainability. The three types of CSBM may bear different implications for CSB's environmental, social and economic sustainability. Finally, we contribute to the broader scholarly debate on value elements by introducing new dimensions and attributes that describe value proposition, creation and capture.

Great societal challenges demand policymakers to strike new paths. As CSBM are environmentally, socially and economically more sustainable than conventional business models, we recommend policymakers to become aware of this alternative to conventional business models. We invite policymakers to seriously consider CSB and CSBM in designing their political activities.

Keywords

Community-supported business, community-supported business models, sustainable business models, business model innovation towards sustainability, typology

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Determinants of Circular Business Model: Case Study of Developing Nation

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Extended abstract

In present decade, the circular economy has become a hot subject for discussion by economists in association with political agencies, such as international organization like OECD, United Nations, Eu, and different national/international financial institutions, representing a response for a sustainable growth (WHO, 2018; UN, 2020; EU, 2014; OECD, 2019). But in reality, linear economy has promoted the inequalities, food insecurity, and affecting the quality of life of many peoples (UN, 2020). These is no doubt that the economic growth of our planet has increased considerably in the last one hundred years at an increased speed, soon after the Second World War. This development has been confused and fast: every country producing almost everything with no planning. Just as an example, each EU citizen generates more than 4.5 tons of waste annually and almost half of it is disposed of in landfill sites! [1, 2]. Today we are in presence of a mature economy of the world. In recent years, entrepreneurship is treated as an important force that creates the jobs and enhances the productivity, stimulates economic growth, encourages innovation and also work for environment. So many entrepreneurs are working in circular economy. Therefore, the purpose of this study to explore the motives of circular entrepreneurs, why entrepreneurs engage in circular entrepreneurship in the lens of individual, institutional, and structural. In this paper, factor model is applied to investigate the important determinants of circular entrepreneurship.

We collected survey-based data from 10 markets of Gujranwala city of Pakistan. Snowball sampling technique used for picking the respondents because no comprehensive list of circular entrepreneurships is existing in these markets or in chamber of commerce. Sample size was 600 were conducted in each market with the help of four trained interviewers. Shockingly, this study reveals that only institutional factors are not serious but individual and structural factors are play a positive role to boost the circular entrepreneurial culture, at least in developing nations. The outcomes of this paper will help policymakers who work to promote the circular economy. Findings verified that individual and structural factors also have a significant role in the development of circular entrepreneurial culture. Government agencies can be considered important factors for taking policy decision to boost circular entrepreneurial practices in developing nations. This study

is pioneer to factorize the individual, structural, and institutional based determinants to explore the most important reasons for circular entrepreneurship.

Keywords

Circular economy, circular entrepreneurship, determinants, developing nations, pakistan

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Social Partnership with Multinational Enterprises (MNEs), and Micro, Small, and Medium Enterprises (MSMEs) in post-COVID times in an emerging economy – Integrating volunteering and social entrepreneurship as newer strategic healthcare model to achieve Sustainable Development Goals (SDGs)

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Extended Abstract

In the post-pandemic times, an emerging economy like India requires the gainful engagement of the youth, the aspiring population that contributes to more than 25% of the total population. An empowerment and capability enhancement framework can support and built an enterprising temperament among them. However looking at the core Government priorities in the present context, we proposed a new normal strategic sustainable social model involving the MSMEs, MNEs, and Community to address the need for social progress, sustainability, equity, and justice. To the best of the author's knowledge, this is a first-of-its-kind study in India. The research outcome may further help eradicate poverty, bringing better health, resilience, and prosperity to the country.

Context:

Health-related Sustainable Development Goals-3, (SDG-3) denote “Ensure healthy lives and promote wellbeing for all at all ages” (UNITAR, 2020), is compromised due to the unprecedented COVID 19 pandemic in the recent past. India is an emerging economy with a more than 1.35 billion population. There is a vast socio-economic, political, and geographic diversity in the country. Linguistic barriers, cultural distinctiveness, and demographic transitions are some of the crucial factors impacting daily life, influencing on health and wellbeing behaviors of this diverse population in the post-pandemic times. Despite a well-crafted fiscal and monetary policy support, there has been a 7.3 to 12.5 percent contraction of India’s economy in FY 2021-22 due to the COVID-19 pandemic. (World Bank, 2021). The pandemic has exacerbated pre-existing global problems, but solutions to many of those challenges already exist all around the world. However, in many cases, local solutions miss out on their potential by not being scaled up globally and thereby prevented from maximizing their impact for SDG achievement.

COVID-19 is an infectious disease spread rapidly across the globe by the Severe acute respiratory syndrome corona virus 2 (SARS-CoV-2) or nCOV virus, discovered in the year 2019 (WHO, 2020). This is further declared a global pandemic by World Health Organization. Subsequent mutated nCOV strains across the globe had an unprecedented impact, implicating socio-economic, political, technological, environmental, and legal (regulatory) disruptions worldwide (UNCTAD, 2020). The WHO regions and the countries from developing, developed, emerging, and rising economies were severely affected by this pandemic.

Globally, as of 08 April 2022, there have been 494,587,638 confirmed cases of COVID-19, including 6,170,283 deaths reported by WHO. India reported 4300 067 confirmed cases of COVID 19 with 521573 deaths (WHO, 2020a).

Though it is seen in the third wave most of the people infected with the mutated strains of COVID-19 virus experienced mild to moderate respiratory illness and get recovered without requiring special treatment. Older people and those with underlying medical problems are more likely to develop serious illnesses. To prevent and slow down the transmission of the virus and for preventive measures community and individuals should be well informed about the COVID-19 virus and should be abiding by preventive rules. Disease preparedness includes surveillance, testing and case management, infection prevention and control, contact tracing, and risk communication, community awareness and engagement play an important role in mitigating disease spread risks. (WHO,2020b).

The pandemic has significant health implications and mortality across the globe and in India. The country had taken swift and stringent public health actions. That includes lockdowns, citizen curfews, stopping of mass religious and social gatherings, closure of educational institutions, and restrictions on the movement of the public to prevent the spread of the infections during the first wave of COVID 19 pandemic. The Government advisories played a significant role in addressing the community's responsibilities. The pandemic crisis requires cumulative concerns and responsibilities both from the individuals and the community. The social leaders, public health professionals, health care managers, health care workers (HCWs), community health workers, and all other stakeholder collaborations and joint action can help mitigate such risks in the future. Volunteering as a social health measure is an important aspect of creating awareness, and engagement, to remove structural barriers and stigma in the community (Marston, C. et.al, 2020).

Disease spread is either due to wide misinformation or limited information on the disease. The hurdle to cost-effective disease prevention and control practices in communicable and non-communicable diseases in India is the lack of public awareness of risk factors and healthy behaviors (Hunter & Reddy, 2013). Awareness, education, and basic understanding of disease lead to responsible behaviors by the community. This can minimize the disease burden on the individuals as well as on the diseased segment (Sharma, 2015). The effectiveness of disease awareness advertising if sponsored by credible organizations and regulated by the government, will have a better impact on Society as per the physician's view. (Banerjee & Dash 2013).

Micro, Small, and Medium Enterprises (MSMEs) in the manufacturing and service sector contributed significantly to the growth of the global value chain (GVCs). The MSMEs play a vital role in the wider eco-system of multinational enterprises (United Nations, 2020). India has approximately 63.4 million MSMEs as of the year 2019. About 20% of MSMEs are based out in rural areas, which helps in rural employment. The MSMEs contribute approximately 24.63% of the GDP from service activities. (CII, 2019). Last-mile delivery has become easier due to better roads, while the KYC norm has made loans for SMEs easy. (Kashyap, 2020). These MSMEs can further be integrated more profoundly into the volunteering networks.

India has a 365 Million Young Population as of 2018 (UNFPA, 2018) growing, and India is home to a fifth of the World's youth population. Post pandemic unemployment rate for India is 7.80% for the year 2021. The urban population was affected more in context to the rural population. The unemployment rate for urban is 9.04%, whereas, for the rural, this is 7.23% (CMIE, 2021). Youth engagement is an important driver in contributing to the progress of any country. Volunteering can be viewed as a new social dimension to integrate youths into various activities to achieve social progress in terms of better health, education, poverty eradication, sustainability, equity, and social justice. Collaborations, alliances, and partnerships can help re-energizing volunteering to achieve the SDGs (UN GTM, 2020). Sustainable business ventures are influenced by internal factors, such as strengths and weaknesses, rather than external factors, such as opportunities and threats, to engage prospective entrepreneurs. (Stefan et.al., 2021). Volunteering through united initiatives by combining local volunteering forces with global and vis-e-versa, addressing the minimal financial needs can further be an integrative approach and willingness of people to accelerate the progress in the post-pandemic times.

Based on the context, we proposed a newer sustainable social model involving the service sector MSMEs, MNEs with community volunteering as a new partnership model to address the need for social progress, sustainability, equity, and justice. It can further help eradicate poverty, bringing better health, resilience, and prosperity to the country.

Technical Approach and Methodology

We conducted a systematic desk research review, followed by qualitative research using an in-depth analysis (IDIs) tool involving the key stakeholders from the MNEs, MSMEs, and the community. Published articles and gray literature searched on poverty, unemployment, and social entrepreneurship models in an emerging economy like India. The search consideration included social, political, economic, and cultural contexts. The respondents were from the healthcare settings, NGOs, pharmaceutical organizations, and the key opinion leaders from the community for the qualitative research. We conducted online, telephonic, or face-to-face IDIs due to prevailing

COVID restrictions. The qualitative insights were analyzed in keeping the fast-paced complex development context in the post-pandemic times. Framing of the works was done involving the COVID 19 context challenges. The proposed model was developed after stakeholders' recommendations and suggestions.

Preliminary Findings:

Our preliminary findings suggested a pertinent role of MNEs, MSMEs, and Community partnerships in developing a community partnership entrepreneurship model. Emergence and acceptance of regional value chain integrating Global Value Chain to the last-mile delivery of public health goods, pharmaceuticals, and other health accessories require understanding, awareness, and availability, where community-driven entrepreneurship models have a definite role. The emerging social partnership model may engage people and youth as volunteers, ensuring global sustainable development efforts to achieve SDG 3 towards better health in the post-pandemic times.

Study Limitations:
The existing research requires a quantitative study involving a large-scale sample survey which can be more pertinent from a broader policy perspective.

Originality:
To the best of the author's knowledge, this is the first of its kind study in India, on the social entrepreneurship and volunteering partnership model involving MSMEs, MNEs, and communities towards resilience, better health, social progress, equity, and justice in the post-pandemic times.

Keywords

Social Entrepreneurship Partnership Model, Volunteering, MSMEs, MNEs, Social Equity, Justice, Poverty

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The Economic and Social Impact of Incubators' Activities on Businesses and their Stakeholders in Sub-Saharan Africa

A systems perspective

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Extended abstract

There is growing attention for business incubation as a means to support business survival and growth around the world. Business incubators are seen as a key driver of economic growth, job creation and poverty alleviation because they intend to reduce business failure rates and stimulate entrepreneurial activity (Assenova, 2020; Msimango-Galawe and Hlatshwayo, 2021). Therefore, the number of business incubators has grown explosively, not only in developed countries but also in emerging countries. In void institutional environments, there is often a lack of good quality education, entrepreneurial culture and access to resources which are critical for business growth (Mrkajic, 2017). Business incubators can fill these voids by providing access to physical, financial and network resources as well as office and entrepreneurial startup support to simulate new business activity (Carayannis and Von Zedtwitz, 2005).

Consequently, scholars have devoted significant time researching the benefits and shortcomings of incubators in Nigeria (Adegbite, 2001), South-Africa (Assenova, 2020; Schutte, 2019), China, India, Malaysia and Pakistan (Jamil et al., 2016); the resources, competences and services of incubators to address businesses' needs in South-Africa (Lose, 2021; Lose and Kapondoro, 2020; Msimango-Galawe and Hlatshwayo, 2021); the impact of different support services on business success in Malesia (Kee, Yusoff and Khin, 2019) and South-Africa (Schutte and Chauke, 2021); and the archetypes of incubation models in emerging economies in general (Carayannis and Von Zedtwitz, 2005) and Egypt in specific (Mrkajic, 2017). Despite these insights, Msimango-Galawe and Hlatshwayo (2021) argue that more empirical research is urgently needed into incubators' effectiveness in emerging countries because their number is growing at a rapid rate without a systemic measure of their success.

Therefore, we study how incubators' activities in different stages of the entrepreneurial process influence the businesses they support. In doing so, we take a systems perspective because business incubation involves various actors which are affected by the entrepreneurial process in different

ways (Schutte and Chauke, 2021). In system thinking, it is important to look at the whole ecosystem in which the business operates (Flood, 2010). Accordingly, we research not only the businesses but also three groups of stakeholders it potentially affects: suppliers, customers and the community. In addition, it means that we need a holistic approach to assess performance. It clearly make sense to measure economic well-being, yet businesses also shape and are shaped by their social network and capabilities (London, 2009). Hence, we also use stakeholder capabilities and relationships as indicators of success (or failure). Thus, our research question is: how do incubators' activities in different stages of the entrepreneurial process influence the economic situation, capabilities and relationships of the business and its suppliers, customers and community?

We study this question in a multiple case study of four business incubators. Incubator Scale supports partnerships in inclusive agribusiness. Incubator Next focusses on local entrepreneurs. Incubator Expert supports SMEs. Incubator Smart focusses on turning smart ideas into successful startups. They are operating in Angola, Burkina Faso, Ethiopia, Ghana, Mozambique and/or Nigeria. Besides the archival data we collected from each case, two representatives and two (former) participants from each incubator were interviewed with semi-structured questionnaires. The 16, approximately 45-minute long, interviews were carried out in November and December 2020. As the world was dealing with the COVID-19 pandemic, all interviews were done online using video conferencing software. Content analysis was used to identify patterns in the large amount of text we gathered and transform these patterns into the key findings. We chose a directed approach because our analysis started with theory as guidance for initial codes.

The findings show that the activities of incubators have a major beneficial impact on the economic situation and capabilities of the business and its suppliers, customers and community. In the business planning phase, incubators improve the business and its stakeholders' economic situation through the development of local expertise. In the resource phase, incubators improve the business and its stakeholders' economic well-being and capabilities through network building, local solution creation and access to finance. In the launch and manage venture phase, incubators enhance the business and its stakeholders' economic performance and competences through local expertise development and access to finance. In the growth and harvesting phase, incubators increase the business and its stakeholders' economic situation through the development of local expertise. Although the incubators' impact on the relationships of the business and its community is also substantial, the effect on the suppliers and customers' relationships is less pronounced. The relationship of the business and its stakeholders is, regardless of the entrepreneurial phase, supported by network building and the development of local expertise. In turn, the relationships developed by the business and the community it operates in also provide access to financing and other resources, improving their economic well-being.

To conclude, the results show that incubators' impact extends well beyond the business itself towards its suppliers, customers and community. Moreover, incubators' impact is not limited to economic survival and growth, it also includes the capabilities and relationships of the business and its stakeholders. Incubators create this multi-actor multi-value impact through performing different activities in different phases of the entrepreneurial process. Theoretically, these insights contribute to the literature on the effectiveness of business incubators in emerging countries by: 1) collecting empirical evidence of the impact of business activities in different stages of the entrepreneurial process; and 2) taking a systems perspective to capture a complete picture of incubators' impact, exploring multiple types of value and indirect effects on the business' stakeholders. In addition, the

study provides insights for incubators operating in Sub-Saharan Africa into how the overall impact of their incubation program can be enhanced. Specifically, they need to develop long-lasting partnerships to establish relationships and create economic stability for the business and its stakeholders next to the well-known incubation activities, e.g. offering office space and business plan support.

Keywords

Incubators, stakeholders, economic value, social value, emerging countries

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More Sustainable Humanitarian Cash Transfer Programming through Implementing CSV and the Nexus

Identifying the Factors Impeding Collaborative and Sustainable Cash Transfer Programming

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Extended abstract

Introduction and Problem Statement

Humanitarian Cash and Voucher Assistance (CVA) has seen a tremendous rise compared to traditional in-kind assistance. In 2019, 17.9% of all humanitarian assistance was executed in cash, compared to 10.3% in 2016 (CaLP 2018; CaLP 2020). This means the number of people being provided with cash as humanitarian assistance instead of goods and food is growing. This is in light of the commitment made by the humanitarian sector to increase cash-based interventions (CBI) in the Grand Bargain (2016), wherein ten priorities were agreed upon to increase efficiency and effectiveness in humanitarian aid. That is, cash has been found to be 18% more efficient than in-kind assistance (Hoddinott, Sandström & Upton, 2018).

Another priority committed to in the Grand Bargain is the increased connection between humanitarian interventions and international development mechanisms, the so-called humanitarian-development nexus. Such interventions aim to make humanitarian aid more effective and sustainable by increasing people's resilience, meaning their ability to cope with negative shocks (OECD, 2019). Hence, there is a reduced need for future humanitarian action due to the increased effectiveness and sustainability of the previous intervention.

Ideally, related to CBI, this means programming is connected to development mechanisms in the form of financial inclusion instruments, such as savings groups, micro-credit, or a full-service bank account. This would essentially go beyond a humanitarian intervention into a system-wide collaborative model to increase financial inclusion (El-Zoghbi et al., 2017). However, such humanitarian-development nexus defined cash interventions are barely implemented. Current interventions merely have a closed-loop payment system exclusively for receiving funds, excluding access to other financial services (Chehade et al., 2020; Bemo et al., 2017). Consequently, people's access to savings and credits mechanisms is withheld, not allowing them to create sustainable livelihoods. This is problematic, especially as financial inclusion has been proven to foster economic growth, reduce poverty and increase resilience (Klapper & Hess, 2016), both through credit taking (Karlan, Ratan & Zinman, 2014) and saving (Hudner & Kurtz, 2015).

Moreover, this is not only problematic for beneficiaries. Firstly, it harms humanitarian organizations that are creating limited social value and are moreover being evaluated on the sustainability criterium by institutional donors funding their program (OECD, 2019). And secondly, it impedes financial service providers (FSPs) from accessing a customer base at the bottom-of-pyramid (El-Zoghbi et al., 2017). Therefore, the limited connection of CBI to development mechanisms negatively affects all actors in the cash assistance system.

Shared Value Creation

The problem as described above is essentially impeding creating shared value (CSV) following the theory pioneered by Porter and Kramer (2011), who argue that businesses should be addressing societal issues with their core business besides creating economic value for themselves. In the status quo of cash transfers, both economic value creation for the FSP and social value creation for beneficiaries and humanitarian organizations is limited. Overcoming this lack of shared value creation in the cash transfer system through implementing the humanitarian-development nexus cannot be done by humanitarian actors or private/development actors alone. As Ceyla Pazarabisiogly, Senior Director Finance and Markets Global Practice of the World Bank Group, states in a 2017 CGAP report (p. iii): 'Continued collaboration across sectors, institutions, and borders is the only way that the global development community will be able to address the immense challenge of forced displacement in a sustainable manner.' Moreover, a preliminary interview with Eunice Mwende, Interagency Cash Coordinator for the World Food Program in Uganda, indicates that it are FSPs whose factors should be scrutinized as their stance makes it hard to link financial inclusion mechanisms to humanitarian interventions. For example, their business models and services might not align with the system's needs (Mercy Corps, 2016).

We hope that by using the New Business Model related approaches of multi-value creation (Pennink, 2014) and collaborative business models (Jonker et al., 2020), we can contribute to the multi-actor sustainability problem in cash transfers. We draw from collaborative business model theory by scrutinizing and decomposing the complex multi-dimensional problem from the position of all stakeholders (Jonker et al., 2020). Hereby we try to find the factors limiting the humanitarian-development nexus implementation in cash transfers and the inherent restricted financial inclusion and shared value creation for the stakeholders involved. That is, we theorize that humanitarian-development nexus implementation in cash programs resembles a collaborative business model in which actors are interdependent for their value creation. Sustainable collaborative cash transfers

models following a constructive humanitarian-nexus implementation would result in increased financial inclusion for vulnerable people, social value creation for humanitarian organizations and economic value creation via new clientele and reconceived products for FSPs (El-Zoghbi et al., 2017; Porter & Kramer, 2011).

Objective and Research Questions

Therefore, this paper aims to identify the current interactions between stakeholders along the humanitarian-development continuum in the CBI system and the factors that foster or limit financial inclusion and the related shared value creation between the stakeholders. Moreover, it will try to identify the opportunities for increasing the shared value between the actors and aim so by answering the following research questions:

1. How do the different actors interact within Uganda's cash-based intervention system across space and time?

2. Which factors contribute to the sustainability of the system in terms of fostering long-term financial inclusion and beneficiary resilience?

3. How could shared value be created or enhanced for all actors?

Methodology

The research questions will be answered through a qualitative exploratory study with a case study in Uganda. A systemic stakeholder approach is taken through conducting semi-structured interviews with two to four responders from all stakeholder categories involved in the Ugandan CBI system, including donors, humanitarian organizations, development organizations and private financial institutions. For the data analysis of these interviews, Grounded Theory methodology and its process of open, axial, and selective coding is used (Strauss and Corbin, 1998). Grounded Theory enables to discover and generate concepts confined in practice through scrutinizing characteristics of categories and the relationships between these categories, all deducted through the continuous comparison of data (Jonker & Pennink, 2009).

Firstly, interviews will be conducted with humanitarian organizations because of their centrality in the system, whereafter separate semi-structured interview guides will be developed for other stakeholder categories based on the findings of the literature review and previous interviews. Through the Grounded Theory data analysis of all interviews, a conceptual model will be created that displays the factors fostering sustainability of cash transfers in the form of financial inclusion and its related shared value creation. Results are expected in June 2022.

Relevance and Justification

Whereas the literature on public-private partnerships has been extensive, CSV has previously not been applied to humanitarian action, especially not to CBI. Moreover, literature on CSV has exclusively taken a firm-centred view (Menghwar & Daood, 2021), in contrast to the systemic view of our research focusing. By focusing on business-humanitarian collaboration, we expect to contribute to the CSV knowledge and broaden the collaborative business model spectrum.

Likewise, humanitarian literature has amply focused on making cash interventions sustainable through the connection to development mechanisms and the private sector. Finally, the research has practical value through studying a real-world problem that aid organizations deal with and which outcomes could provide practical insights concerning value creation for FSPs (Chehade et al., 2020; El-Zoghbi et al., 2017).

Keywords

Humanitarian Cash Transfers, Sustainable Humanitarian Aid, Creating Shared Value, Humanitarian-Private Partnerships, Financial Inclusion

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Immigrant Women Entrepreneurs as a Global Grand Challenge: Evidences from management studies

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Abstract

Due to the immigrants' contribution to the development and the economic growth of both their countries of origin and their transit and/or destination countries, labor market integration is considered, today, a key issue at the international level. However, if we consider management studies, an aspect worth mentioning when dealing with this stream of literature is that the gendered nature of migrant entrepreneurship is often neglected. Therefore, the goal of this study is to examine those papers that jointly analyze these two groups (i.e. migrant entrepreneurs and women) in order to answer the following key research questions: RQ1. What are the peculiarities of immigrant women entrepreneurs and their firms that are emerging from management studies? And, consequently: RQ2. Which are the most investigated research topics that management scholars are focusing on, and which are the main gaps to identify and address?

In order to answer these questions, a SLR on 83 papers on the topic has been developed and the main trends on this topic in management literature have been highlighted.

Track 3.4 - Sharing economy business models for sustainability: design, functioning and impacts

Track chairs: *Venere Sanna (Sapienza University)*, *Cecilia Grieco (Sapienza University) and Trond Halvorsen (SINTEF)*

Since it began, the sharing economy has tended to be viewed as benign; the reality is that not all of its impacts are positive. The business models of the sharing economy are often associated with positive effects on the environment, economy, and society - such as the access and/or use of under-utilized goods or services, more sustainable consumption, waste reduction, strengthening social interaction, as well as providing other economic and social benefits. However, the sharing economy has a history of disrupting traditional business sectors and a growing body of research is casting doubts on its overall social, economic and environmental effectiveness and even intrinsic sustainability.

This track aims to explore how to design and implement sustainable business models for the sharing economy, and how to identify methods and tools for evaluating their impacts.

Full Throttle! Engaging Ethnic Minority and Majority Consumers in Car Sharing

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Abstract

The world is affected by environmental and social challenges, resulting in calls for engaging consumers with initiatives focused on sharing underutilized resources in Western countries. Meanwhile, these countries are characterized by migration and ethnic diversity, giving rise to ethnic minority consumers. Although ethnicity is a driver of consumer engagement, little is known about the influence of ethnicity on consumer engagement with sharing initiatives in Western countries. To address this gap, we examine the role of perceived value and trust for engaging ethnic minority (vs. majority) consumers with sharing initiatives by relying on survey data gathered in the Belgian car sharing context. The results suggest that ethnic minority consumers perceive more environmental value of car sharing than ethnic majority consumers, yet no differences are observed with regard to perceived economic and social value of car sharing. Meanwhile, ethnic minority consumers have less trust in car sharing than ethnic majority consumers. Moreover, perceived value and trust act as important mediating mechanisms for non-behavioral manifestations of consumer engagement but even more for behavioral manifestations of consumer engagement. From a theoretical perspective, this research advances the sharing economy literature and the literature on sustainable business models by unraveling the mechanisms for engaging ethnic minority and majority consumers with sharing initiatives. From a practical perspective, this research supports practitioners and policymakers to include ethnic minority and majority consumers in the transition to a more sustainable economy by exploring their engagement with sharing initiatives.

Keywords

Sharing economy, consumer engagement, ethnic minorities, perceived value, trust

Main text

1. Introduction

Today's world is facing grand challenges such as climate change and social inequality. In response to these challenges, academics, practitioners and policymakers embrace sharing initiatives to increase the utilization rate of resources (Grinevich et al., 2017). They do so because sharing initiatives have the potential to simultaneously deliver – in accordance with the triple bottom line perspective – social equity for People, environmental quality for Planet, and economic prosperity for Profit (Böcker & Meelen, 2017; Kirchherr, Reike & Hekkert, 2017). This sustainable potential can, however, only be realized if sufficient consumers engage with sharing initiatives (Edbring, Lehner & Mont, 2016; Weng et al., 2020). Even though consumers increasingly engage with sharing initiatives (Sands et al., 2020), few initiatives – such as Vinted, Couchsurfing and BlaBlaCar – were able to build a consumer base of millions of consumers (Clauss, Harengel & Hock, 2019; Möhlmann, 2015). Hence, insight into the determinants of consumer engagement with sharing initiatives, reflecting the psychological or motivational disposition of consumers in relation to sharing initiatives, is of utmost importance (Brodie et al., 2011; Clauss, Harengel & Hock, 2019; Hollebeek, Glynn & Brodie, 2014).

In parallel, today's world is characterized by migration and ethnic diversity. For example, in 2019, 23 million out of 447.3 million people living in the European Union (5.1%) were non-EU citizens and 44.9 million out of 328 million people living in the United States of America (13.7%) were non-American citizens (Batalova, Hanna & Levesque, 2021; Eurostat, 2021). As a result of migration, many Western countries are constituted of both ethnic majorities whose value set has its origins in Western nations or cultures as well as ethnic minorities whose value set is subject to non-Western influences (e.g. Kipnis et al., 2013; Linzmajer et al., 2020; Shoham, Segev & Gavish, 2017). Ethnic minorities are thus considered groups of people whose ethnicity – which reflects the state of belonging to a group with shared national or cultural origins (Antioco et al., 2012; Arnould, Price & Zinkham, 2004; Yang, 2000) – is different from that of the majority population in a specific country (Bartikowski et al., 2018). Some ethnic minorities in Western countries – like Turkish citizens in the European Union or Hispanics in the United States of America – are becoming a considerable consumer segment and hence cannot be left behind in the attempt to boost consumer engagement with sharing initiatives in the transition to a more sustainable economy (Knafo, Roccas & Sagiv, 2011; Lee & Huang, 2020). In most – if not all – Western countries, however, ethnic minorities remain underrepresented in the sharing economy, as a result of which the sharing economy is not yet inclusive (e.g. Etter, Fieseler & Whelan, 2019; Frenken, 2017; Piscicelli, Cooper & Fisher, 2015). Prior research on sharing initiatives did not elaborate on the influence of ethnicity within countries on consumer engagement. To date, research on ethnicity in relation to sharing initiatives has mainly focused on the way in which national or cultural differences between countries shape consumer engagement with sharing initiatives, thereby wrongly assuming that countries are homogenous in terms of ethnicity (e.g. Bartikowski, Taieb & Chandon, 2016; Cleveland, Laroche & Hallab, 2013; De Mooij, 2019). Given that ethnicity is an important driver of consumption (Rosenbaum & Montoya, 2007) and a possible barrier to the effectiveness of actions favoring sustainability (Zakari & Toplak, 2021), more insight into the influence of ethnicity on consumer engagement with sharing initiatives and the mechanisms resulting in non-inclusivity of ethnic minorities in Western countries is urgently needed.

Against this background, we rely on survey research to investigate the influence of ethnicity on consumer engagement with sharing initiatives, thereby paying specific attention to the underlying

mechanisms which may differ according to ethnicity. Drawing upon social exchange theory, the present research examines the role of perceived value and trust to engage consumers from different ethnic backgrounds with sharing initiatives. Indeed, extant sharing economy research recurrently embraces perceived value to explain consumer engagement with sharing initiatives (e.g. De Canio et al., 2020; Tussyadiah, 2016), thereby emphasizing – consistent with the triple bottom line perspective – perceived economic, environmental and social value (e.g. De Canio et al., 2020; Méndez-León, Reyes-Carrillo & Díaz-Pichardo, 2021). In a similar vein, many scholars acknowledge that trust is of major importance for engagement in the sharing economy (e.g. Dabbous & Tarhini, 2019; Gu et al., 2021; Hazée et al., 2020). As ethnicity matters for perceptions of value and trust (Pankhania, Lee & Hooley, 2007; Soroka, Banting & Johnston, 2007; Tian et al., 2020), a key question is to what extent ethnicity affects perceived value and trust in relation to sharing initiatives, and consequently consumer engagement with sharing initiatives.

This research contributes to theory and practice in several ways. First, this research advances the sharing economy literature by generating a better understanding of consumer differences in terms of consumer engagement with sharing initiatives (Böcker & Meelen, 2017; Lutz & Newlands, 2018). Specifically, this research investigates the role of ethnic differences between consumers within Western countries. Next, as the role of perceived economic, environmental and social value is investigated, this research embraces the triple bottom line perspective when examining the mechanisms for engaging ethnic minority and majority consumers with sharing initiatives. Additionally, this research contributes to the sharing economy literature by exploring the role of not only perceived value but also trust as a mechanism for engaging consumers with sharing initiatives (Akhmedova et al., 2021; Baker et al., 2021; Eckhardt et al., 2019). Finally, this research advances the literature concerning sustainable business models. Indeed, by investigating the mechanisms through which ethnic minority (vs. majority) consumers engage with business models that aim to simultaneously deliver economic, environmental and social value (e.g. sharing initiatives), we enhance extant knowledge on how these business models can expand their consumer base and grow (e.g. Day et al., 2020; Parente, Geleilate & Rong, 2018; Piscicelli, Ludden & Cooper, 2018). For business practitioners and policymakers, our findings can provide guidance in motivating consumers from different ethnic backgrounds to engage with sharing initiatives (Sands et al., 2020).

2. Theoretical background

2.1. Ethnicity and engagement with sharing initiatives

Consumer engagement with an offering reflects the psychological or motivational disposition of consumers in relation to that offering (Brodie et al., 2011; Hollebeek, Glynn & Brodie, 2014). This disposition entails non-behavioral manifestations (e.g. thinking and feeling positive about an offering) as well as behavioral manifestations (e.g. using and recommending an offering) and both are necessary for the success of an offering.

Extant research suggests that ethnicity influences the extent to which consumers engage with an offering (e.g. Boshoff, 2012; El Banna et al., 2018; Gill, Kim & Ranaweera, 2017). Ethnicity, reflecting the state of belonging to subgroups that are distinguished – by itself or by others – on the basis of common national or cultural origins (Antioco et al., 2012; Arnould, Price & Zinkham, 2004; Yang, 2000), is a salient trait for categorization and comparison of subgroups between countries but also within countries (Bozkurt, Gligor & Hollebeek, 2021; Müller, 2009; Pichler et al., 2019). Indeed,

although relatively little research has investigated ethnic variation within countries, research has successfully evidenced that different ethnic groups within countries have different values which manifest themselves in different perceptions of an offering, which also affects their engagement towards that offering (e.g. Kipnis et al., 2019; Laroche et al., 2003; Pankhania, Lee & Hooley, 2007).

With regard to sharing initiatives, a couple of sharing economy studies suggest that differences in national origin may explain consumer engagement (e.g. Lang, Seo & Liu, 2019; Lee & Huang, 2020). Additionally, some studies investigate the influence of differences in cultural origin on consumer engagement with sharing initiatives (e.g. Gupta et al., 2019; Wu & Shen, 2018). Although countries are not homogenous in terms of ethnicity (e.g. De Mooij, 2019; Gbadamosi, 2015; Kipnis et al., 2019), the vast majority of studies in the sharing economy literature focuses on differences regarding national or cultural origins between countries (e.g. Lee & Huang, 2020). If ethnicity within countries is considered in sharing economy studies, extant research fails to explain how and why ethnicity shapes engagement beyond diversity in terms of cultural values (e.g. Wu & Shen, 2018).

2.2. Social exchange theory as mechanism of consumer engagement

To date, extant research suggests that consumer engagement with sharing initiatives is – in accordance with social exchange theory – dependent upon the perceived value stemming from sharing initiatives (Boateng, Kosiba & Okoe, 2019; Verleye, 2015). Sharing economy studies recurrently draw upon the triple bottom line approach and relate perceived value to the three dimensions of sustainable value: economic value (Profit), environmental value (Planet) and social value (People) (e.g. Böcker & Meelen, 2017; De Canio et al., 2020; Hamari, Sjöklint & Ukkonen, 2016). Next to perceived value, social exchange theory emphasizes reciprocity in social exchanges (vs. pure economic exchanges) and argues that engagement is also driven by trust (Chuah et al., 2021). In this regard, sharing economy research also stresses the importance of trust for engagement with sharing initiatives (Baker et al., 2021; Fritze et al., 2021).

Building upon the abovementioned evidence, this research investigates how the state of belonging to the ethnic minority (vs. majority) influences consumer engagement with sharing initiatives through perceived value of sharing initiatives and trust in sharing initiatives.

Perceived economic value – which reflects monetary gains and/or savings through sharing – is evidenced to induce consumer engagement in the sharing economy (e.g. Hamari, Sjöklint & Ukkonen, 2016; Hawlitschek, Teubner & Gimpel, 2018; Möhlmann, 2015). Meanwhile, a key question revolves around the influence of consumers' ethnicity on the perceived economic value of sharing initiatives. In this regard, prior research suggests that ethnic minorities may face restrained financial means (Bhutta et al., 2020; Choudhury, 2002; Kochhar & Cilluffo, 2018). As disclosing financial deprivation may have negative consequences for their economic position in society (Jaikumar, Singh & Sarin, 2018; Ungerer, 2019), sharing may have less economic value in the eyes of financially-restrained consumers. Consequently, ethnic minorities may prefer ownership over sharing as this allows them to hide financial deprivation from the outside world (Jugert, Leszczensky & Pink, 2018; Schaefers et al., 2021; Sharma & Alter, 2012). Therefore, we hypothesize:

> *H1: Compared to ethnic majorities, ethnic minorities in Western countries (a) perceive less economic value from sharing initiatives, which (b) negatively influences their engagement towards sharing initiatives. Hence, (c) perceived economic value*

mediates the relation between ethnicity and consumer engagement towards sharing initiatives.

Regarding perceived environmental value, referring to positive environmental implications of sharing through increased utilization of idle resources, empirical studies conclude its stimulating role for consumer engagement in the sharing economy (e.g. Hamari, Sjöklint & Ukkonen, 2016; Hawlitschek, Teubner & Gimpel, 2018). Meanwhile, ethnicity may affect perceptions of environmental value as not all ethnic groups pay equal attention to the environment. Ethnic groups whose value sets find their origins in non-Western cultures or nations – which is the case for many ethnic minorities in Western countries – may care more about the environment, following a focus on collectivist rather than individualistic values (Kizgin et al., 2018; Patterson, 2017; Shavitt & Zhang, 2004). Indeed, several scholars have discovered a positive relationship between collectivism and environmental values (Eastman & Iyer, 2021; Segev, 2015; Shi, Wu & Kuang, 2018). Therefore, we hypothesize:

H2: Compared to ethnic majorities, ethnic minorities in Western countries (a) perceive more environmental value from sharing initiatives, which (b) positively influences their engagement towards sharing initiatives. Hence, (c) perceived environmental value mediates the relation between ethnicity and consumer engagement towards sharing initiatives.

With regard to perceived social value as another important determinant of consumer engagement with sharing initiatives, a distinction should be made between social value originating from belonging to a community of like-minded people (e.g. Hawlitschek, Teubner & Gimpel, 2018; Möhlmann, 2015) and social value originating from gaining recognition from like-minded people (e.g. Hamari, Sjöklint & Ukkonen, 2016; Hawlitschek, Teubner & Gimpel, 2018; Lamberton & Rose, 2012). Consumers who embrace collectivistic values – such as many ethnic minorities in Western countries – may perceive more social value in the form of community belonging and recognition when sharing, because sharing initiatives tailor into the need for respectively strong social ties and desire for social approval (e.g. Koydemir & Essau, 2018; Prabhu, 2011; Yang, Ding & D'Alessandro, 2018). Meanwhile, drawing upon similarity-attraction theory, people tend to perceive higher levels of community belonging when connecting with people of the same ethnic group (i.e. in-group) compared to connecting with people of other ethnic groups (i.e. out-groups) (Bozkurt, Gligor & Hollebeek, 2021; Ta, Esper & Hofer, 2018). This so-called homophily effect is even stronger for ethnic minorities compared to ethnic majorities (Bozkurt, Gligor & Hollebeek, 2021). A similar pattern is observed when looking at recognition. Building upon social identity theory, ethnic minorities value recognition by their own ethnic group (i.e. in-group) more than they value recognition by other ethnic groups (i.e. out-groups) (Bozkurt, Gligor & Hollebeek, 2021). If the in-group is less engaged in sharing initiatives – which holds for ethnic minorities who are underrepresented in the sharing economy (Andreotti et al., 2017; Cansoy & Schor, 2017) – consumers may perceive less social value in terms of community belonging and recognition. Hence, we hypothesize:

H3: Compared to ethnic majorities, ethnic minorities in Western countries (a) perceive less social value of community belonging from sharing initiatives, which (b) negatively influences their engagement towards sharing initiatives. Hence, (c)

perceived social value of community belonging mediates the relation between ethnicity and consumer engagement towards sharing initiatives.

H4: Compared to ethnic majorities, ethnic minorities in Western countries (a) perceive less social value of recognition from sharing initiatives, which (b) negatively influences their engagement towards sharing initiatives. Hence, (c) perceived social value of recognition mediates the relation between ethnicity and consumer engagement towards sharing initiatives.

Following social exchange theory, not only perceived value is of importance to engage consumers, also trust plays a crucial role (Ma et al., 2020; Wang et al., 2019). In the sharing economy, exchanges commonly take place between strangers which makes trust even more vital for consumer engagement with sharing initiatives. Indeed, the urgency of trust in the sharing economy is stressed by multiple scholars (e.g. Crucke & Slabbinck, 2019; Hawlitschek, Teubner & Gimpel, 2018; Möhlmann, 2015). Extant research suggests that consumers tend to perceive higher levels of trust when engaging in exchanges with the in-group than when engaging in exchanges with out-groups (Dinesen & Sønderskov, 2015; Putnam, 2007). As ethnic minorities are underrepresented in the sharing economy (Andreotti et al., 2017; Cansoy & Schor, 2017), they are less likely to engage in exchanges with the in-group (i.e. consumers from the same ethnic group) than to engage in exchanges with out-groups (i.e. consumers from other ethnic groups) and hence have less trust in sharing initiatives. Based upon this evidence, we hypothesize:

H5: Compared to ethnic majorities, ethnic minorities in Western countries (a) have less trust in sharing initiatives, which (b) negatively influences their engagement towards sharing initiatives. Hence, (c) trust mediates the relation between ethnicity and consumer engagement towards sharing initiatives.

The research model resulting from these hypotheses is depicted in Figure 1.

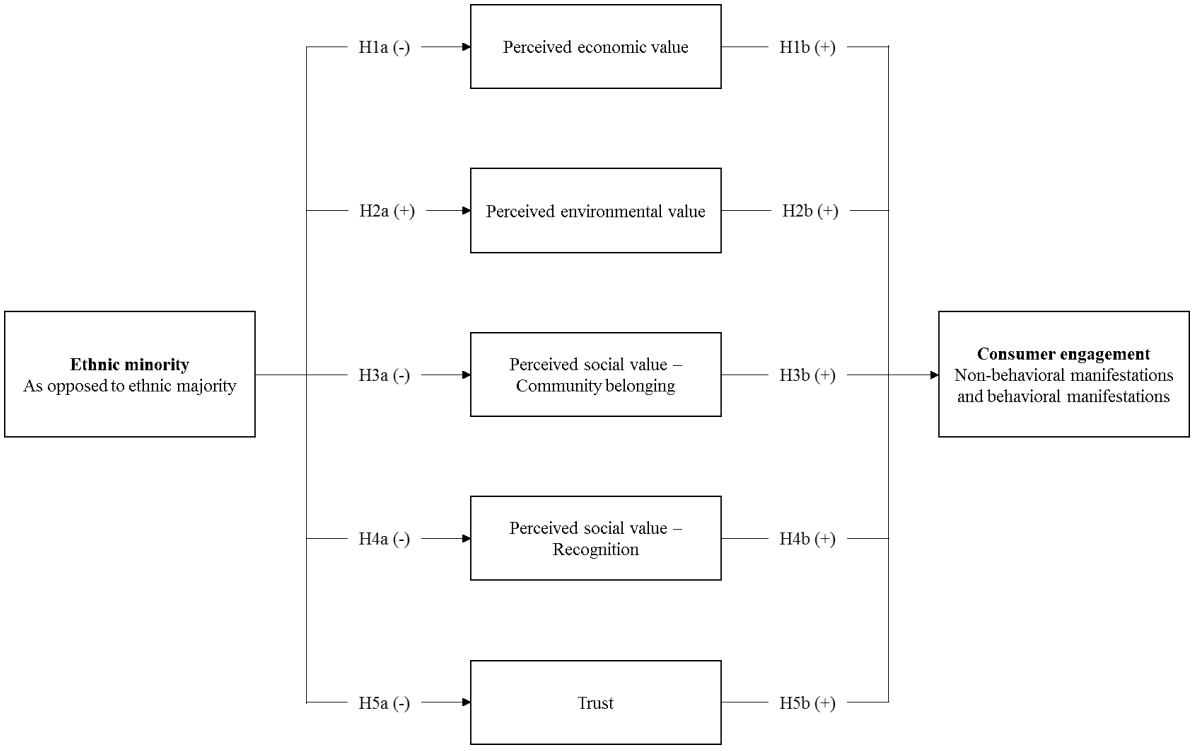

Figure 1. Research model

3. Methodology

3.1. Design

To empirically investigate the influence of consumers' ethnicity on their engagement with sharing initiatives, this research employs a survey design. Though the sharing economy covers a wide variety of sectors in different countries, this research focuses on business-to-consumer car sharing in Flanders, Belgium (Fernandes, Chimenti & Nogueira, 2020; Lang et al., 2021). First, car sharing is considered one of the most promising sectors in the sharing economy (Matthijs et al., 2021; PricewaterhouseCoopers, 2016), not in the least because an average car is used only four to eight percent of the time (Kumar, Lahiri & Dogan, 2018) or because global CO2 emissions from road transport primarily stem from passenger vehicles (International Energy Agency, 2019; OECD, 2011). Second, many car sharing initiatives are active in Flanders (Chapman, Eyckmans & Van Acker, 2020; Crucke & Slabbinck, 2019). Third, even though the Flemish car sharing market is relatively mature, car sharing initiatives experience difficulties in engaging ethnic minorities (Chapman, Eyckmans & Van Acker, 2020; Crucke & Slabbinck, 2019; Staes, 2015). Finally, the ethnic diversity in Belgium is comparable to the ethnic diversity in other Western countries (Eurostat, 2021; Hooghe & De Vroome, 2015).

To capture whether respondents belong to the ethnic minority (vs. majority), we gathered information on their nationalities (Licsandru & Cui, 2018; Pires & Stanton, 2000). As non-EU ethnic minorities in Belgium – like most European countries – predominantly encompass people with the Turkish or Maghrebian nationality (Meeusen, Abts & Meuleman, 2019), we have classified people with the Turkish or Maghrebian nationality – whether or not combined with the Belgian nationality – as belonging to the ethnic minority group. People only having the Belgian nationality were classified as belonging to the ethnic majority group. Next, we relied on extant multi-item scales in the sharing economy literature to capture perceived value of sharing initiatives (Barnes & Mattsson, 2017; Hamari, Sjöklint & Ukkonen, 2016) and trust in sharing initiatives (Möhlmann, 2015). With regard to consumer engagement, we distinguished – in line with our conceptualization – between non-behavioral consumer engagement (e.g. thinking and feeling positive about an offering) and behavioral consumer engagement (e.g. using and recommending an offering) (Brodie et al., 2011; Hollebeek, Glynn & Brodie, 2014). For non-behavioral consumer engagement, we used the scale of Hamari, Sjöklint and Ukkonen (2016). For behavioral consumer engagement, we relied on the scale of Barnes and Mattsson (2017). All aforementioned scales were measured on 7-point Likert scales (1 = strongly disagree; 7 = strongly agree). Finally, we collected sociodemographic information (here, gender and age).

3.2. Sample

Data was collected from November 2019 until March 2020, using an online survey administered via Qualtrics (in Dutch). It should be noted that data was captured before stay-at-home measures imposed by the Belgian government due to the COVID-19 pandemic. Respondents were approached via direct messages, social media platforms such as Facebook and LinkedIn, and e-mails to ethno-cultural organizations. Next to being older than 18, respondents had to possess a driver's license and understand the Dutch language (as the survey was in Dutch).

The A-priori Sample Size Calculator for Structural Equation Models was used to calculate the required sample size (Soper, 2021). Given the 28 observed items of the seven latent variables, the observed independent variable and the two observed control variables (Crucke & Slabbinck, 2019; Halder et al., 2020; Minami, Ramos & Bortoluzzo, 2021), a minimum sample size of 1244 was required to achieve a power of 0.80, an (small) anticipated effect of 0.12 and a probability level of 0.05 (Cohen, 1988; Lau et al., 2019; Morrison, Morrison & McCutcheon, 2017; Soper, 2021).

Altogether, 2553 respondents started the Qualtrics survey, yet only 1379 respondents fully completed the survey (completion rate of 54.01%). In the final sample, all respondents who answered all questions related to the research model in Figure 1 are included. The final sample includes 1495 respondents with variety in terms of ethnicity (10.34% ethnic minority respondents) and other sociodemographic characteristics (41.87% male respondents; mean age = 36.18).

4. Results

The measurement model and the structural model were analyzed by means of Structural Equation Modeling using the lavaan package in R (Rosseel, 2012).

4.1. Measurement model

The results of the confirmatory factor analysis (CFA) exhibited an adequate fit of the measurement model. The chi-square statistic of 2285.11 with 329 degrees of freedom was significant ($p < 0.01$). The comparative fit index (CFI) was 0.94, the Tucker-Lewis index (TLI) was 0.93 and the root mean square error of approximation was 0.06 (Bentler, 1992; Bentler & Bonett, 1980; Hu & Bentler, 1998, 1999).

To assess the reliability of the constructs, we relied on Cronbach's alpha values and composite reliability values. The Cronbach's alpha values of the constructs ranged between 0.81 and 0.94 which implies good to excellent construct reliability (Hair, 2009). Moreover, all composite reliability (CR) values exceeded the threshold value of 0.60 (Bagozzi & Yi, 1988).

To ensure convergent validity, both the factor loadings and the average variances extracted were investigated. The factor loadings were all significant and above 0.60 which indicates convergent validity (Anderson & Gerbing, 1988; Fornell & Larcker, 1981). Additionally, all average variances extracted (AVE) were above 0.50, evidencing convergent validity (Bagozzi & Yi, 1988).

To ensure discriminant validity, we followed the criterion of Fornell and Larcker (1981). As the square root of the average variances extracted was always larger than the correlations between the constructs, discriminant validity was established (Bagozzi & Yi, 1988).

4.2. Structural model

The structural model also showed an acceptable fit with the data as CFI, TLI and RMSEA values were 0.88, 0.87 and 0.08, respectively (Bentler, 1992; Bentler & Bonett, 1980; Hu & Bentler, 1998, 1999). For the mediation model, we requested bootstrap standard errors and a bootstrap based p-value (5000 bootstrap samples). The hypotheses were tested whilst controlling for the influence of gender and age on consumer engagement with car sharing as these control variables were found

to influence consumer engagement in previous sharing economy research (e.g. Böcker & Meelen, 2017; Minami, Ramos & Bortoluzzo, 2021).

First, we investigate the direct effect of ethnicity on non-behavioral consumer engagement and behavioral consumer engagement. The former is significantly negative ($\beta = -0.155$, $p < 0.001$), thus indicating that ethnic minorities in Western countries exhibit less non-behavioral engagement towards sharing initiatives than ethnic majorities. The latter is not significant ($\beta = 0.039$, $p > 0.05$), hence no difference in behavioral consumer engagement across ethnic groups could be detected in this study.

Regarding perceived economic value, no significant relation is found between ethnicity and perceived economic value ($\beta = -0.030$, $p > 0.05$), thus not supporting hypothesis H1a. However, in support of hypothesis H2b, a positive relation was found between perceived economic value and non-behavioral consumer engagement ($\beta = 0.104$, $p < 0.001$) and between perceived economic value and behavioral consumer engagement ($\beta = 0.079$, $p < 0.01$). This evidence shows that perceived economic value is indeed a determinant of consumer engagement towards sharing initiatives. Next, the indirect effect of ethnicity on non-behavioral consumer engagement through perceived economic value is not significant ($\beta = -0.003$, $p > 0.05$), nor is the indirect effect of ethnicity on behavioral consumer engagement through perceived economic value ($\beta = -0.002$, $p > 0.05$). In other words, hypothesis H1c is not supported.

The results further suggest that ethnic minorities in Western countries perceive more environmental value of car sharing compared to ethnic majorities ($\beta = 0.081$, $p < 0.01$), which supports hypothesis H2a. Perceived environmental value, in turn, positively influences non-behavioral consumer engagement ($\beta = 0.231$, $p < 0.001$) as well as behavioral consumer engagement ($\beta = 0.139$, $p < 0.001$). In other words, more perceived environmental value results in more consumer engagement towards sharing initiatives. Hence, hypothesis H2b is supported. Moreover, the indirect effect of ethnicity on non-behavioral consumer engagement through perceived environmental value is significant ($\beta = 0.019$, $p < 0.01$), as is the indirect effect of ethnicity on behavioral consumer engagement through perceived environmental value ($\beta = 0.011$, $p < 0.05$). As a result, hypothesis H2c is also supported.

Regarding perceived social value of community belonging, no significant relationship is found between ethnicity and perceived social value of community belonging ($\beta = 0.042$, $p > 0.05$), thus not supporting hypothesis H3a. Moreover, whereas the relation between perceived social value of community belonging and non-behavioral consumer engagement is not significant ($\beta = 0.022$, $p > 0.05$), the relation between perceived social value of community belonging and behavioral consumer engagement is significantly positive ($\beta = 0.063$, $p < 0.05$). Hence, hypothesis H3b is only partially supported. In addition, the indirect relation between ethnicity and non-behavioral engagement through perceived social value of community belonging is not significant ($\beta = 0.001$, $p > 0.05$), nor is the indirect relation between ethnicity and behavioral consumer engagement through perceived social value of community belonging ($\beta = 0.003$, $p > 0.05$). As a result, hypothesis H3c is not supported.

Regarding perceived social value of recognition, no significant relation is found between ethnicity and perceived social value of recognition ($\beta = 0.058$, $p > 0.05$), thus not supporting hypothesis H4a. In contrast, perceived social value of recognition positively influences non-behavioral consumer engagement ($\beta = 0.072$, $p < 0.01$) and the same holds for the relation between perceived social

value of recognition and behavioral consumer engagement (β = 0.206, p < 0.001). Hypothesis H4b is thus supported. Then again, the indirect effect is insignificant for non-behavioral consumer engagement (β = 0.004, p > 0.05) and behavioral consumer engagement (β = 0.012, p > 0.05). Consequently, hypothesis H4c is not supported.

Finally, the results indicate that belonging to the ethnic minority group negatively influences trust (β = -0.049, p < 0.05), which indicates that ethnic minorities in Western countries perceive less trust in car sharing than ethnic majorities. This is in line with hypothesis H5a. Moreover, trust positively affects non-behavioral consumer engagement (β = 0.504, p < 0.001) and behavioral consumer engagement (β = 0.394, p < 0.001). In other words, less trust in sharing initiatives results in less engagement towards sharing initiatives. This evidence supports hypothesis H5b. Ultimately, the indirect effect stemming from ethnicity mediated via trust is negative for both non-behavioral consumer engagement (β = -0.025, p < 0.05) and behavioral consumer engagement (β = -0.019, p < 0.05), thus satisfying hypothesis H5c.

5. Discussion

5.1. Theoretical implications

First, this research focuses on the role of ethnicity in engaging consumers with sharing initiatives. In doing so, this research advances the sharing economy literature, which suggests that consumer engagement with sharing initiatives is – in accordance with social exchange theory – dependent upon perceived value and trust (e.g. Boateng, Kosiba & Okoe, 2019; Chuah et al., 2021; Ma et al., 2020; Verleye, 2015; Wang et al., 2019). Specifically, the present research contributes to this literature stream by demonstrating how consumer perceptions about social exchanges in the sharing economy (here, perceived value and trust) are influenced by ethnicity. By unraveling how ethnic minority and majority consumers engage with sharing initiatives, this research also generates a better understanding of consumer differences (here, differences linked to ethnicity) in the sharing economy, as called upon in previous research (Akhmedova et al., 2021; Böcker & Meelen, 2017; Lutz & Newlands, 2018). Moreover, by providing insight into engaging ethnic minority and majority consumers, this research advances extant knowledge on attracting and retaining consumers with different ethnic backgrounds in the sharing economy, which is a key research priority in the literature on sustainable business models (Hu et al., 2019; Piscicelli, Ludden & Cooper, 2018).

Second, the present research embraces the triple bottom line perspective when investigating the mechanisms for engaging ethnic minority and majority consumers with sharing initiatives. Indeed, these initiatives – as a subset of sustainable business models – have the potential to deliver not only economic but also environmental and social value (e.g. Bocken et al., 2020; Ciulli & Kolk, 2019; De Giacomo & Bleischwitz, 2020; Lozano, 2018). The research findings, however, nuance the engagement potential of the triple bottom line, in that perceptions of economic, environmental, and social value of sharing initiatives vary among consumers. Consumers' ethnicity partially explains this variability in terms of perceived sustainable value, in that ethnicity influences perceived environmental value. This evidence suggests that different actors may have different views on the sustainable potential of sharing initiatives.

Third, this research presents not only perceived value but also trust as a mechanism for engaging ethnic minority and majority consumers with sharing initiatives, thereby building upon insights from the sharing economy literature (e.g. Hawlitschek, Teubner & Gimpel, 2018; Möhlmann, 2015).

The present research also advances this literature stream by demonstrating that ethnicity affects trust in such a way that ethnic minority consumers have less trust in sharing initiatives than ethnic majority consumers and hence show less engagement. Although the influence of ethnicity on trust is less pronounced than its influence on perceived environmental value, the engagement potential of trust is higher than the engagement potential of perceived environmental value. As such, this research supports the important role of trust in engaging consumers with sharing initiatives whilst highlighting differences between ethnic minority and majority consumers.

Finally, this research explores consumer engagement with sharing initiatives in terms of behavioral as well as non-behavioral manifestations. By doing so, this research builds upon the sharing economy literature that – inspired by the theory of reasoned action and the theory of planned behavior – focuses on explaining behavioral intentions and actual usage of sharing initiatives, which resonate with behavioral manifestations of engagement (e.g. Becker-Leifhold, 2018; Lang & Armstrong, 2018; Toni, Renzi & Mattia, 2018). Non-behavioral manifestations of consumer engagement with sharing initiatives, however, are equally important, in that consumers who use offerings – such as sharing initiatives – without thinking and/or feeling positive about them may not contribute to their success from a triple bottom line perspective and the same goes for consumers who think and/or feel positive about offerings without using them (Brodie et al., 2013).

5.2. Managerial implications

For business practitioners in the sharing economy, this research offers relevant insights for generating and maintaining consumer engagement with sharing initiatives. First, as this research provides concrete insights into the determinants of consumer engagement among ethnic minorities (vs. majorities), it advances knowledge about consumer heterogeneity in the context of sharing initiatives based on consumer ethnicity (Böcker & Meelen, 2017; Lutz & Newlands, 2018; Sands et al., 2020). Additionally, by revealing the underlying mechanisms of consumer engagement among ethnic minorities (vs. majorities), this research contributes to moving away from universally addressing and targeting (potential) consumers of sharing initiatives, which is unlikely to be a successful approach (Gupta et al., 2019; Lee & Huang, 2020). Different ethnic groups can be addressed more adequately when including the significant mediating influences from this study in marketing communications. For example, business practitioners could emphasize the environmental value of sharing initiatives even more in communications towards ethnic minorities. Next, given the significant influence of trust on consumer engagement, sufficient attention should be paid to trust building mechanisms (Barnes & Mattsson, 2017; Möhlmann, 2015). Finally, the findings from this study may also assist sharing business models – and by extension sustainable business models – in eliciting consumer engagement and expanding their consumer base. Indeed, it is no longer sufficient for businesses to only deliver economic value, also environmental and social value are of importance (Esch, Schnellbächer & Wald, 2019; Panapanaan et al., 2016). However, sustainable business models – such as sharing initiatives – are dependent upon a critical mass of consumers (and providers) to deliver sustainable value. In this regard, ethnic minorities represent an important target market as demographic trends suggest that ethnic minorities will continue to increase (Pankhania, Lee & Hooley, 2007). Hence, understanding ethnic minorities in relation to sustainable business models is a necessity for these business models to secure enough participants, leverage network effects and grow (e.g. Day et al., 2020; Hu et al., 2019; Parente, Geleilate & Rong, 2018).

5.3. Limitations and future research

This research has some limitations which offer suggestions for future research. First, this research exploits data stemming from Belgian consumers regarding engagement with sharing initiatives in the car sharing sector. As this may limit the generalizability of the findings, future research might want to replicate this study among consumers in different countries and different sectors (Böcker & Meelen, 2017; Cocquyt, Crucke & Slabbinck, 2020; Möhlmann, 2015). Moreover, generations of ethnic groups might differ in their identification with host country and country of origin and, in turn, in engagement towards sharing initiatives (Tufan & Wendt, 2020). Second, although this research focuses on business-to-consumer car sharing initiatives, alternative car sharing business models – such as cooperative car sharing business models – exist, for which the influence of ethnicity and the underlying mechanisms regarding consumer engagement might be different (Crucke & Slabbinck, 2019; Lamberton & Rose, 2012). Third, this research investigates both non-behavioral engagement and behavioral engagement, yet no actual behaviors. Given the attitude-behavior gap as well as the intention-behavior gap, future research should invest in collecting data on actual behaviors in the sharing economy to assess whether the influence of ethnicity and the underlying mechanisms for consumer engagement will still be the same (Böcker & Meelen, 2017; Cocquyt, Crucke & Slabbinck, 2020; Hamari, Sjöklint & Ukkonen, 2016; Nguyen, Nguyen & Hoang, 2019). Fourth, the cross-sectional data was collected before the onset of a worldwide pandemic which might have led to biased results. Indeed, the dynamics to engage with sharing initiatives might have changed because of the COVID-19 pandemic (e.g. social interactions), which strengthens the need for longitudinal data about consumer engagement with sharing initiatives to highlight long-term effects (Hamari, Sjöklint & Ukkonen, 2016). Finally, as this research provides insights into the mechanisms of consumer engagement for ethnic minority and ethnic majority groups, it might support future research on promoting sharing initiatives among different ethnic groups through signaling value and trust (Anwar, 2017; Eckhardt et al., 2019; Prothero et al., 2011).

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An offer to help: Impacts of covid-19 lockdown on local sharing economies

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Abstract

The preventive measures applied in response to the covid-19 pandemic have transformed social and economic activities. Based on a case study of the Norwegian digital sharing platform Nabohjelp (English: Neighbour help), this article describes how sudden introductions of social distancing policies, such as lockdowns, affect the usage of peer-to-peer (p2p) sharing economy platforms. The analysis includes all messages posted by users on the Nabohjelp platform over a period covering one month before and two and a half months after the announcement of the first covid-19 lockdown in Norway (N=14997). Statistical analysis is applied to understand the impact of the lockdown on different types of platform activities, and text analysis is performed on a stratified random sample of messages (n=400). We find evidence of a rapid response to the lockdown and highly increased app usage, as well as increased technology adoption rates, in the first five weeks of lockdown. Before the lockdown, the messages were mainly related to specific needs with a short deadline, while messages during the lockdown were more open-ended and general in nature. We find an initial spike in the number of messages from people offering to help others, driven by both pre-existing and new users. When society gradually opened up again after about two months, the daily number of posted messages remained about three times higher than before the lockdown. We conclude that p2p sharing platforms can play an important role in the robustness of local societies in times of a pandemic.

Key words:

Sharing economy, peer-to-peer sharing, crisis management, covid-19

Introduction

Since late 2019, social distancing has been an important policy in many countries for slowing the spread of the covid-19 virus. This paper explores how the sharing economy can help to alleviate the difficulties that social distancing imposes at the local level. Below, we present detailed evidence of how a smart phone sharing app called Nabohjelp (Eng: Neighbour help) was used in response to the national lockdown following the outbreak of the covid-19 pandemic in Norway. Through collaboration with the platform owner, we were given access to the full set of messages posted on the app for a period starting one month before lockdown measures were imposed to about ten weeks after (N = 14 997). Our findings provide new insights into the dynamics of how a peer-to-peer (p2p) app designed for collaborative consumption within local neighbourhoods was adopted and used by the public when the crisis struck. We describe how the app usage changed, and how usage evolved over the following ten weeks.

Before vaccines were developed and deployed, social distancing was among the primary strategies, along with testing and sanitation, to combat the novel corona virus known as covid-19. Social distancing takes many forms, from avoiding physical contact, e.g., handshakes and hugs, to isolation in homes, travel restrictions and the temporary closure of businesses and public institutions. Whether self-imposed or mandated by government, social distancing creates many challenges to everyday life. We find that thousands of Norwegians responded to the lockdown by going online to self-organize and either seek or offer help. The messages on the Nabohjelp platform are a clear expression of people's desire to help each other out in a time of large uncertainty. The findings are relevant to decision makers planning policy responses to new crises, e.g., potential future waves of the covid-19 pandemic. Firstly, improved understanding of societal resilience helps in estimating the social and economic costs of anti-contagion measures. Secondly, our findings support the notion that governments and policy makers should support the use of sharing apps as a means for communicating and helping people who are isolated. Thirdly, the results suggest that new app users were driven by the same motives as pre-existing users. Fourthly, the underlying data gives a first-hand account of how the public reacted when the covid-19 pandemic came to Norway in the spring of 2020. The next section covers the background for our study. It positions the current paper in the existing literature on the sharing economy and collaborative consumption. Next, it describes the Nabohjelp app in more detail and describes the social context in which our data was generated. In section three, we present the dataset and the research design. The results are presented in section four, followed by a discussion in section five. Finally, section six concludes the paper.

Background

The social benefits of the sharing economy

The concept of a sharing economy has proven hard to define (Botsman, 2013; Juliet B. Schor, Fitzmaurice, Carfagna, Attwood-Charles, & Poteat, 2016). It relates to several different empirical phenomena, such as collaborative consumption, collaborative economy, peer economy, and network economy, amongst others, where the exchange of goods and services is facilitated by a digital platform and what (Arvidsson, 2018) calls "an ideology of 'sharing'". In this paper, we follow Botsman and Rogers (2011) in defining the sharing economy as “an economic model based on sharing underutilized assets from spaces to skills to stuff for monetary and non-monetary benefits, largely focused on peer-to-peer transactions”. These assets might be in terms of labour, material goods, or knowledge (Botsman & Rogers, 2011).

That sharing platforms generate both economic and social benefits is well known (Böcker & Meelen, 2017; J. Schor, 2014; Juliet B Schor & Fitzmaurice, 2015). For example, the sharing platforms link consumers with resources in what Schor (2014) calls “stranger sharing”. The social aspect of the sharing economy tends to be especially important in local communities such as neighbourhoods (Akin, Jakobsen, Floch, & Hoff, 2021). When the parties of an exchange live close to each other, there is an increased chance that engaging in the local sharing economy may lead to repeat encounters on and outside the sharing platform. In this way, sharing platforms have the potential to move communities towards increased levels of trust (Arvidsson, 2018; Hamari, Sjöklint, & Ukkonen, 2016). There is also a potential for people to self-select to platforms that are locally oriented if social interaction is part of their motivation to participate (Akin et al., 2021). As such, bridging and bonding effects may in some cases be intentional, rather than unintended externalities.

Seddighi and Baharmand (2020) explore the role of the sharing economy in crisis management, including how ICT platforms has the potential to share information and coordinate actions, resources and needs across sectors and stakeholder groups. In a review of the related literature, they identified eight studies, of which four covered responses to natural disasters and the need to help refugees. None related to a health crisis such as a pandemic. The current study aims to contribute to fill this knowledge gap.

The Nabohjelp mobile app

Nabohjelp is a digital sharing platform owned and developed by OBOS, the largest housing co-operative in Norway. The mobile app is free to download and use. It was Launched in 2017 and had about 125 000 registered users in March 2020 when the lockdown came into effect.

The key objective of Nabohjelp is to facilitate contact between neighbours. Users can post messages that become visible to other users living within an adjustable radius from their home. Messages are typically requests for help with practical issues, that require a quick response. Users can also post offers to share resources or general information. There is also an option for grassroot organisations to register places of interest or upcoming events through a web site.

Figure 1 shows how the app may appear on a cell phone. The main user interface contains a list of recent posts and a map displaying the location of nearby requests and offerings, upcoming activities and places of interest. At the bottom of the screen, five icons allow users to navigate to perform different actions. From left to right, they are: "Home" for displaying the active messages posted by users near your home; "Statistics" to bring up statistics about app usage in your area in the recent weeks; "Add message" for creating new posts; "Conversations" to see private messages between yourself and other users; "Profile" where you can change the information in your user profile and adjust the radius that determines the visibility of your posts. The maximum radius was changed from 3 km to 10 km in an update that was pushed to users soon after the lockdown took effect. This particularly benefited users in areas with a low adoptation rate, e.g. in rural areas.

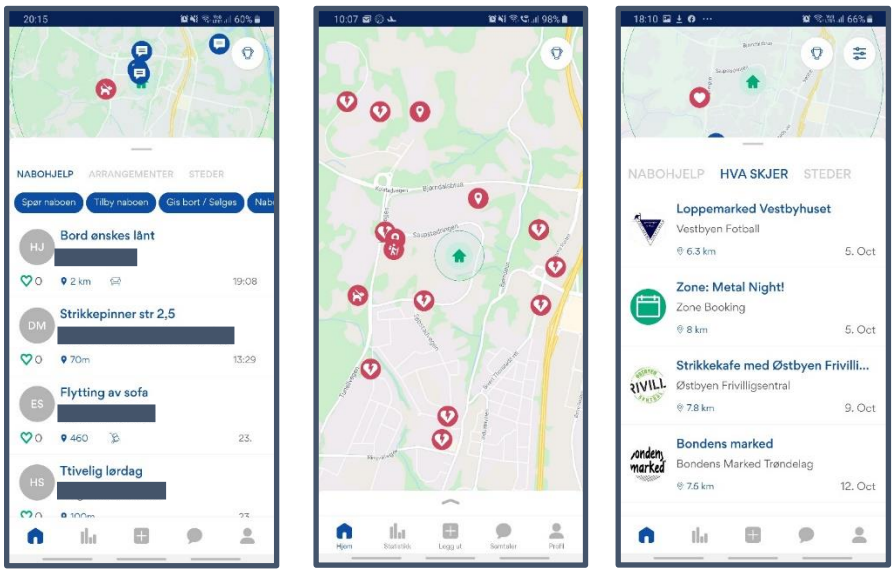

Figure 1 Screenshots from Nabohjelp

Note: Figure 1 shows screen shots of neighbour messages (left), a map of nearby places of interest (middle) and a list of local happenings arranged by NGOs (right).

Policy measures introduced at the outbreak of covid-19 in Norway

The first confirmed case of covid-19 in Norway was registered on February 26th 2020. Around the same time, travellers were returning home from winter holidays in Italy and Austria, unknowingly bringing the virus with them. Within two weeks, the authorities lost the ability to trace the spread of the disease. At 2:00 pm. on March 12th 2020, the Norwegian government announced and implemented large-scale anti-contagion measures, introduced by the Norwegian Prime Minister Erna Solberg as "the most severe restrictions on personal freedom in peacetime" (NTB, 2020).

This included the temporary closure of workplaces, kindergartens, schools, universities, gyms, hairdressers, restaurants, bars, cultural and sports activities and more. Regulations were introduced to limit social contact in places that still were open, and those who could were encouraged to work from home. The measures were implemented to protect vulnerable groups and maintain a functioning health care system as the pandemic entered a new phase. The lockdown took the public by surprise, with almost no time to prepare for the new situation.

Data description and research design

Data description

Through collaboration with OBOS, we obtained the complete set of messages posted by Nabohjelp users in the period from February 12th to June 2nd, 2020. The dataset contains 14 997 messages, covering periods before, during and after the national lockdown of March 12th. Each message contains a title, a body of text with the message itself, and the date and time of publication. The user that published a message is registered by the date and time that the user registered him-/herself on the app, providing unique identification of users. Each message is registered with a type:

offering, request, commerce or information. The format and range of the variables are summarized in Table 1.

Table 1 Variables included in the dataset

Variable	Format	Range
Title	Text	Open
Body	Text	Open
Message type	Text	Offering, Request, Commerce, Information
Publication date	Timestamp: dd.mm.yyyy	12.02.2020 – 02.06.2020
Publication time	Timestamp: hh.mm.ss	00:00:01 – 23:59:59
User registration date	Timestamp: dd.mm.yyyy	06.09.2016 – 02.06.2020
User registration time	Timestamp: hh.mm.ss	00:00:01 – 23:59:59

Research design

The number of observations and the level of detail in the dataset presented several opportunities for analysing the data. After an initial familiarisation with the data, we designed a mixed method research approach with an explanatory sequential design (Creswell & Plano Clark, 2010), combining quantitative and qualitative research methods to analyse the dataset. The analysis followed two phases. In the first phase, quantitative analysis was used to generate descriptive statistics based on the entire population of messages. In the second phase, we wanted to exploit the level of detailed insight that a manual investigation of the posted messages would give, but it was clear that a full readthrough of all the posts would be too time consuming. As an alternative, we decided to draw samples from subsets of the data, representing periods before, during and after the lockdown. The periods were selected based on the results from the quantitative analysis. Working with samples allowed for an in-depth content analysis focusing on the message titles and bodies.

The quantitative analysis utilized the entire dataset, covering the period of February 11th to June 2nd. Python scripts were used to aggregate the number of posted messages according to various criteria, such as publication date, message type and date for user registration. The quantitative analysis was scripted in Python 3.8.3 using PyCharm IDE 2020.1.2. The qualitative content analysis was guided by the empirical data, consistent with a grounded theory approach (Glaser & Strauss, 1967; Krippendorff, 2019). The messages were coded using Microsoft Excel version 16.48. Sampled messages where coded as whether and to what extent they contained any relation to covid-19, as well as the users' own tagging of messages related to type, and the payment option.

It was decided to use four sample periods of varying length. Period 1 covers the days in the dataset that occurred before the lockdown: Feb 12th to March 11th (28 days). Period 2 begins on the day when lockdown measures were introduced and extends about two weeks, from March 12th to March 26th (15 days). Period 3 covers the time from March 27th to April 11th (15 days). Finally, period 4 was defined as May 2nd to June 2nd (32 days). This period represents the final month in the available dataset and covers a time when most of the lockdown measures had been reversed or moderated, allowing society to open back up and partially return to normality.

100 messages were drawn from each of the sample periods. The title and body of these messages were read manually to identify indicators that would suggest whether the message was related or not to the ongoing pandemic and anti-contagion measures. The messages were then divided in

three groups, as either explicitly referring to the pandemic, implicitly related based on the content of the message, or unrelated. For classifying messages as explicitly referring to the pandemic, we looked for terms such as "quarantine", "home office", "temporarily laid off work" and "home-schooling", and messages describing people as being sick or at risk, as well as being healthy (indicating the ability to help people that are sick or at risk). Expressions such as “these times” or “these days” were also considered as explicitly referring to the pandemic.

The identification of implicit references to the pandemic is based on news reports during the lockdown. For example, certain products were in high demand and often sold out from stores in the initial weeks, such as yeast for baking bread and equipment for setting up home offices. Another example is requests of board games and recommendations for activities for children at home. Such messages were considered to implicitly refer to home schooling or -kindergarten and thereby implicitly referring to the pandemic. The remaining messages were coded as unrelated to the pandemic. One researcher read all of the four hundred sample messages and coded them, as the content was unambiguous and easy to code in most cases. Messages where the researcher was in doubt were presented and discussed in consensus meetings with all authors to decide on the coding.

Results

The distribution of messages over time

This section reports the results of the quantitative analysis for the distribution of posted messages over time. It provides an overview of the development and gives more insight into the motivation for dividing the dataset into sub-periods. Descriptive statistics are provided for each sub-period as an initial indication of changes in user behaviour motivated by the covid-19 pandemic.

Figure 2 shows the number of messages posted on Nabohjelp on each day from February 12th, 2020 to June 2nd, 2020. It is immediately clear that there was a large increase in the daily number of posted messages, corresponding with the date of the press conference where the lockdown measures were announced. Up until May 11th, the activity on Nabohjelp was relatively stable. For the first month in the data set, period 1, the number of messages averaged 54,9 with a standard deviation of 10,2, see Table 2. In the following two weeks, period 2, the average jumped to 183,4, with a standard deviation of 76,8. A peak was reached on March 15th 2020, when 429 messages were posted.

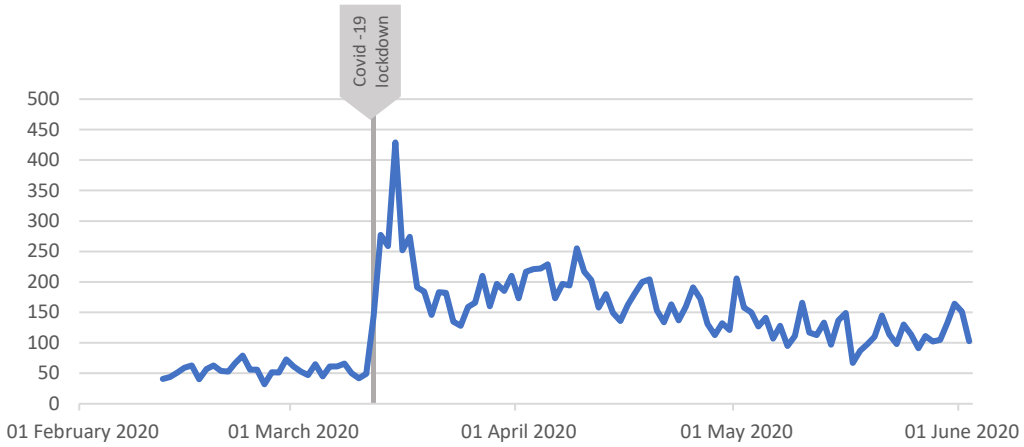

Figure 2 Number of messages posted during period Feb 12th - June 2nd

The activity remained high until April 9th, after which it started to gradually decrease. In the final month of the dataset, period 4, the average number of daily messages was 120,3 with a standard deviation of 23,9. This is more than twice as many as in the period before the lockdown.33 It is also worth to notice that there is no indication in the data for period 1 that would suggest that a national lockdown was imminent. On March 11th, 2020, the number of posted messages was 42, about one standard deviation below the average of that period.

Table 2 Average number of daily messages posted to Nabohjelp and standard deviation

Period	Dates	Average number of daily messages	Standard deviation of daily messages
Period 1	February 12 - March 11	54,9	10,2
Period 2	March 12 - March 26	183,4	76,8
Period 3	March 27 - April 11	169,1	23,3
Period 4	May 2 - June 2	120,3	23,9
All data	February 12 - June 2	133,9	66,3

The metadata for each message contains information about the types of messages that were posted. There are four types which the user chooses among when posting a message: The type “commerce” deals with sharing items either for free or against payment, “information” with broadcasting an announcement to neighbours, “offer” and “request” for respectively offering and asking for support, either for free or against payment.

[33] A comparison of the sample means using a two-sided t-test gives a p-value <0.001.

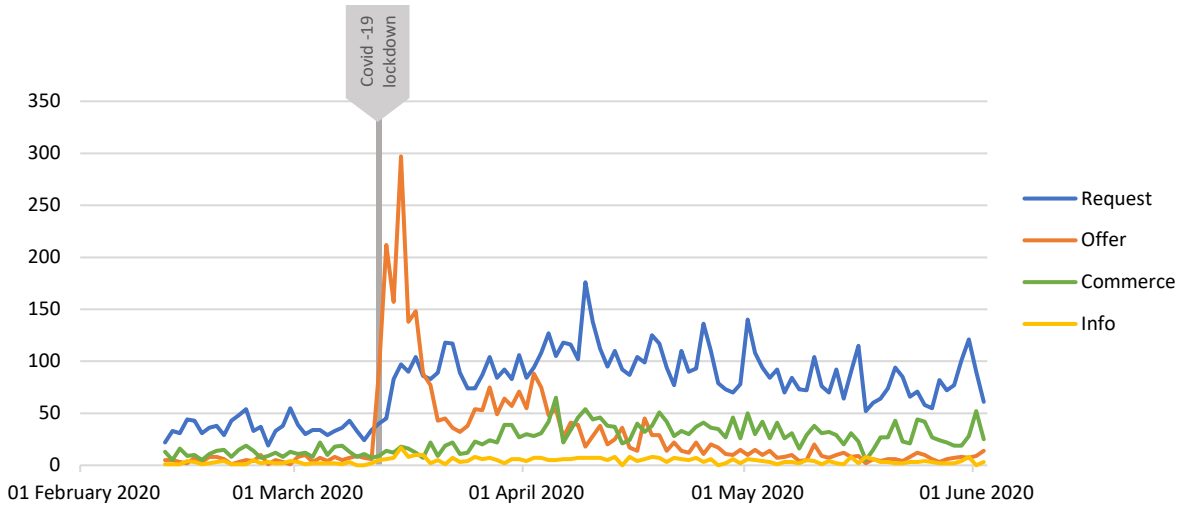

Figure 3 Number of messages per day, sorted by message type

By graphing the development of posts by message type, see Figure 3, it becomes even more clear that the spike in messages after March 12th was atypical. While the majority of messages posted are usually requests for help of some kind, there was a week from March 12th to March 18th where offers to help outnumbered the requests. Secondly, the peak in messages of the offering and information type occurred on March 15th, while requests for help occurred about three weeks later, on April 9th. The commerce type messages peaked on April 5th.

Table 3 The number and percentage of posted messages by type for each sample period

Message type	Period 1 Feb 12 - Mar 11	Period 2 Mar 12 - Mar 26	Period 3 Mar 27 - Apr 11	Period 4 May 2 - Jun 2	Complete dataset
Commerce	335	206	547	883	2781
Information	57	93	87	103	457
Offer	148	1455	789	252	3148
Request	1002	1189	1637	2510	8611
Total	1542	2943	3060	3748	14997
Commerce	22 %	7 %	18 %	24 %	19 %
Information	4 %	3 %	3 %	3 %	3 %
Offer	10 %	49 %	26 %	7 %	21 %
Request	65 %	40 %	53 %	67 %	57 %
Total	100 %	100 %	100 %	100 %	100 %

Note: The table reports the frequency of Nabohjelp messages of various types, in absolute numbers and as percentages. The percentages are calculated as the number of messages of a given type, divided by the total number of messages in the respective period.

Table 4 Distribution of covid-19 related messages in the samples (n = 400)

	Period 1 Feb 12 - Mar 11	Period 2 Mar 12 - Mar 26	Period 3 Mar 27 - Apr 11	Period 4 May 2 - Jun 2
	Covid-19	**Covid-19**	**Covid-19**	**Covid-19**

Type	Total	Explicit	Implicit	Total	Explicit	Implicit	Total	Explicit	Implicit	Total	Explicit	Implicit
Commerce	18			3	1	1	18			23		
(% related)	(0%)			(67%)			(0%)			(0%)		
Information	2			2			1			1		
(% related)	(0%)			(0%)			(0%)			(0%)		
Offer	12			57	42	3	27	12	6	6		
(% related)	(0%)			(79%)			(67%)			(0%)		
Request	68	1		38	8	1	54	5	1	70		1
(% related)	(1%)			(24%)			(11%)			(1%)		
Total	***100***	***1***		***100***	***51***	***5***	***100***	***17***	***7***	***100***		***1***

Note: The table summarizes the number of messages that are either explicitly or implicitly related to the covid-19 pandemic, according to message type. *% related* shows the share for the given message type that was found to be related to covid-19. In total, 100 messages were sampled from each of the four periods, n= 400.

The results from the in-depth content analysis are summarized in Table 4, where the sample messages are also sorted according to message type. In period 1, only one message was found to implicitly refer to covid-19, and none did so explicitly. Thus, 99% of messages in period 1 were about unrelated topics. The single atypical message refers to the delayed delivery of a product from China due to covid-19. Most messages in period 1 (68) are of the request type, and most requests are concrete describing specific user needs and looking for helpers with or without professional competence. Some examples are:

> *Car will not start - I have a [car model and colour] that won't start. It looks like the battery has run out of power. If anyone has a starter cable I could borrow, I would have greatly appreciated it [smiley emoticon]. I live in [address].*
>
> *Help with moving - Hi, I am picking up a piano at [area] and transporting it to [area]. From 1st floor to 1st floor. Anyone? We'll agree on a price [smiley emoticon].*

In addition to such requests, some users ask for advice, e.g., about the best agreement with a power supplier, and some look for apartments available for rent. The sample in period 1 also includes 18 messages of commerce type, all of which were give-aways and sales adds, and 12 messages of offer type. The two messages of information type are both about lost and found items.

In period 2, 56 out of the 100 messages in the sample, refer to covid-19. Of these, 51 refer explicitly to the pandemic, and 5 messages make an implicit reference. Differently from period 1, and in line with the population of messages, offer is the most used type in period 2. Among the 57 messages of offer type in the sample, 45 (79 %) have a title and/or body relating them to covid-19. Request is the second most used type, with 9 out of 38 messages (24 %) related to covid-19. 2 out of 3 messages of type commerce were related to covid-19, one selling disinfectants, and one selling toilet paper, both of which we know were scare commodities at the time. Finally, there were two messages of type information, both unrelated to covid-19.

The messages of type offer in period 2 were typically more open in scope and time than the messages from period 1. Some examples of period 2 offers related to covid-19 are:

> *Walk dog - Hi! If anyone in these corona times have difficulties with walking their dog, I have a boy who would gladly help. He is 8,5 years old and has had his own dog since he was small.*

> *Shopping help for corona exposed -Are you in quarantine or isolation? Are you in the risk group, and want to limit leaving home? If you need help to shop, go to the pharmacy or other important errands, I gladly assist. I'm not in the risk group and wish to do a "dugnad" [Norwegian term not translated] contribution and to limit the extent of the contagion we are exposed to. We will take necessary precautions to avoid infection! This will not cost you anything of course, other than paying for your own goods [smiley emoticon].*
>
> *Quarantine help - I'm home on leave since I work in a kindergarten. My fingers ITCH after doing something! Need help with sundries, send me a message!*

Some examples of requests that relates to covid-19 are:

> *Help to shop food - Hi! We have symptoms of cold and are staying indoors. We therefore need help from some kind souls to buy food for us. Send a message if you have the opportunity. Thank you!*
>
> *Anyone who can pick up a delivery in [area]? - Have a postal package that must be picked up by [date]. I am in home quarantine and should avoid this myself.*

In period 3 we observe that, already within two weeks, the share of covid-19 related messages was on the way down. In total, 23 % were found to be either explicitly or implicitly related to the pandemic, compared to 56 % in period 2. This decrease can be associated with both a lower share of the offer type (27 %), and a lower share of request type being covid-19 related. In period 3, 11% of requests contained a reference to the pandemic, compared to 24% of requests in period 2. As shown in Figure 3, the number of daily requests on the app approximately doubled from the beginning to the end of period 3, but there is no evidence in the content of the messages that this increase relates to the pandemic.

In period 4, there were no messages with content explicitly related to covid-19. A single message, possibly implicitly related to the lockdown, came from a couple asking to borrow a modem after their home office internet broke down. Similar to many other countries, several Norwegian employees have worked from home during 2020 and 2021. In terms of the type of the messages, we observe that by period 4, the app usage had returned to a behaviour that resembles the pre-lock down time of period 1. Among the six messages of offer type in period 4, two were related to child- and animal care, while two were give-aways of furniture and a plant. The remaining two were general offers of helping with chores. 23 of the sample messages were posts of the commerce type, where most of them related to selling furniture, leftover materials (e.g., laminate flooring materials, kitchen cabinets, etc.) or interior. 70 of the messages were requests.

Are the new users behaving like earlier users?

This section reports quantitative evidence of changes in user behaviour during the period covered by the dataset. It covers both the addition of new active users, and the number of messages posted by these users. The analysis gives new knowledge to the question of whether users registered shortly after March 12th behave differently than app users registered at an earlier date.

The term "active user" is used to refer to users who posted at least one message to Nabohjelp between February 12th 2020 and June 2nd 2020, so that the user's registration date is in the dataset. The app provider claims that the majority of people who register on the app never post a message.

User registration over time

The registration of active users has been relatively stable over the previous two years. In 2018, an average of 158 active users we registered per month. In 2019 the average was 132. For January and February in 2020, the average was 165 new active users. During March 2020, the number of active users increased dramatically with new 1799 users, and 1180 extra in April 2020. In May 2020 there were 395 registrations of active users. Table 7 lists the number of observed user registrations in each sample period. In the month leading up to the crisis (period 1) 256 active users were registered. This is twice as many as the monthly average of 2019 and indicates that the rate of user registration was already accelerating. In periods 2, 3 and 4, the respective numbers of observed user registrations were 1273, 987 and 390. In total, the dataset contains messages from 8665 individual users. 5384 (62 %) of them registered before March 12th 2020 and 3281 (38 %) registered on March 12th or later. In the following, we will refer to the first group as pre-existing users, and the latter as new users.

Table 6 The number of new active users of Nabohjelp during the spring of 2020

Period	Date	User registrations
Period 1	Feb. 12 – Mar. 11	256
Period 2	Mar. 12 – Mar. 26	1273
Period 3	Mar. 27 – Apr. 11	987
Period 4	May 2 – Jun. 2	390

The distribution of daily registrations in the first five months of 2020 is illustrated in Figure 5. It shows a spike in registrations on March 15th that coincides with the spike in messages the same day. It also shows that after the initial boost in period 2, the influx of new active users continued in period 3. April 16th, 2020 was the last day that Nabohjelp experienced more than 50 registrations of active users in a single day. The average number of daily registrations of active users in May 2020 was 12,7. This is about twice as high as the daily average between January 1st 2020 and March 11th of 6,2 new active users.

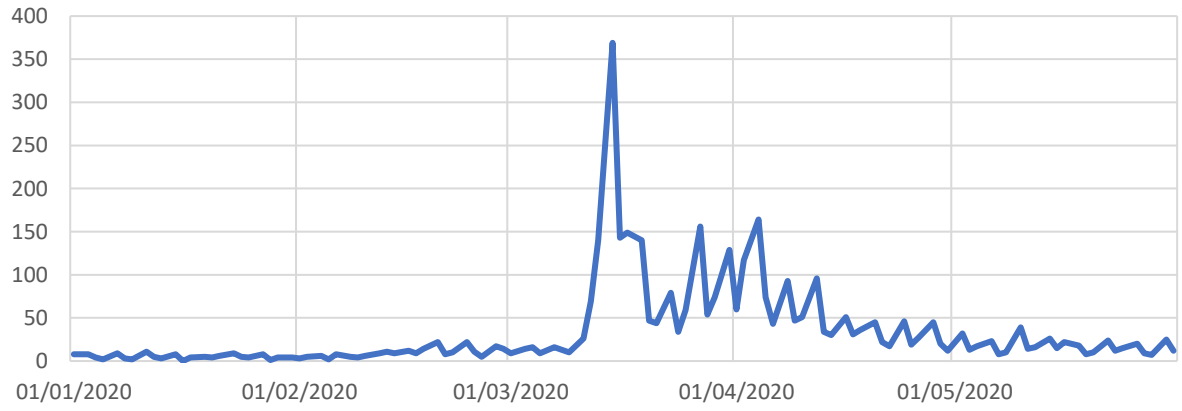

Figure 5 Daily registrations of active users of Nabohjelp (1.1.2020 – 31.5.2020)

Sharing behaviour by new and pre-existing users

Figure 6 graphs the number of messages posted daily by users registered up to and including March 11th and those who registered on March 12th or later. It shows that both groups were active in posting messages in the initial days after the lockdown. In other words, the public responded rapidly to the crisis, also by downloading Nabohjelp if they had not done so already. On March 15th, new

users posted more messages than pre-existing users, with 228 and 201 messages respectively. However, despite that the number of new active users continued to grow, the number of daily messages soon fell back below that of pre-existing users. The fact that most messages throughout the lockdown came from pre-existing users may be attributed to a relatively high number of pre-existing users.

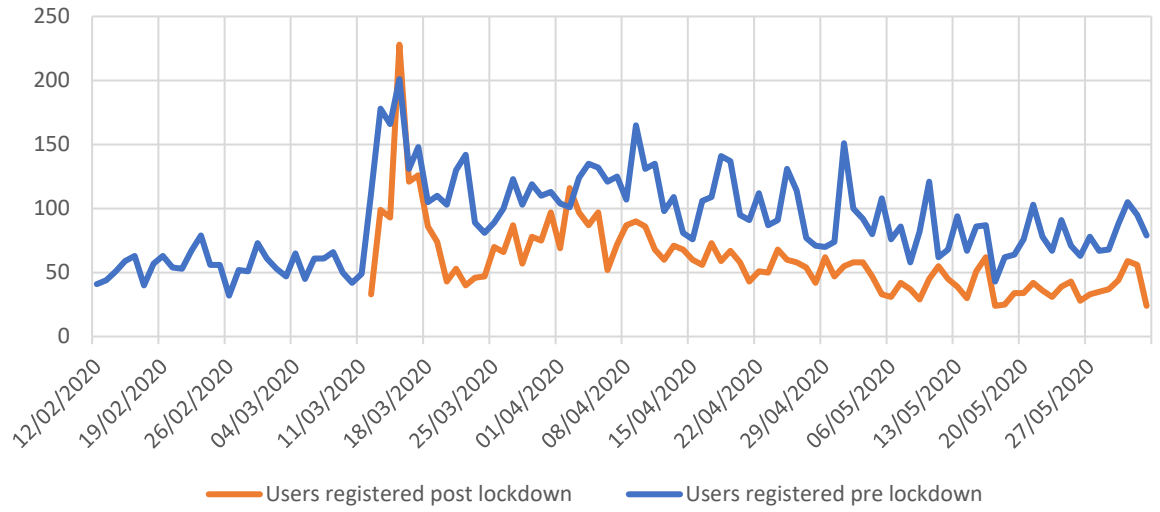

Figure 6 The number of daily messages by users registered before and after March 12th 2020

New users contributed with 0 % of messages in period 1, and 39 %, 40 %, 33 % of messages in periods 2-4 respectively. In the sample drawn for the in-depth study, 23 out of the 56 covid-19-related messages in period 2 (41 %) were posted by new users. The fact that new users posted 39% of all messages and 41% of the covid-19-related messages in period 2 suggests that the kind of messages posted by new and pre-existing users was similar in nature. Figure 7 provides more information on this point, by separating messages according to message type. The overall picture is that both new and pre-existing users posted few Commerce and Information type messages, and that the development of Request type messages is similar for the two user groups. The main distinction in the behaviour of new users seems to be that they were responsible for a second wave in Offer messages, between March 22nd and April 6th. This increase in offers is not apparent in the data for pre-existing users. Instead, it matches the high level of registrations of new active users in the same period.

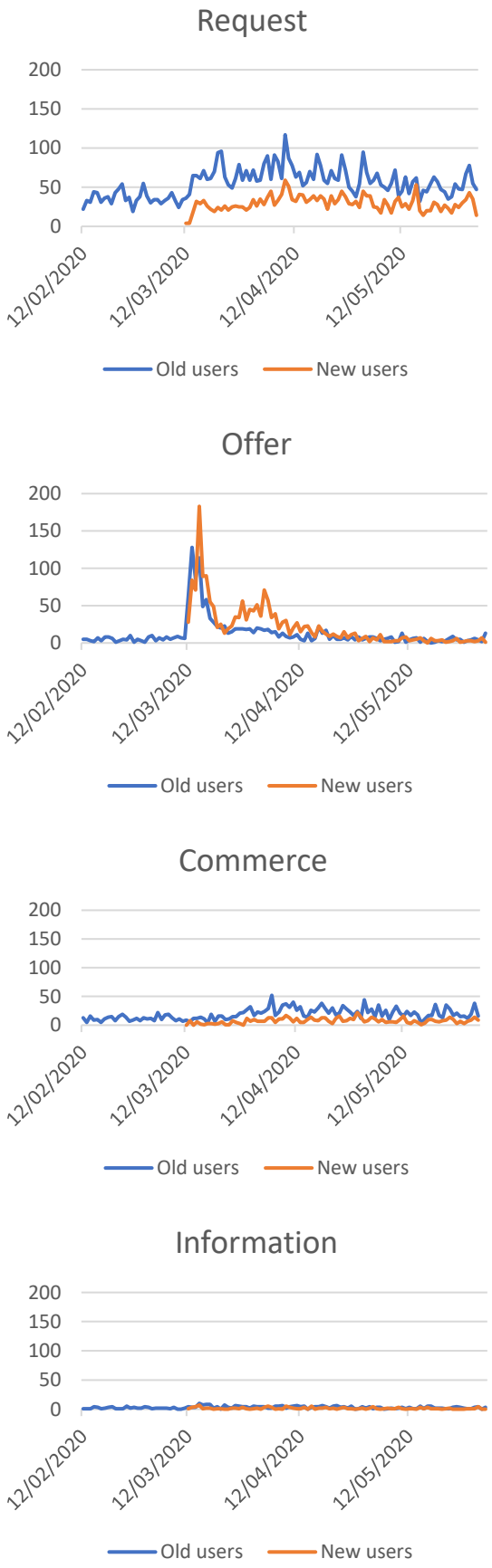

Figure 7 The number of daily messages posted by pre-existing and new users, by message type

Messages per user

To investigate whether the new users were more or less active in posting messages than pre-existing users, we calculated the share of users posting between 1 and 10 messages. The results are provided in Table 7. One thing to note here is that the pre-existing users had more time to post several messages, as they span the entire period that we investigate, totalling 111 days. The new users were, by definition, only present from March 12th, giving them 82 days to be observed. With 35 % more days, it should be expected that a higher share of the pre-existing users would be posting more than one message. This is also what is found in the data: 73 % of the new users have posted only one message on the app. This compares to 64 % of the pre-existing users.

In total, the 3 281 new users posted 4988 messages, giving an average of 1,52 messages per new user. In comparison, the 5 384 pre-existing users posted 10 009 messages, with an average of 1,86 messages pr user. The maximum number of messages by a single user is 27, equally for both the new and pre-existing users. The 1 % of pre-existing users that posted 10 or more messages contributed 10 % of all messages posted by that group. Among the new users, 0,5 % of them posted 10 or more messages, generating 4 % of the messages by new users.

Table 7 The number of messages per user, by user group (from February 12th, 2020 to and including June 2nd 2020)

Messages per user	Share of messages posted by new users	Share of messages posted by old users	Share of new users	Share of old users
1	48 %	34 %	73 %	64 %
2	23 %	21 %	17 %	19 %
3	10 %	12 %	5 %	7 %
4-10	16 %	25 %	5 %	8 %
>10	4 %	9 %	0 %	1 %
Sum	**100 %**	**100 %**	**100 %**	**100 %**
N	**4 988**	**10 009**	**3 281**	**5 384**

Note: The table shows the number of messages that users post on the Nabohjelp platform. New and old users refer to users registered before and after the covid-19 lockdown of March 12th 2020 respectively.

Discussion

The key question we address in this article is how the sharing economy can help to alleviate difficulties that arise with policies related to pandemic lockdown, including strict rules for social distancing. The previous section addressed the specific case of using the sharing app Nabohjelp in the first wave of the covid-19 pandemic in Norway. In this section, we summarize the results and discuss their relevancy to other settings and earlier findings in the literature on crisis management.

The lockdown led to increased app usage

First of all, there is convincing evidence that the covid-19 lockdown strongly influenced both the usage and number of users of Nabohjelp. We observed a large jump in the number of messages posted per day that coincided in time with the announcement of the lock down measures on March 12th, 2020. Prior to this date, there were no indications in the data that there would be significant changes in the activity level. Indeed, the lockdown took the public by surprise. An official Norwegian report about the government's handling of the corona pandemic shows that the Norwegian director

of health was given the task of identifying relevant measures to stop the spread of covid-19 less than 24 hours before the lockdown became a reality (NOU 2021:6, , part 3).

The large changes in app usage that literally happened overnight from March 12th to 13th 2020 supports claims from Frenken (2017) and Seddighi and Baharmand (2020) that the sharing economy has the potential to serve rare peaks in demands from citizens in crisis and to reduce the burden on public organizations. In this case, the Nabohjelp app seems to have facilitated the matching of users with needs and users with residual capacities within a close geographic area. Placed in the framework proposed by Seddighi and Baharmand (2020) that defines the different roles the sharing economy may play in disaster management, Nabohjelp fits the role of contributor. In other words, Nabohjelp may enhance community resilience by providing access to an extended network of resources and things.

Our analysis of the content of the messages provides further evidence for that the spike in app usage was driven by the lockdown. Only one of the hundred sampled messages from the month leading up to the lockdown (period 1) is related to covid-19. In contrast, 56 % of the sampled messages from the following two weeks (period 2) were referring to the pandemic. The fact that 44 % of messages in period 2 did not have clear references to the pandemic does not necessarily mean that there would have been an increase in usage regardless of the social isolation policies. For example, several of these messages were offers to help with shopping for groceries, an activity that was not very prominent in period 1. This indicates that more messages in the samples are related to the need for social isolation than those identified as directly or indirectly related to covid-19. The challenge with classifying such messages as covid-19 related is that the phrasing does not support a clear differentiation from similar messages posted before the lock-down. As such, our measure of messages related to covid-19 should be regarded as a conservative lower bound, rather than a point estimate.

The increase in activity since March 12th is also evident in the number of daily new active users. Our findings show that the influx of new users was exceptionally high for about a month (until April 14th) and that it continued to sustain a higher rate than in the pre-lockdown period. The newly registered users immediately contributed to a large share of posted messages. This indicates that the public quickly identified Nabohjelp as a potentially relevant channel for communication and coordination. Within two weeks, the development team at OBOS responded by designing and launching an information campaign on how to install and use their app, which helps to explain the second wave of user registrations and offers by new users, starting from March 22nd.

The pattern of use changed significantly when the lockdown came into effect, but the changes appear to have been temporary. During period 2, both new and pre-existing users posted a higher share of messages classified as offerings, typically not demanding any payment, and with a scope that was more open than what was observed in messages from period 1. This pattern continued in the two following weeks (period 3) with a steady addition of new active users posting offering messages, while the pre-existing users returned to using the messages of type request as the most frequently used. One and half month after the effective date of the lockdown (period 4), overall app usage appears to be very similar to that of period 1, except for the number of daily messages being considerably higher than before the lockdown.

Both new and pre-existing users were driven by context dependent motives

The temporal shift in message content that was observed likely indicates a temporal shift in the user's motivations to use the platform, and that this was a shift towards more socially oriented motives. The fact that the number of messages per user was very similar for new and pre-existing users, and that the two user groups have near equal shares off messages that are identified as covid-19 related, is consistent with the view that the lockdown did not attract users with fundamentally different motivations for participating in sharing.

We interpret the results as evidence for both new and pre-existing users having context dependent motivations for participating. When society is functioning with a large degree of normality, app usage appears to be driven primarily by specific short-term needs. But when the society enters a new situation, or context, such as a national crisis, this is immediately reflected in the sharing behaviour. In a time of crisis, there is an increased expression of social motives, such as the willingness to help, that is evident until society returns to normal. We see from the results that the altruistic behaviour is driven by both empathy with those who become socially isolated, and by new opportunities to help that arise from being more at home with more time for leisure activities.

At the individual level, context dependent motivations can be expressed as a desire for flexibility. Both (Akin et al., 2021) and (Gazzola, Vătămănescu, Andrei, & Marrapodi, 2019) have argued that flexibility and convenience are important prerequisites for users of sharing economy platforms, and that these aspects are key enablers for well-functioning sharing. One strategy to obtain flexibility is illustrated by Bellotti et al. (2015) who show that sharing economy participants may use different sharing platforms for different purposes. In their study, they make a clear distinction between users who provide resources on a platform (e.g., an Uber driver) and users who receive a resource (e.g., an Uber passenger), and show how the underlying motivations differ between these roles. As the current study has shown, Nabohjelp allows the users to act as both provider and receiver at will and the platform is flexible enough to accommodate sudden changes in the user needs and resource availability. This may explain how the activity on Nabohjelp increased as much as it did during the crisis.

Business model implications

The observed changes in app usage provides new insights into the motivations driving sharing economy participation. Earlier studies have typically sought to differentiate between materialistic and altruistic motives among users and platform providers, relying on self-reported accounts in single round interviews or surveys (see e.g., Akin et al., 2021; Bellotti et al., 2015). Such studies are susceptible to experimenter-demand effects where subjects seek to comply with perceived expectations from the researcher. In addition, they are unlikely to capture dynamics that arise with unexpected changes in user needs.

In contrast, with detailed information of actual app usage, the quantitative data in this study are objective, and the findings derived from the qualitative data are only dependent on the researchers' own analysis and presentation. Secondly, the longitudinal dimension of our dataset enables us to follow evolutions in app usage over time. This also allowed us to identify the similar behaviour of

new and pre-existing users, both in the immediate crisis and in a more normalized situation. This finding rejects the idea that the crisis attracted a new kind of users to the platform, but further studies are needed to characterize the concept of context-dependent preferences of sharing economy participants.

While we have shown that Nabohjelp was used by thousands of people seeking or offering help in a time of great uncertainty, this study does not discuss how governments should engage with platform providers to mobilise the sharing economy in future crises. E.g., Seddighi and Baharmand (2020) observe that implementing sharing economy platforms in crisis management can challenge coordination by expanding the set of decision makers and stakeholders. It is also conceivable that some offers to help that were displayed on Nabohjelp would have made a larger impact if it was directed towards established organisations, such as the local red cross. These examples suggest that there is still a large need for studying collaboration and information sharing across stakeholders from different sectors, i.e., public, private, and volunteering.

Concluding remarks

This paper presented the population of messages on the Nabohjelp app in the immediate time before and after lockdown measures were introduced in Norway in March 2020 due to the covid-19 pandemic. Besides providing a detailed description of the people's reaction to the "new normal", the study also gives new insights on the more general topic of the usefulness of sharing economy platforms as tools for crisis management.

The study provides new evidence for the claim that p2p sharing economy platforms, such as Nabohjelp, can create more robust societies and play an important role in crisis management. In the case of the covid-19 pandemic in Norway, the platform connected people at the local level without the need to meet physically, so that they could communicate needs and abilities to help. The willingness to help others in a time of crisis was spontaneous and the sharing economy platform was able to meet this sudden change in needs, as predicted by Frenken (2017). Both pre-existing and new users were quick to use Nabohjelp in this way.

Crisis management is not the intended purpose of the Nabohjelp platform, and the response happened without the involvement of public authorities. This is in line with Seddighi and Baharmand (2020) who found that disaster managers seldom coordinate with sharing economy providers before disaster strikes, despite the potential benefits this can have. The study further extends their framework to the recovery phase since Seddighi and Baharmand were unable to find any studies or examples that could validate the role of the sharing economy in the recovery phase of a crisis. The results of our in-depth analysis of message content indicate that app usage had returned to normal within the data period, and we show that the p2p sharing economy can assume the role of "contributor" also after the preparation and response phases.

The findings should be relevant for app developers and investors, as well as crisis managers, governments and local societies struggling with the pandemic. With vaccination efforts still ongoing in many parts of the world, the covid-19 pandemic continues to require social distancing through

forced and self-imposed isolation. Luckily, the p2p sharing economy can facilitate assistance to at least some who need it.

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Appendix A

Sample representativeness

Table A.8 presents the distribution of messages by type for the 100 messages that were randomly drawn from each sample period for the in-depth content analysis and for the total population of messages. The distribution of messages in the samples is close to that of the message population, indicating that the samples are representative for the app usage in these periods.

Table A.8 The distribution of posted messages by type in samples from period 1-4

	Message type	Period 1 Feb 12 - Mar 11	Period 2 Mar 12 - Mar 26	Period 3 Mar 27 - Apr 11	Period 4 May 2 - Jun 2
Sample amount	**Commerce**	18	3	18	23
	Information	2	2	1	1
	Offer	12	57	27	6
	Request	68	38	54	70
	Total	100	100	100	100
Sample percentages	**Commerce**	18 %	3 %	18 %	23 %
	Information	2 %	2 %	1 %	1 %
	Offer	12 %	57 %	27 %	6 %
	Request	68 %	38 %	54 %	70 %
	Total	100 %	100 %	100 %	100 %
Population percentages	**Commerce**	22 %	7 %	18 %	24 %
	Information	4 %	3 %	3 %	3 %
	Offer	10 %	49 %	26 %	7 %
	Request	65 %	40 %	53 %	67 %
	Total	100 %	100 %	100 %	100 %

Note: The top panel in the table reports the frequency of messages of various types in absolute numbers. The middle and bottom panels display the distribution of messages by type for the samples and the overall population of messages respectively.

A Proposed Framework for Sustainable Business Models in Sharing Economy Contexts

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Introduction

The sharing economy is now considered as a major building block for transitions to sustainability. It is also seen as a disruptive innovation facilitated by advanced technologies, mainly the Internet that significantly impacts the way businesses are developed and operated (Ferrell et al.,2017; Heinrichs, 2013; Ritter and Schanz, 2019). The concept of sharing economy is widely used, but there is still confusion about the factors that comprise a sharing economy business model. The aim of the current paper is to propose a comprehensive framework for sharing economy business models to operate in a sustainable manner.

Researchers of the sharing economy divided its role into three pillars; which are environmental, social and economic (Acquier et al., 2017; Cherry and Pidgeon, 2018). According to Botsman and Rogers (2010), sharing economy reduce resource utilization and idle capacity through focusing on having access rather than ownership such as carsharing and home sharing practices (Ritter and Schanz, 2019). Academics, media, practitioners, and policymakers are always promoting for sharing economy as a sustainable practice (Hassanli et al.,2019; Heinrichs, 2013). They assume that sharing economy practices reduce net consumption, reduce greenhouse gas emissions and improve material efficiency, as well as providing other economic and social benefits (Acquier et al., 2017; Hamari et al., 2016; Laukkanen and Tura, 2020). However, some researchers and studies showed that sharing economy may have negative consequences on sustainability outcomes. This is due to negative rebound effects that may lead to an increase in net consumption (Parguel et al., 2017; Plepys and Singh, 2019).

For instance, Airbnb as a major sharing economy business model is blamed for increased housing prices, reducing local housing stock, and restoration, as well as displacement of local communities (Curtis and Mont, 2020). Uber and lyft are seen as a significant contributor to air pollution and traffic congestion (Plante, 2019). This can show that sharing economy is not sustainable by default; it must be re-structured, and businesses must be more cautious and strategic in how to design sustainable business models in the context of sharing economy. No tool currently exists to support sustainable business model innovation at the organizational level in the context of sharing economy

(Curtis and Mont, 2020). Also, it was found that no research discussed the impact of consumer behavior in developing sustainable business model in a sharing economy context.

Business models are defined as "the rationale of how an organization creates, delivers, and captures value (Osterwalder and Pigneur, 2010:14). It is also defined by Teece (2010:179) as "A business model articulates the logic, the data and other evidence that support a value proposition for the customer, and a viable structure of revenues and costs for the enterprise delivering that value" Sustainable business models are referred to as creation of value for both customers and society through the integration of the environmental, social, and economic pillars of sustainability (Bocken et al., 2013; Geissdoerfer et al., 2018). To achieve sustainability goal through the big umbrella of sharing economy, thus sharing economy models should be considered in research and practice. Sharing economy business models are considered innovative businesses as well as a fast-growing part of economies with a very low cost of market entry. They also have a significant impact on traditional businesses due to their environmental, societal and economic positive effect towards sustainability (Geissdoerfer et al., 2018).

Therefore, the current paper aims to provide a framework that may support the design and implementation of sharing economy business models for enhanced sustainability performance. This framework is based on consumer desires from the sharing practice as well as including the main three pillars of sustainability. In doing so, the researchers aim to make two contributions. First, to develop a model that considers consumer behavior and perceptions towards sustainability in building a sustainable model in sharing economy context. Second, to support practitioners and organizations in designing, implementing, and communicating sharing economy.

Comprehensive Framework for Sharing Economy Business Models

As stated by Heinrichs (2013) that sharing economy is believed to be the new prospective pathway to achieve sustainability, the below model is developed. Botsman and Rogers (2010) claim that sharing economy will disturb the unsustainable activities of hyper-consumption. The authors mentioned that sharing economy helps in shifting from a culture where consumers own their products to a new culture where consumers share and re-use products from cars to drills through the Internet and online platforms that facilitate communication between individuals. This shows that it all starts with changing consumer behaviors and impacting their understanding and perceptions towards the importance of sharing economy practices that contributes to sustainability.

A study conducted by Keeble (2013) concluded that consumers who participate in sharing and collaborative practices induce three types of value perceptions. The first one is the economic/utilitarian value; where consumers have access to products by sharing rather than ownership, which lowers costs. The second value is hedonic; in which consumers have a feeling of enjoyment because of sharing and experiencing various options with other people. The hedonic value is mainly experienced with pro-social behaviors; where consumers feel that they are contributing to their environment and society. The last value is the symbolic one; which refers to social values where consumers are aware of the importance of sustainable consumption. Therefore, they try to consider the consequences of their behaviors on the environment when consuming gas or food (Hwang and Griffiths, 2017). Although research has proved that sustainability could be a

factor behind consumers' sharing practices, however, the economic aspects still have the significant impact behind their consumption behaviors (Hamari et al.,2016; Li and Wen, 2019).

Based on previous studies conducted in sharing economy contexts revealed that consumers encouraged to participate in sharing practices because of lower costs. Sharing economy practices help them to save money and reduce ownership of products. Also, having a positive environmental impact is a major reason behind consumers' positive attitudes towards the concept of sharing economy (Li and Wen, 2019; Abutaleb et al., 2020). Other studies revealed that consumers have a sense of connection and social value when participating in sharing and collaborative communities. As well as sharing practices help in saving time as it is more convenient (Joo, 2017).

Based on the results of previous studies and the aspects that are included in a sustainable business model the current model is developed to set the path for startups and companies to integrate sustainability, and consumer behavior into their sharing economy models.

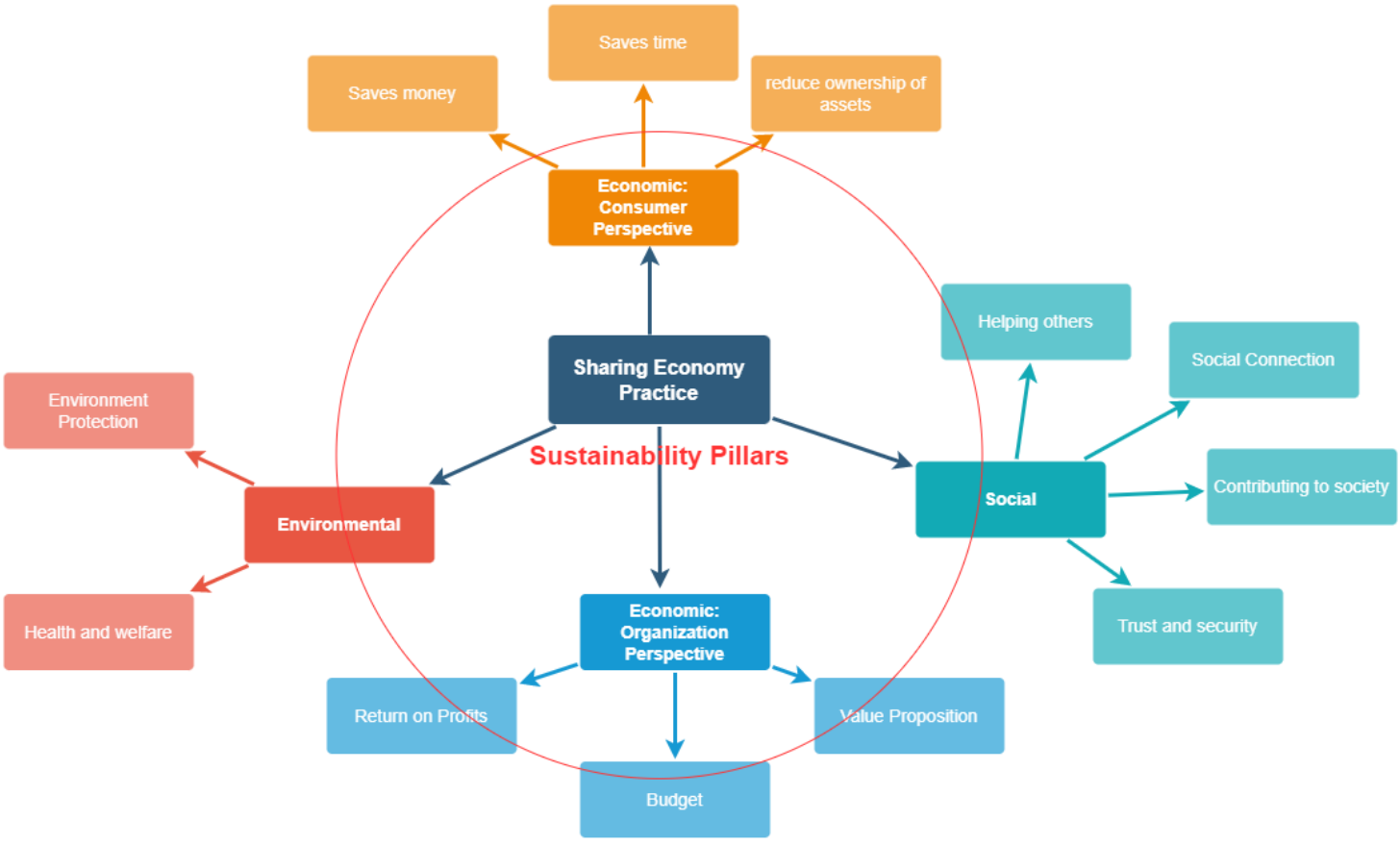

Figure1: Proposed model for a Sustainable Sharing Economy Business model based on Consumer Behavior Insights

In conclusion, the aim of this paper is to contribute and propose the major aspects of a sustainable business model in the context of sharing economies. The proposed model shows the main pillars that should be in a sharing economy business model that leads and fits with sustainability pillars and goals as well as consumer behavior. The researchers developed the model based on comprehensive insights from the literature review and various studies conducted on explaining

sharing economy business models. For businesses to take major steps in transforming their sharing economy business models to more sustainable ones; they must focus on their consumers. It starts with changing consumer behavior and increase their awareness towards the importance of achieving the sustainability goals through their consumption patterns and purchasing behaviors.

It is stated by Porter and Kramer (2011) that business model innovation offers a potential approach to deliver the required change, which is sharing economy models, through redesigning and re-creating the value in parallel with sustainability. Businesses and startups need to redesign their business models through pursuing sustainability strategies, through integrating the environmental, societal, and economic aspects as well considering consumer behavior. Also, with the rising global sustainability pressures, it is important for businesses to collaborate with other stakeholders in creating sustainable strategies and business models (Lowitt, 2013). It is claimed that value is no longer created by firms only, however, it needs firms to act in collaboration with other parties to develop business models (Beattie and Smith, 2013). Therefore, the aim of this paper is to highlight the major role of consumers as a stakeholder in the development of sustainable business models in the context of sharing economy.

Keywords:

Sharing economy, Sustainability, business models, consumer behavior

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Exploring consumer preferences in Mobility-as-a-Service platforms

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Extended abstract

Introduction

Enabled by digitalisation, Mobility-as-a-Service (MaaS) platforms typically present shared mobility, public transport, and ride-hailing services in a single mobile application and include services related to payment, e-ticketing, and journey planning (Sakai, 2019). Such platforms could reduce single-car trips, traffic congestion, pollution levels, and CO2 emissions, and thus contribute to cities' sustainable development (Utriainen & Pöllänen, 2018). MaaS platforms are triggering changes in the business models within the mobility ecosystem (Athanasopoulou et al., 2019). Examples of national MaaS platforms are Hely in the Netherlands (hely.com), Skedo in the USA (skedgo.com), and Istmobil in Austria (istmobil.at).

MaaS platforms could fundamentally change mobility by providing alternative travel and commute options to consumers. The MaaS mobile applications present consumers with multiple MSPs alternatives to reach their destination, enabling them to easily compare prices and travel times across transport modes. Previous research has identified several service attributes that influence consumer adoption of shared mobility services, such as convenience, price, travel time, and data privacy (e.g., Poppelaars et al., 2018; Rahimi et al., 2020; Tirachini et al., 2020; Tunn et al., 2021). Whilst consumer adoption of various modes of mobility has been extensively studied, less is known about consumer preference for mobility services and consumer segments within MaaS platforms. For MSPs it is important to identify the service attributes determining consumer preference to identify relevant consumer segments for their service.

To better understand consumer preference in MaaS platforms, this study addresses the research questions: (i) Which service attributes influence consumer preference for mobility providers within MaaS platforms? (ii) What consumer segments can be distinguished based on consumer preferences? We analyse the influence of mobility service attributes, such as convenience, price, transportation mean, sustainability, personal space, and data privacy, on consumer preference for MSPs.

Methodology

To investigate the influence of mobility services attributes on consumer preference within MaaS platforms, we apply the Q-methodology (Brown, 1996; Van Exel & de Graaf, 2005). The Q-methodology is used to find shared viewpoint patterns on a topic of interest. The identified viewpoint patterns can be considered as common among the target population and thus reflect the main viewpoints of consumers regarding the way they choose services in a MaaS platform. In this case, a viewpoint pattern can be described as a segment comprising consumers with similar preferences.

We designed an online survey including sorting statements and a short questionnaire. Participants first read a scenario, the scenario describes that Ingrid needs to travel six kilometres from a train station to a work meeting and uses a MaaS app to compare mobility alternatives. Providing this scenario ensured that all participants have the same context in mind for the subsequent task. Participants then ordered statements related to mobility service attributes and the question 'For the scenario above, how do the aspects from the list influence Ingrid's preference on the route to her final destination?'. Participants had to place the statements in a forced distribution grid (see Figure 1) which has a single scale (Valenta & Wigger, 1997; Kroesen, 2013) ranging from -3 (decreases preference), 0 (no influence), to +3 (increases preference).

Participants were recruited via the platform Prolific in exchange for a small financial reward for their participation. The sample consists of n=107 respondents who reside in the Netherlands (mean age 28, 52% female, 46% male, 2% prefer not to say). Only 20% of respondents stated that they had used shared mobility and 88% public transport in the three months prior to the survey.

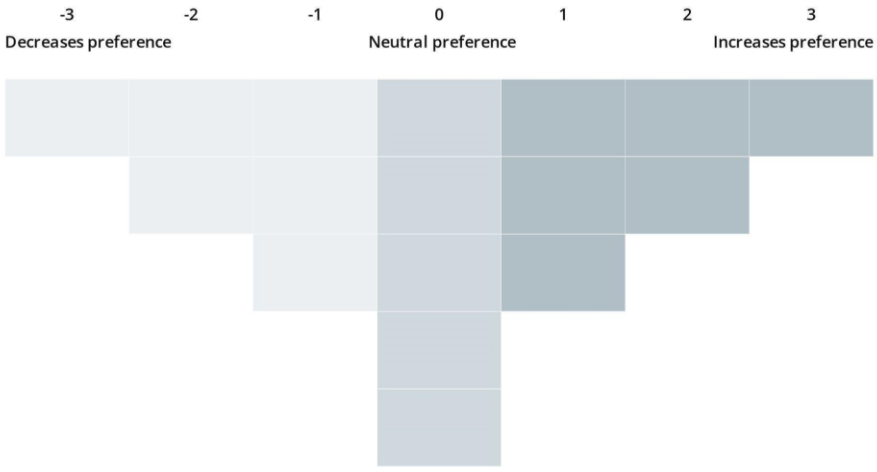

FIGURE 1. THE Q-SORT DISTRIBUTION GRID.

We performed a Q-factor analysis with the collected data. This analysis identifies distinct viewpoints of the MaaS platform. A Centroid Extraction paired with a Varimax rotation was applied to achieve an orthogonal rotation. We retained the six viewpoints, also referred to as factors, with eigenvalues exceeding 1. The final step of the Q-methodology is to classify the respondents based on their factor loadings. For n=17 (the number of statements) significant factor loadings ($p < 0.05$) should exceed 1.96 (1÷ √n) (Brown, 1980). Hence, factor loadings with an absolute value exceeding 0.47 are

considered significant in our study. In case participants load significantly on multiple factors, we retain only the highest loading factor.

Results

The analysis of the sorted statements resulted in four significant factors, each representing a different consumer segment. These segments differ in the drivers of preference for mobility services on MaaS platforms. Ten respondents load the highest on factor 1. In this factor, statements related to low cost, short travel time and minimum walking rank the highest, with statements referring to longer walking times to rank the lowest. In factor 2, 19 participants had the highest loadings. For this factor, statements related to the environment loaded very high, while statements related to data sharing and storage were ranked very low. In total 13 participants load the highest in factor 3. Statements related to cost were ranked to the two extremes with cheap and free travel strongly increasing preference. Finally, in factor 4, seven participants had the highest loading. In this factor, we can see a variety of statements ranking very high and very low without clear preference of the type of statement. Table 1 presents the z-scores (i.e., standard deviations above the mean within the factor) of the loadings for each statement per factor.

TABLE 1: STATEMENTS AND THEIR STANDARDISED FACTOR LOADINGS.

Statement	Factor 1	Factor 2	Factor 3	Factor 4
It costs 10-15 euros	-1.7	-0.88	-2.15	-1.41
It costs 2-4 euros	1.25	-0.04	-1.35	-0.49
There is a driver	0.12	-0.34	-0.41	-0.09
Personal Data will not be stored	0.5	1.05	0.8	-0.19
Ingrid is the only passenger	0.11	0.38	0.41	0.28
Ingrid drives/operates the vehicle	-0.24	-0.11	-0.16	-0.14
It is free of charge	1.51	1.19	2.04	0.63
Personal Data will be stored and handled by the app	-0.15	-0.98	-0.35	-0.06
0-5 minutes of walking is required	0.72	0.31	0.33	0.41
10-20 minutes of walking is required	-0.79	-0.01	-0.42	-1.93
Personal Data will be shared with third parties	-1.15	-1.63	-0.9	-0.91
Short travel time	1.4	0.84	1.4	1.83
Ingrid shares the vehicle with others	-1.08	-0.51	0.06	-0.3
Travel has relatively high environmental footprint	-1.18	-1.95	-0.71	-1.01
The travel is environment friendly	-0.75	1.63	0.64	0.84
No walking is expected	1.13	-0.13	0.35	1.51
The vehicle is frequently cleaned	0.31	1.16	0.43	1.03

Note: Statements and standardised factor loadings

Discussion and Conclusion

We identified four distinct consumer segments for MSPs on MaaS platforms. These segments differ in the service aspects that influence consumer preference. While one segment prefers convenience and a low price, another segment prioritises sustainability. We found that overall price, convenience and sustainability strongly influence consumer preference for mobility services on MaaS platforms while service aspects such personal space, contamination and data privacy have a lesser influence.

This study contributes a better understanding of consumer segments in the MaaS context and identifies aspects of mobility services that influence consumer preference. The insights also contribute to MaaS in practice. Clearly, some MSPs are more relevant to specific consumer segments. Using these insights MSPs can gear their business models towards the most relevant consumer segment(s) and their preferences. Alternatively, MSPs can also alter or diversify their marketing messages or business models to appeal to different consumer segments.

MaaS platforms are frequently presented as a solution to shift towards more sustainable transport systems. However, in practice this requires a fine balance between consumer preferences, business interests, and environmental sustainability. By redesigning their business models, MSPs can become more attractive to relevant consumer segments and replace less sustainable modes of transport.

Keywords

Digitalization, Shared Mobility, Sharing Economy, Segmentation, Urban Mobility.

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Barriers to urban mobility sharing in European cities: why people resist bike and e-scooter sharing systems

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Abstract

Over the past few years, urban shared micro mobility systems - such as bike and e-scooter sharing schemes - have been promoted in many European countries as means to foster a more just, sustainable, and healthier urban life. Accessing these systems might be more affordable for vulnerable and low-income social groups than other means of transportation, and therefore could foster social and labour market integration of groups such as youths and/or the unemployed, via affordable access to effective urban transportation. When the Covid-19 pandemic hit, emphasis on light and shared mobility systems was reinforced, and such schemes were promoted by several national and local governments as safer and feasible alternatives to public transportation and private cars. There is currently a scarcity of research on the use of these means of transportation during the Covid-19 period, but this article aims to address an even less examined research topic, namely the motivations of non-users. What are the resistance points from potential users who have access to these services but do not wish to reap their transport, environmental, and social benefits? The analysis provides results from a comparative and survey-based research carried out in 2021 in five European capital cities: Budapest, Lisbon, Rome, Vilnius, and Warsaw, and discloses the principal motivations of non-users of bike and e-scooter sharing systems before and during the pandemic period, when these means were strongly promoted for safety and health reasons.

Keywords

bike sharing, e-scooter sharing, European capitals, micro-mobility, Covid-19

Introduction

Light and shared urban micro mobility is one of the most obviously developing trends in transportation in Europe and beyond. It is driven by a diverse set of factors in response to changing conditions in urban development, such as the sustainable development of mobility towards low-carbon transport, the elimination of traffic congestion, and comfort and convenience. This trend also leads to the transformation of urban mobility practices around shared transport, which requires adaptation of residents' behaviour (Cohen, 2019). Travelers are motivated to choose modes of transport based on different inputs, rational or emotional, based either on observations or perceptions, often influenced by various cultural and social groups, and other individual factors, such as cost, time, comfort, convenience, safety, environmental concerns (Cairns et al. 2014; Cohen, 2019)

Bike and electric scooter sharing schemes (hereafter BSSs and ESSs) play an increasingly important role in the growth of urban micro-mobility. The introduction of such solutions in urban areas is driven by the need to increase the efficiency of urban transport systems, and a desire to reduce the environmental impact of traditional modes of transport. Shared mobility can complement public transport, providing alternative modes of transport for the "first and last mile", and reaching areas that are not well served by public transport. In some places BSSs and ESSs could even replace public transport, thus reducing CO2 emissions and, in the case of bicycles, also bringing additional health benefits (Crozet, Santos and Coldefy, 2019).

These trends and drivers were undoubtedly accelerated by the COVID-19 pandemic, which triggered a shift away from mass transit and towards individual shared solutions, with travellers choosing means of transport more compatible with social distancing. Many cities began to encourage cycling and walking by increasing cycle lanes, car-free zones, and wider pavements. In a survey of 106 European cities during the 2020 lockdown, Kraus and Koch (2020) reported that each city implemented an average of 11.5km of temporary cycle lanes, with each km resulting in a 0.6% increase in cycling.

The choice of transport mode, along with motivations for using BSSs and ESSs, are a common field of interest of academia, policy makers, and urban developers. However the mindset of non-users is also an important source of information for decision-making about these systems. Inputs from non-users would be valuable to help identify barriers to BSSs and ESSs – especially due to the relative scarce research in this field (Fishman, 2016) – and could provide important data to understand their resistance, and what could make them change their minds.

A lack of comparative research related to BSSs and ESSs non-users is especially true across urban contexts and different countries, and we intend to fill this gap with our comparative analysis between Budapest, Lisbon, Rome, Vilnius and Warsaw. In particular our research investigates the use of bike and e-scooter sharing before and during the pandemic. While this contribution discloses the major limitations and barriers to the use of these systems, important outputs of the comparative analysis have been published in Diogo et al. (2021), Sanna et al. (forthcoming 2022), and other areas of the analysis will be the subject of further contributions in the course of publication. The research project is part of the activities of the international research network Cost-Action "From Sharing to Caring: Examining Socio-Technical Aspects of the Collaborative Economy".

Literature review

As a general premise for this section, it should be mentioned that the scientific literature concerning the main drivers for the use of light sharing mobility systems has extensively covered BSSs, while very little has been written about ESSs, a much more recent service.

The convenience of bike sharing has been proven by several studies as the most important motivation for joining the service (Fishman et al., 2013; Ricci, 2015; Fishman, 2016). The proximity of bikes or sharing stations near the place of residence and frequent destinations such as the workplace seems to be vital in the decision to join bike sharing, as indicated by Raux, Zoubir and Geyik (2017) in their research into Vélo'v (Lyon's BSS). Two studies from Montreal's BIXI BSS further highlight the association with BSS use of bike proximity to origin and destination locations. In particular Fuller et al. (2011) estimated that 14% of residents living within 250 meters of a BSS station had used a shared bike, whereas only 6% had used BIXI when living further than 250 m of a BSS station; Bachand-Marleau, Lee and El-Geneidy (2012) estimated that the existence of a BIXI station within 500 meters of a respondent's residence increased the probability of using a shared bike by more than 300%. Travel time reductions are also found as one of the main perceived benefits of using a BSS (Ricci, 2015). For example, surveys of London's BSS users revealed that the main motivation to join the BSS was the system being faster than their previous transport mode (TfL, 2011). Furthermore, countrywide surveys of BSS users in the UK systematically revealed convenience and travel time savings to be the main reasons for joining the system, particularly among commuters (Bikeplus, 2017a, 2017b; Comouk, 2018). Joining and interacting with such a system is also strongly affected by convenience. Among the main barriers to use of a bike sharing in Brisbane (Australia) by identified Fishman, Washington and Haworth (2012), was the amount of time and effort needed to use the system, as well as the fact that the BSS was not available at night.

Factors such as environment sustainability concerns and personal health are also drivers that to joining sharing systems (Fishman, 2014). For instance, national UK surveys about BSSs consistently show both health and environmental concerns as among the top reasons for users shifting to bike sharing, with environmental reasons becoming more and more important over time (Bikeplus, 2017a, 2017b; Comouk, 2018).

Kim et al. (2017) provide psychological insights on the relationship between environmental concerns and the potential to adopt bike sharing. By analysing psychological factors that might impact BSS usage rates, the authors asked residents of Suwon (South Korea) if they were willing to pay for the promotion of the city's BSSs through taxes and were informed of the environmental and health benefits of the system. The research shows that the perception of the BSS's value was directly influenced by the awareness of the BSSs environmental and health benefits.

The affordability of BSSs is also often cited as a driving factor for users (TfL 2011; Ricci 2015; Fishman 2016; Bikeplus 2017a, 2017b; Comouk 2018), as some offer monthly or annual passes to their users that lead to substantial cost savings (Shaheen, Guzman and Zhang 2010). Additionally, the pleasure of cycling is valued by BSS users (TfL 2011; Fishman et al., 2015; Chen 2016), which could lead to positive impacts on users' subjective well-being (Ma et al. 2018).

Lastly, the Covid-19 pandemic introduced additional motivations for using light sharing mobility systems due to the infection fears and risks of using other modes of transport, particularly public transport (Sanna et al., forthcoming 2022). A recent study regarding the motivations for using BSSs during the pandemic found that BSSs users now value bike sharing to avoid public transportation and to maintain a social distance during their trips (Teixeira, Silva i Moura and Sá, 2021).

Research methodology

This contribution is based on the main outcomes of an online survey that aimed to reveal the driving factors and motivations of both BSS and ESS users and non-users, and to capture any changes induced by the pandemic in five European cities. In addition to outlining the socio-economic profile of the respondents, the survey the availability and potential accessibility of sharing services, transport habits before and during the pandemic, major motivations for using or not using the services, etc. The questionnaire was administered between April and June 2021, via social media (mainly neighbourhood, commuter, and urban life Facebook groups) and mailing lists.

The survey had at least for four unique aspects. It: (i) compared the use of BSSs and ESSs simultaneously; (ii) focused on both users and non-users, (iii) covered five EU capital cities simultaneously, administered in local languages; (iv) covered both pre-pandemic and pandemic periods.

996 people responded to the survey. After a process of data cleaning and validation, 797 observations were included in the convenience sample for analysis as shown in Table 1. The highest number of observations were in Rome – about twice as many as the other cities. Gender distribution was almost equal in Warsaw, favoured the female gender in Rome and Vilnius, and was biased on the male side in Budapest.

Table 1. Respondents per city (absolute values and percentage) and gender distribution (percentage)

City	Number of respondents	Respondents (% tot)	Female	Male	Other	Total
Budapest	133	16.69	45.1	54.1	0.8	100.0
Lisbon	129	16.19	40.3	58.1	1.6	100.0
Rome	281	35.26	53.0	46.6	0.4	100.0
Warsaw	128	16.06	48.4	50.8	0.8	100.0
Vilnius	126	15.81	59.5	40.5	0.0	100.0
Total	**797**	**100.00**				

Source: elaboration of the authors

The research deals with very different geographical contexts: the cities targeted are deeply dissimilar in terms of population, social-political and historical backgrounds, geographical features, urban transportation systems, policies, and traditions.

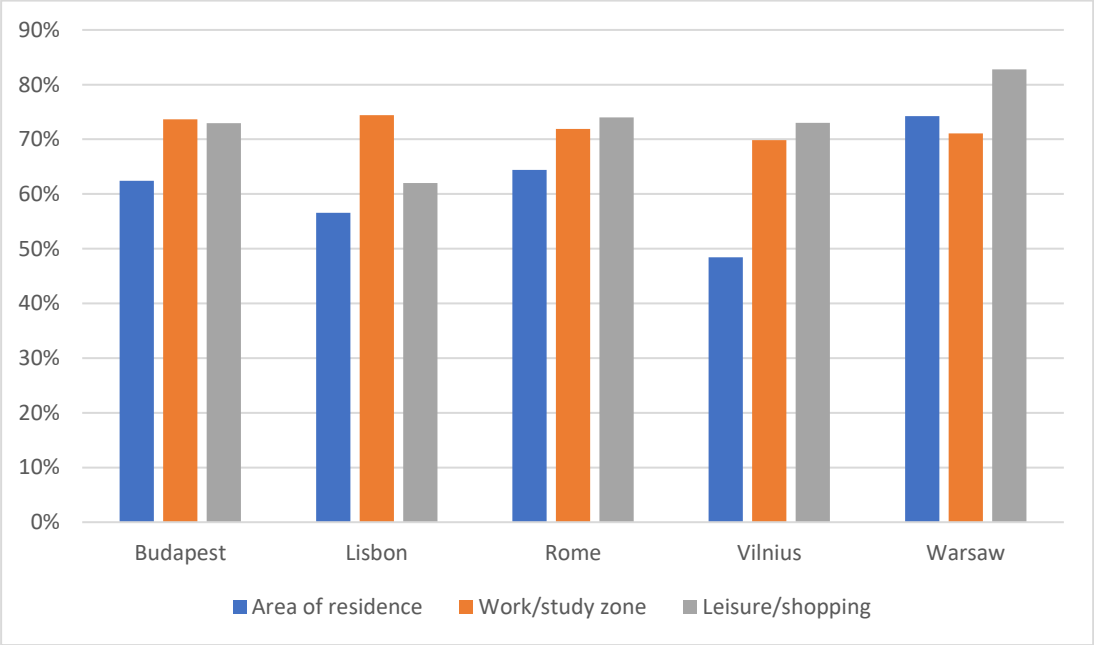
Each of the analysed cities already operated pre-pandemic public and private bike and e-scooter sharing systems. In reaction to the pandemic, some of these cities adopted ad hoc urban policies

or interventions (e.g., fiscal) as discussed in Diogo et al. (2021) to foster the use of safer transportation modes

Availability and barriers to the use of BSS and ESS services: a comparative analysis

The questionnaire provides evidence that bike and e-scooter sharing services are available to the majority of respondents in each analysed city. Shared e-scooters seem to be marginally more available than shared bikes in each city except Warsaw.

Figure 1. Availability of bike sharing systems in the studied cities



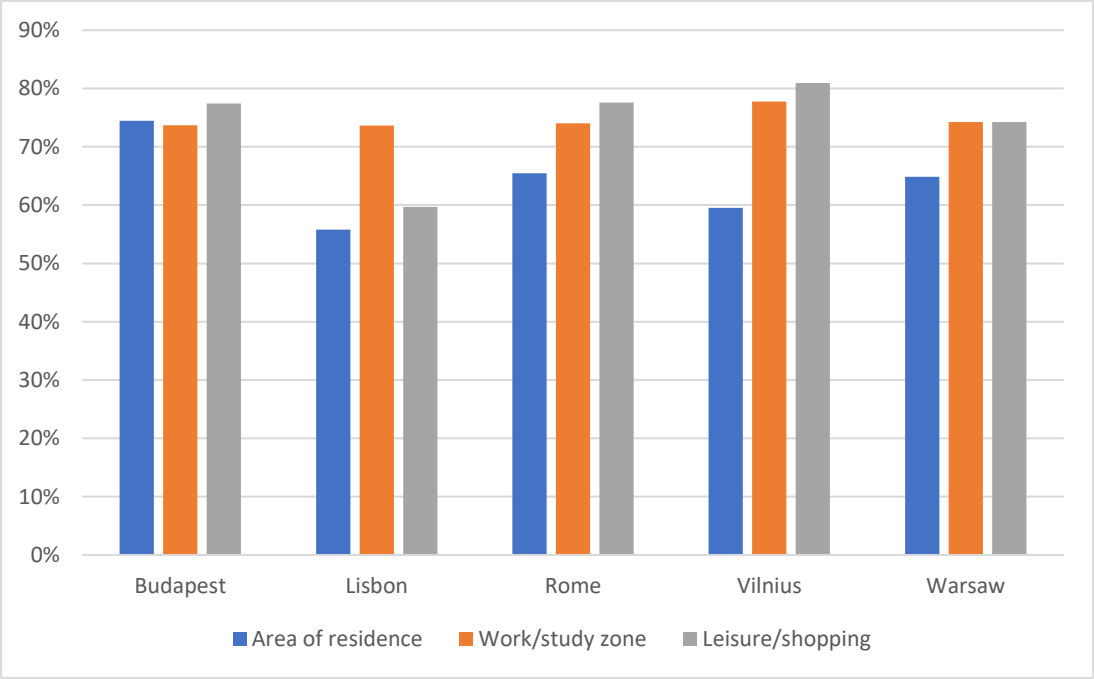
Legend: Percentage of respondents with BSSs available near their area of residence, work/study zone or other frequent destinations (leisure, shopping, etc.).
Source: elaboration of the authors

61.9% of respondents can find shared bicycles in the area where they live, which increases to 72.1% in the area where they work/study, and to 73.5% in areas they visit for leisure, shopping, etc. Data are even few percentage points higher for ESSs.

While there is a substantial perceived availability of light sharing mobility services, there is low uptake. An in-depth analysis of the periods of subscription (or non-subscription) to bike-sharing services revealed that the majority of respondents (61.10%) did not subscribe to the service while 20.2% used them, but only before the start of the pandemic in March 2020, and then abandoned them. The remaining 13.55% of respondents used BSSs both before and during the pandemic, and a residual 5.14% subscribed to the service only “during the pandemic (after March 2020)”.

Similar responses were given for ESSs, where a large proportion of respondents (72.65%) never subscribed to the service, while 14.43% used one before the pandemic (March 2020) and then abandoned it. The remaining 6.65% of respondents used e-scooter sharing both before and during the pandemic and 6.27% subscribed to the service only after the pandemic had started.

Figure 2. Availability of e-scooter sharing systems in the studied cities

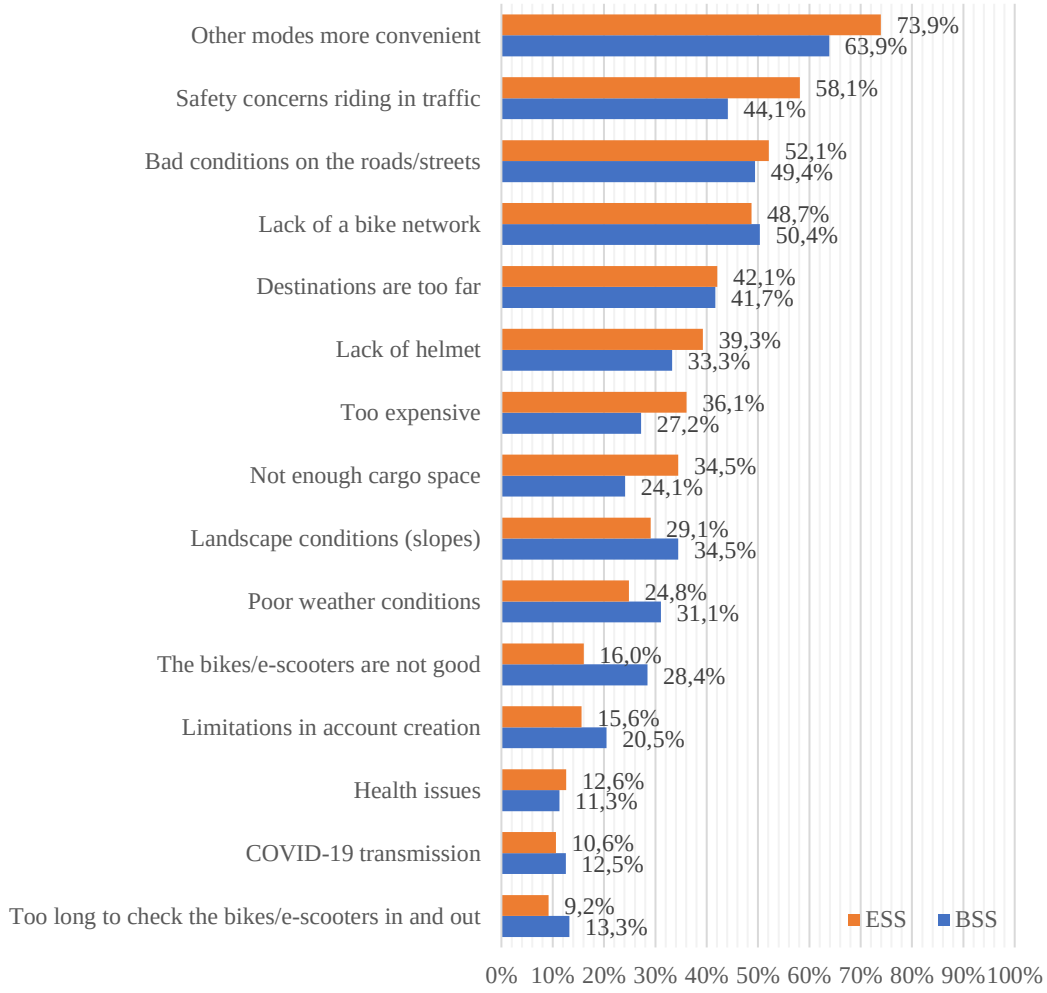


Legend: Percentage of respondents with ESSs available near their area of residence, work/study zone or other frequent destinations (leisure, shopping, etc.).
Source: elaboration of the authors

Examining the motivations of the non-users it is interesting to determine why, despite the fact that the majority of respondents declared they could access ESSs and BSSs, they do not use them. It is interesting to note that motivations can mainly be attributed to external factors that are out of the control of the respondents, and mainly stem from infrastructural settings. As shown in figure 3, the main reasons are: (i) other modes of transportation are more convenient; (ii) safety concerns of riding in traffic (iii) bad conditions on the roads/streets; (iv) the lack of a bike network; (v) respondents' preferred destinations are too far by bike or e-scooter.

Other minor external factors that prevent adoption include landscape or poor weather conditions, which are also difficult to overcome, but there are other, less frequently mentioned barriers that might be eliminated by some adaptation implemented either by the user or the BSSs/ESSs provider, such as helmets, price, or the quality of the shared bikes or e-scooters (Figure 3). Covid-19 transmission is not a major concern, with only 13% of the respondents mentioning it against BSSs, and 11% against ESSs. The same applies to other health issues, again one of the least mentioned barriers to shared bike and e-scooter use (11% and 13%).

Figure 3. Reasons for not using bike or e-scooter sharing



Reasons for not using BSS (N=415) and ESS (N=499) ranked according to respondents' rating of agreement with a range of options. For an easier reading, only the combined percentage of the two highest ratings - strongly agree and agree - is shown.
Source: elaboration of the authors

The general ranking of the barriers to use BSSs or ESSs are very similar in the five cities, but with a few notable outliers based on contextual individuations:

- In Budapest the insufficient quality of bikes was mentioned as the third most important barrier, at twice the share of the five-city average (55% in Budapest), however, the survey was carried out immediately before the change of the shared bikes of the main Budapest BSSs, *MOL-Bubi*, which was developed due to these quality concerns.
- In Lisbon landscape conditions (hills) were mentioned more (50%) compared to the five-city average (35%), as well as issues in account creation (30% vs an average of 20%).
- In Rome infrastructural issues such as poor road conditions and the lack of a bike lane network were mentioned above average (66% vs 50% on average and 64% vs 50% on average), as well as landscape conditions (48% vs 35% on average).

- In Vilnius poor weather conditions were more of a barrier (mentioned by 43% vs 31% of the five-city average) as well as the quality of shared bikes (mentioned by 33% vs 28% on average), the time (too long) to check the bikes in and our (18% vs 13% on average). However, Vilnius respondents have much less frustrations regarding the safety concerns in traffic (mentioned by 18% vs 44% on average).
- In Warsaw an excessive procedure to check bikes in and out was the greatest source of frustration (32% vs 13% on average).

Conclusions

Sustainable urban micro mobility modes, most notably bike and e-scooter sharing services, are on the rise in European cities, which is an increasingly popular topic for both academic and applied policy research. However, the focus often lies on the users of these schemes, while non-users and their reasons are often underrepresented. This contribution intended to examine this overlooked aspect to support both academic and policy research and urban mobility and transportation planning, with inputs on the barriers to a further increase in the use of BSSs and ESSs.

The analysis revealed that the main reasons of non-users are exogenous factors over which users have no control. These are mainly: economic; infrastructural (such as bad road conditions) or the lack of a bike network; or a perception that destinations are too distant to be reached via BSS or ESS. Barriers over which users have more influence BSSs and ESSs are shown to be less important. This finding points out that the further development and spread of BSSs and ESSs in European cities primarily depends on the ability and promptness of city planners to improve the urban transportation network, and to rethink overall urban transportation policy.

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Does sustainability affect consumer behavior in sharing economy?

Insights from a literature review

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Extended abstract

Background and purpose. The sharing economy takes off as an economic model based on cooperation, where exchanges happen among customers populating both the demand and the offer sides. Despite the existence of different perspectives, scholars do agree on considering the sharing economy as a system of exchanges among communities of peers to access services and goods through the use of digital platforms (Botsman and Rogers, 2011, Hamari et al., 2015; Rong et al., 2021).

This innovative paradigm is not only a different way to consume goods or services, but it represents a new lifestyle with altruistic values and social and environmental sustainability being the main drivers. As a peer-to-peer system, the relational aspect plays a key role and the mutual trust among customers has to be ensured as participants in the exchanges need to be reassured about the potential risks that might arise from the counterpart.

The short paper presented is a part of a wider research project aimed at systematizing the existing literature about consumer behaviour in sharing economy through a systematic literature review. From this background, the role of sustainability along the phases of the purchasing funnel has been explored to gauge its impact in orienting each of them.

The purchasing funnel concept refers to the steps consumers made in the consumption process, and it sums up all the passages from the identification of the need to the expression of the final (dis)satisfaction. From a theoretical perspective it has been widely addressed from scholars and practitioners. Among the existing contributions, Kotler (2017) defines the 5As model: *aware*, *appeal*, *ask*, *act* and *advocate*. In the *aware* phase consumers acquire knowledge about the product or the brand thanks to the marketing initiatives or the word-of-mouth. In the *appeal* phase consumers evaluate whether the product would be a possible solution for their needs. In the *ask* phase consumers are prone to the product and actively involved in finding the proper information about it to understand its potential benefits and risks. In the *act* phase consumers actually buy the product. In the *advocate* phase consumers are able to evaluate whether their expectations have been met and, consistently, their intention to buy the product again and recommend it to others.

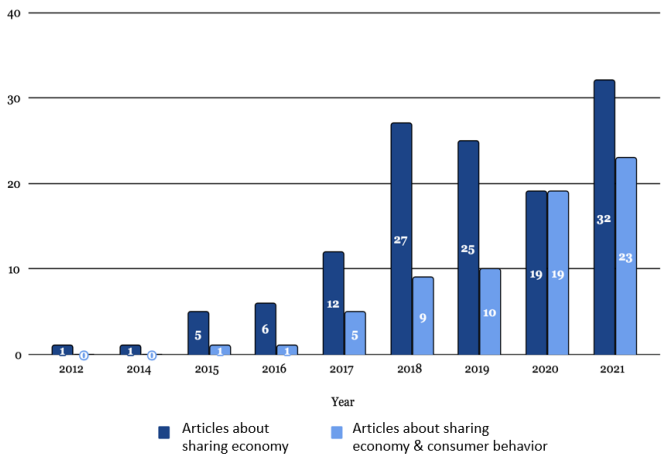
The decision to explore this process in the sharing economy and to propose a literature review about it, arises from the growing number of contributions about sharing customers on the one hand, and the lack of a systematization of those on the other. Existing reviews are in fact focused on the general phenomenon of the sharing economy.

As for the second purpose, the relation between sharing economy and sustainability has been largely debated. Several authors have stressed that the sharing economy can be considered sustainable to all effect as it seeks both environmentally and socio-ethically beneficial solutions (Botsman and Rogers, 2011; Vezzoli et al., 2015), it is less resource intensive than the traditional way to access goods and services (Schor, 2014) and it promotes a more frugal approach to living that is opposite to materialism (Prethero et al., 2011). A totally different view comes from those who do not share the same utopian view of the sharing economy. Schor (2014) for example underlined that the reduction of carbon emission because of the sharing economy is a widespread belief yet no studies exist about its real impact. Other scholars also affirmed that sharing does not necessarily mean less consumption (Parguel et al., 2017). Despite this divergence, while studies about sharing consumer often refer to sustainability as having an impact on consumer behaviour, the phases on which it does the most have not been identified yet.

Method. In order to achieve the aforementioned purpose, a systematic literature review has been developed (Tranfield et al., 2003). The search has been performed on Ebsco as the main dataset, using "*sharing economy*" AND "*consumer behaviour*" (together with their more frequent synonymous) as keywords. The output is made of 196 articles. Collected articles were read in their title, keywords and abstract. This step led to discard 122 articles because of availability or language constraints or as not consistent with the purpose of the research. The remaining 74 have been further carefully read by two researchers in their full text. This step led to the further elimination of 6 papers that were not consistent with the purpose of the research. The remained 68 articles were considered as the basis of the analysis. A second full text reading allowed the researchers to fill an excel file with all the details about the publications and to classify the articles according to the phases of the funnel: *aware*, *appeal*, *ask*, *act* and *advocate*.

Findings. At a general level it emerges that contributions about consumer behaviour in sharing economy date back to 2015. From that year on, the number of articles rises exponentially, in particular between 2019 and 2020.

Figure 1: The growth of articles over the years (sharing economy VS sharing economy & consumer behaviour)



Source: Authors' elaboration

As for the geographical spread of the analysed research, basing on the affiliation of the first author, 28 countries emerged. Most of the authors come from China (n. 9), USA (n. 9), Germany (n. 7), Spain and Taiwan (n. 4). Those studies that address a specific industry of the sharing economy focus on hospitality (30.9%), mobility (22%) and fashion industry (11.8%). The 68 examined articles come from 64 different journals, where the Journal of Business Research (n. 5) and the Journal of Consumer Marketing (n. 4) are predominant.

Figure 2 shows a word cloud made by the keywords of the 68 analysed articles.

Figure 2: Keywords word cloud

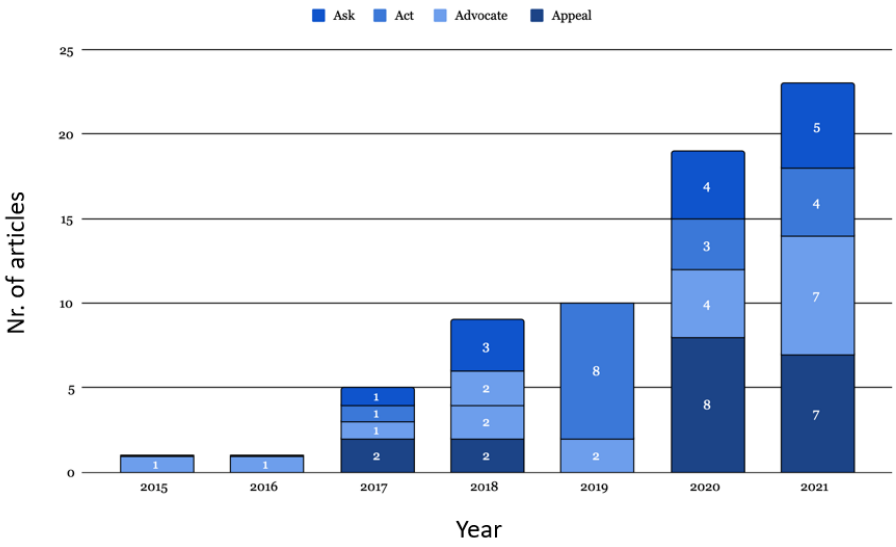
Source: Authors'elaboration

A final consideration concerns the adopted methodology, where empirical studies (91%) outnumber the theoretical ones (8.8%).

As for the phases of the purchasing funnel, the first thing that is worth to be noted is that no articles have been found for the first phase of the process. The 68 analysed articles have then been grouped into the remaining categories to analyse the emerging trends. The concept of sustainability has been detected in three out of four, and in particular in the appeal, act and advocate phase. This means that, according to the analysed articles, sharing consumers deal with sustainability when they have to decide whether a sharing platform would be a good option for them, when they finalize their purchase, and in the post-purchase phase to define their level of satisfaction.

Articles falling within the *appeal* phase are those that investigate the drivers of participation in the sharing economy. This is the phase in which sustainability emerges the most and under different perspectives. Bhalla (2021) and Becker-Leifhold (2018) state that environmental concerns and the benefits of a responsible consumption are not strong enough to be considered as a motivating element. Similarly, Puiu (2020) claims that despite the positive impact sustainability has in catching the interest of people, it does not have an equally strength in orienting their actual behavior.

Figure 3: The growth of articles over the years (sorted by purchasing funnel phase)



Source: Authors' elaboration

Matharu et al. (2020) recall the LOHAS (Lifestyles Of Health And Sustainability) concept, stating that sustainability has an impact in orienting those individuals with a positive attitude towards sustainable consumption, that can draw inspiration from their social environment, and that perceive the consumption as an easy process.

A summing up point of view comes from Becker-Leifhold (2018): in his view it is not possible to have "one size fits all" considerations about the driver of the sharing economy, as it all depends on the kind of good or service and the kind of consumer involved. According to the author, considerations about sustainability have an impact in orienting the purchasing process of those products that are not considered as significative in defining the consumer's self (e.g., the car for young consumers). Otherwise, sustainability has no impact when the product is perceived as essential in defining the consumer (e.g., clothes). In this case, elements such as the influence of the peers or the need to express a specific social status have the main impact in driving the process.

Sustainability emerges again in the articles falling into the *act* phase of the purchasing process. Scholars who cover this aspect stress the indirect relation between environmental and economic benefits. For example, Khan et al. (2019) suggest that individuals who care about the environmental protection turn to the sharing economy when they perceive its economic advantages and there is the possibility to rely on apps and websites.

Caspersen et al. (2021) focus the attention of the shipping aspect. What emerges in their article is that some consumers are willing to accept longer delivery times if it ensures a lower transport pollution. Moreover, a longer delivery time usually goes along with a lower delivery cost or even with free shipping. A controversial aspect lies in the characteristics of the group of users that emerges as more prone to this kind of initiatives. In Caspersen's analysis this group is made by the over forty, while previous literature identifies in the youngest the target that cares the most about the environment.

Finally, in the *advocate* phase, sustainability is referred to only in one article from Arteaga-Sánchez (2020). The author pinpoints at how sharing consumers feel that their purchasing processes can generate environmental benefits, and that this thought has a positive impact on their satisfaction and their intention to continue sharing.

Conclusion. This extended abstract sums up the main findings of a literature review about consumer behaviour in the sharing economy, where the role of sustainability has been identified and analysed along the phases of the purchasing funnel. What emerged from the analysed contributions is that the impact of sustainability on the consumer behaviour in the sharing economy mostly concerns the appeal, act and advocate phases. The achieved results offer implications at both academic and managerial levels. As for the first one, the output of the literature review provides a systematization of the contributions about consumers in the sharing economy, filling a gap that emerged in the extant literature. Also, the role of sustainability has been detected in three out of the five phases of the purchasing funnel (appeal, act and advocate). This result is interesting from an academic perspective as it adds on the discourse about between sharing economy and sustainability, offering greater insight about their connection in the consumer behaviour background. It can also be of interest for managers and practitioners from the sharing economy as they can increase their knowledge about their consumers, finetuning their strategies to drive them through the purchasing funnel.

Keywords

Sharing economy, Consumer behavior, Sustainability, Literature review

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Food sharing platforms: unlocking opportunities for digital impact reporting

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Extended abstract

Food waste prevention and reduction is considered one of the main challenges of our time. According to the UN Environment Programme, in 2019 about 931 million tonnes of food waste was generated, 61 per cent of which came from households, 26 per cent from food service and 13 per cent from retail (UNEP, 2021). In this scenario, food sharing and redistribution business models aiming at the re-use of surplus food for human consumption may represent an impactful tool to address this issue.

Food sharing platforms have recently raised increasing scholarly attention because of their ability to leverage the digital technologies to connect suppliers and consumers of edible food waste while having social and environmental impacts related to the reduction of waste (Michelini et al., 2018). Prominent examples of food sharing platforms are *Too Good to Go* founded in 2015 in Denmark and operative in almost all major European cities, and *Olio* started in the UK in 2015 and currently active in 49 countries.

Generally, food sharing platforms involve three main different categories of actors: (i) peers (or providers) who share exceeded or not saleable (e.g., ugly food) food; (ii) users (private users or non-profit organizations); and (iii) third part as local institutions that act as track donations and apply a tax deduction.

Due to the multitude of stakeholders potentially involved and to the different types of business models, the positive impact of these platforms is not limited to the food waste reduction but encompasses different areas that are worthy of investigation such as poverty and social inclusion (Michelini et al., 2020). Consequently, there is a pressing need to explore the impact beyond the material waste reduction and to understand how potential social, economic, environmental, and political areas of impact are addressed (measured, communicated, etc.) by different platforms.

Considerable effort has been paid in the literature to identify feasible indicators and measures shared by the research community and provide easy-to-use frameworks to assess and report the

wider impact of food sharing (Mackenzie and Davies, 2019). However, the effective implementation of shared measurement models is still a challenge, and little is known on the extent to which these impacts are reported to the stakeholders by the food-sharing platforms.

Building on these premises, the purpose of this research is to *identify whether and how the different dimensions of impact are measured and reported by food sharing platforms, and to point out some main pitfalls.* Specifically, the study aims to answer the following research questions:

- How food sharing platforms report their potential social, economic, environmental and political impacts?
- Are there any differences among food sharing platforms business models?
- What is the relationship between the platform performance on the different areas of impact, and the popularity that each individual platform has on the web?
- What are the main pitfalls / criticalities which emerge in the impact reporting?

For every type of impact, we then reflect both on the potential benefits and the main pitfalls face in the impact assessment reporting, contributing to the sharing economy literature through an advancing of the understanding about the main strategy path to enhance the impact assessment and reporting**.**

Drawing on the existing literature (Sanna and Michelini 2021; Michelini et al., 2020; Mackenzie and Davies, 2019) we developed a framework composed by four areas of impact - economic, environmental, social, and political. Considering a food sharing platform as the "unit of analysis", we then devised a set of indicators aimed at measuring the potential positive and negative impacts (Table 1).

Area of impact	Indicator	Description of the indicator
Social	**Social bonding**	Strengthening social interaction/networking between members - trust)
	Quality of life / well-being	To improve quality of life, to promote leisure and/or health of P/U.
Environmental	**Sustainable food value chain**	Reduction of saleable and unsaleable food wasted CO2 emissions saved
	Green attitude and behaviour	Activities, articles, events aiming to enhance green consumer attitude
Economic	**Opportunities for providers**	Create new economic opportunities for providers, and growth of new economic sectors (e.g. secondary market supporting the CSE ecosystem).
	Ecosystem	To improve the self-sufficiency of the local community (e.g. local money is spent locally/off-the-grid/self-organization). Waste tax reduction, Reduction of bureaucracy
Political	**Political empowerment**	Political empowerment and participation of P/U, including in decision-making processes.
	Political mobilization	Political mobilization and increased demand for political change. This involves P/U organising with a common purpose or common understanding to achieve collective goals, social mobilisation, building alliances and coalitions.

Table 1. Areas of impact and selected indicators for the assessment

In order to give an answer to our research questions we carried out a two-steps analysis (quantitative and qualitative analysis) on a sample of 45 food sharing platforms active worldwide. In order to critically assess and elaborate a cluster analysis of food-sharing platforms, we built a comprehensive database in which a number of variables have been collected and categorised (e.g.

country of origin; foundation year; business type e.g. for-profit or non-profit organizations; revenue model; marketplace; ecc.).

Based on the aforementioned impact assessment theoretical framework (Table 1), the selected platforms have been analysed (this means that every web page of the platforms was examined), and each individual indicator has been assigned a performance value ranging from 1 to 5 (*where 1 represent a bad performance and 5 a top performance*). In addition, in order to devise a *Social Media Popularity Index*, the amount of social media followers for three major social networks (Facebook, LinkedIn and Instagram) have been collected and incorporated in the analysis.

This comparative assessment of food sharing platforms shows to what extent social, economic, environmental and political impacts have been addressed by the selected selection of sharing platforms. Using illustrative cases, we explore how these platforms tend to report their impacts. Finally, in order to reflect on the main drawbacks/pitfalls and to suggest future implementation trajectories, we propose possible and transferable examples of *impact assessment reporting strategies* which have already been implemented by existing platforms.

Keywords

Food sharing platforms, impact reporting, food waste

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Track 3.5 - Responsible and sustainable production and consumption: the reduction of food loss and waste through new business models and circular economy

Track chairs: *Ludovica Principato (Roma Tre University), Luca Secondi (University of Tuscia)*

Within the international SDG framework, the specific target 12.3 foresees “by 2030 to halve per capita global food waste at retail and consumer levels and to reduce food losses along production and supply chains, including post-harvest losses”. However, advances and the effective achievement of this objective, which can bring economic and environmental benefits to territorial systems at different levels, require a rethinking of production strategies by businesses as well as consumption habits both at home and out-of-home.

This track aims both at exploring new sustainable and circular business models that allow for the reduction-recovery and reuse of losses and waste generated throughout the production process, and at analysing whether and to what extent encouraging a change in consumer behaviour can have an effect on a smoother transition to new circular and sustainable production models.

Investigating the role of government incentives/subsidies in environmental transparency of corporations

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Extended abstract

One of the most important social aspects of sustainability is transparency. It is explained as clarifying the external influence of all actions of a corporation on the environment, human being and so on which should be obvious in a report, referred to as *Environmental Disclosure Report*. Transparency has a significant impact on both sustainability of the green products and the consumers' behavior. It can help to increase the consumers' satisfaction of the green product. Canadian corporation such as Magna and Power Corporation of Canada have recently published their environmental actions and the performance of the different indicators through the reports, referred to as *Sustainability Report*. Although the government of Canada has granted $915 million to motivate the corporations to become more transparent between 1983 and 2015, there is still an ongoing challenge regarding this aspect of the sustainability in the environmental actions of the Canadian corporations and the government. For example, the report from Overseas Development Institute in 2018 shows that Canada ranked 6th amongst the G7 nations in environmental transparency.

Due to the urgency of environmental issues, world governments and industry leaders have defined their roles to address environmental issues, via a mutually developed framework, referred to as Sustainable Development. Sustainable Development (SD) is defined as "a development that fulfills the requirements of the present without jeopardizing the capability of next generations to meet their own needs" (Brundtland et al., 1987). However, the requirements of corporations (financial) and citizens (social) should be considered as well as the environmental concerns in order to successfully apply SD. As a result, corporations have established the triple-bottom-line (TBL) framework, proposed by Elkington (1999), to examine essential considerations of the economy, environment and the society. Even though the definition of TBL requires all three concerns simultaneously, most of the studies on the sustainability development in the operations management literature have focused only on the environmental and financial aspects. In this research, we contribute to the operations management literature on sustainability development by focusing on all three aspects of the TBL in the corporations' decision-making process. Thus, this interdisciplinary research answers the question of how decision makers such as government can

play a fundamental role in helping corporations become more transparent as well as environmentally and socially sustainable while complying with investors' financial expectations. There are several responsibilities for corporations to consider the social concerns in TBL, referred to as *corporate social responsibility* (CSR). Bowen (1953) defined CSR as the moral and legal operating constrains which corporations should consider in their decision-making process in line with societal values and objectives. An important aspect of CSR is *transparency*, defined as the external impact of a corporation's actions which is available and clear in its public report (Crowther and Martinez, 2004). As corporations disclose more information regarding the impact of their actions on the environment, the consumers can distinguish products that are ecologically friendly to those that are not and therefore, corporations might charge more for greener products as the consumers would be willing to pay more to purchase them (Bemporad and Baranowski, 2007).

Multiple studies have shown that the government could help corporations improve sustainability through transparency development. The government can offer subsidy/taxes to incentivize corporations for transparency development and penalize for unaccountability. As corporations disclose more information regarding the impact of their actions on the environment, the consumers can distinguish products that are ecologically friendly to those that are not and therefore, corporations might charge more for greener products as the consumers would be willing to pay more to purchase them (Egels-Zandén et al., 2015). On the other hand, the corporations incur lots of expenses to improve transparency duo to certifications, experiments and laboratory infrastructures. Also, reporting all the environmental activities and performance might not have a positive impact on the consumers' behavior. Therefore, the corporations need to decide the amount and the type of the environmental information which should be divulged in their reports.

Given the significance of transparency in the sustainability and the ongoing challenge of this aspect, this research study investigates three important questions to evaluate the feasibility of government-industry collaboration to develop transparency in green supply chains.

First, which types of government subsidies and controlling mechanism would motivate the corporations to become more transparent? To answer this question, we investigate thoroughly the intersection of sustainability development, transparency and green supply chain management literature and also prepare a research questionnaire which were distributed to the stakeholder of the forty Canadian manufacturing companies. The responses to the research questions were analyzed using IBM SPSS Statistics. We also undertake a content analysis of the responses. The analyses suggested three important incentivizing subsidies offered by government including as: (i) subsidy on the retail price of the green products, (ii) subsidy on the environmental and transparency costs incurred by the corporations, and (iii) subsidy on the production cost of the green products. On the other hand, controlling mechanism including as environmental taxation is suggested when the corporations do not meet an acceptable level of transparency.

Second, how much environmental disclosure, referred to as environmental disclosure level, and which part of environmental information, referred to as environmental disclosure quality, should be declared by corporations in their reports? Based on the suggested government's policies, we use a game model to formulate the collaboration between the government as the leader and the supply chain (or corporation) as the follower to improve the transparency in the environmental disclosure report. We consider two types of available information: information about eco-friendly and non-eco-friendly performances, referred to as *positive* and *negative information*, respectively. Based on the subsidy/taxes established by the government, the supply chain decides the fraction of positive and negative environmental information declared in the report. To formulate the transparency cost in the supply chain, we apply the investment cost functions in the Operations Management and Marketing literature that have been used to model the social and environmental costs such as CSR and sustainability efforts (e.g., Ma et al. 2017 and Xu et al. 2017). We assume that the transparency cost is a quadratic function of the positive and negative information. To

formulate the impact of the transparency decisions of the supply chain on the consumers' behavior, we develop a demand function which is dependent on the transparency decisions. To do so, we develop a factor in the demand function, referred to as *transparency factor* and the product's value for the consumers changes based on their observation of transparency as well as the other factors such as the retail price. We conclude that offering both positive and negative disclosure subsidy benefits both government and corporations compared to the case that the government does not intervene and offer any subsidy.

Third, what is the impact of each investigated subsidy/taxes on the policies which are important to corporations and the government such as sustainability development, social welfare and maximal financial efficiency? Based on the developed model, we analytically derive the best mechanism (subsidy/tax) to develop each mentioned policy. The results can be used by the associated governmental agencies and the industry to plan for the development of the environmental transparency as well as the important objectives of the sustainability.

Keywords

Sustainability; environmental disclosure; government intervention; environmental subsidy; responsible production.

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Sustainable and circular business models for fruit and vegetable waste and by-product valorisation

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Extended abstract

One of the world's agrifood system challenges is the prevention of waste (Thyberg & Tonjes, 2016). The Food and Agriculture Organization of the United Nations (FAO, 2011) estimates that one-third of all food produced in the world is lost or wasted. Food is wasted all along the supply chain, in Europe mostly at the consumption stage (FUSIONS, 2016), but for some food groups also substantially in primary production, storage and transport (especially, fruits, vegetables) or processing and manufacturing (mainly fish, oil crops) stages (Caldeira et al., 2019). The fruit and vegetable sector is particularly concerned because these crops are highly perishable and thus susceptible to rapid quality decay. Also, they contain inedible parts that are always removed before consumption; for households, the weight of fruits and vegetables is around one-third of the total purchases (de Laurentiis et al., 2018).

While scientific research on food waste has until now largely focused on the prevention and reduction of waste, often from a (consumer) behavioural perspective, as well as on its valorisation via biotechnological processes (Morone et al., 2019), the role of business models has rather been neglected. Therefore, the research objective was to review and get insights into new business models contributing to a more sustainable and circular bioeconomy (De Vries et al., 2021) by creating value out of fruit and vegetable losses, waste and by-products.

Data was collected via an extensive online search and a review of company websites, presentations and reports, online articles, and research project reports dedicated to fruit and vegetable waste. The online search was done via google, using the following keywords: 'fruit losses', 'fruit waste', 'vegetable losses', 'vegetable waste', 'fruit waste business', 'vegetable waste business', 'fruit waste

valorisation', and 'vegetable waste valorisation'. In total, 47 initiatives of circular business models targeting fruit and vegetable waste and by-product valorisation were analysed via a qualitative thematic analysis. The different data sources were coded for each initiative regarding its general type of business model, geographical location (country), business drivers, business model components, and economic, social and/or environmental impact.

Different types of business models were identified. According to their core waste management strategy, most of the businesses (36 out of the 47 cases) can be classified as upcycling entrepreneurs. They make use of fruit and vegetable losses, waste and/or by-products by converting low-value into higher-value products, materials or ingredients for various food and non-food applications. Another type are service companies, including either waste collection and recycling, or technological services. They offer various solutions such as applications for food waste tracking, redistribution services, or finding alternative markets for discarded fruits and/or vegetables. Mixed types were also found, combining services and products via different collecting, donating, selling, reusing or upcycling activities. The overwhelming part of the businesses are private companies, but also public organisations, public-private partnerships and joint initiatives between the private sector and research institutes exist. Moreover, the majority of enterprises have started their activities recently, with many start-ups in the past 5-10 years. Concerning the country of origin, 26 out of the 47 businesses are settled within the EU, 10 are in the United States, 6 in Asia, 3 in Africa, and 2 in Mexico. It should be noted that in developing countries, usage of losses and waste are taken care of by Partnerships of e.g. the FAO with regional and local communities.

Most of the initiatives are driven by the immediate concern about the food waste problem, whose valorisation is then positively related to opportunities for implementing sustainability and circularity principles, from an economic (business opportunity, increase of farmers' incomes), environmental (reuse, recycle or recover nutrients, water and energy), and/or social (creation of jobs, nutrition security) perspective. Concerning the strategies for new value propositions, results show that numerous valorisation paths exist, with the aim to keep or create the highest possible value, either by redistributing discarded ugly fruits or vegetables, or by upcycling waste and by-products into cosmetics or new food (ingredients) and beverages, or into biomaterials for diverse uses such as packaging, textiles, leather, automotive or design products. Only waste or by-products that are or have become inedible and fully un-exploitable in higher value segments are recycled or recovered for bio-fertilizers or bioenergy use.

The main insights from the business model canvas analysis for fruit and vegetable waste and by-product valorisation are listed in table 1 below. The central value proposition constitutes the main products and/or services offered by a company to its customers or consumers, providing bio-based, eco-innovative, and/or healthy solutions and benefits. Most of the initiatives are converting fruits or vegetable waste into new food, feed or beverages or ingredients such as juices, dried chips, soups, sauces or condiments (22 cases in total). This is followed by conversion into biomaterials for diverse uses such as packaging, textiles, leather, automotive or design products (13 cases). Several enterprises are converting the waste or by-products into bio-fertilizers and/or bioenergy via anaerobic digestion or pelletizing the biomass (6 cases), or into cosmetics or for pharmaceutical use, e.g., soaps, lip balm (5 cases). Finally, some cases of redistribution via food banks, donation or direct resales were found (4 cases), and only one firm's main value proposition is purified wastewater.

Table 1: Business model canvas elements for fruit and vegetable waste valorisation

<table>
<tr><td>Key activities
- Collection and redistribution of fruit & vegetable losses
- Upcycling via processing or designing new products out of waste and by-products
- Collection, recycling and recovering (inedible) waste</td><td rowspan="3">Value proposition
- Food (redistribution)
- Biomaterials (textile, design, packaging)
- Bio-fertilizers
- Bioenergy
- Cosmetics, pharmaceuticals
- Food & feed (ingredients)
- Purified water</td><td>Customer segment
- B2B
- B2C</td></tr>
<tr><td>Key resources
- Discarded, imperfect or overripe fruits & vegetables
- Various waste and by-products from production and processing (leaves, skin, stones, pulp etc.)
- Inedible fruit & vegetable parts</td><td>Customer relationship
- The costumer / consumer as confederate against food waste</td></tr>
<tr><td>Key partners
- Private partners (from within and outside the fruit & vegetable chain)
- Research
- Public
- Associative</td><td>Channels
- Direct: (e-)shops, redistribution, donation
- Indirect: retailers, industry
- Importance of (transparent) communication and marketing</td></tr>
<tr><td colspan="2">Costs
- Costs for R&D, infrastructure (investments), or logistics (waste collection)</td><td>Revenues
- Some products obtain equal or even higher market prices than other products from the same category
- Financial support by subsidies, crowdfunding</td></tr>
</table>

Rather surprisingly, - at least as compared to other previous insights by the authors from the cereals, manure and olive chains (Donner & De Vries, 2021; Donner & Radic, 2021) - a lot of communication is undertaken by the firms about their newly created products and contribution to sustainable development. This most probably has to do with the predominance of the B2C target, and therefore a stronger direct implication of the civil society and consumers. Also, the attractiveness of the types of waste valorised plays a role, such as their potential value as healthy food products or ingredients, or eco-design for textiles. In some agrifood sectors, the word 'waste' is avoided due to the intrinsic value of waste components and by-products. In the fruit and vegetable sector, this also holds, however, waste valorisation has here often a positive effect, namely guilt-free operating while finding creative and humourful solutions.

Finally, nearly all of the initiatives studied explicitly demonstrate on their websites how they contribute to sustainable solutions via their business activities and value propositions. These solutions correspond to one, two or three of the sustainability dimensions – economic, environmental, and social – and are sometimes even expressed in very concrete (impact) numbers, especially when it comes to the environmental impact (e.g. quantities of waste valorised, of saved water, of CO_2 reduced).

As this review is not exhaustive and limited by an analysis of only secondary data in English language, more in-depth research is needed. This also comprises case studies in specific countries including researching the history and development of the enterprises, cooperation between businesses to co-create value, and interactions with actors from their larger business environment.

Keywords

circular economy, bioeconomy, business models, waste and by-product valorisation, fruit and vegetable sector

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Why Is It So Hard To Measure Impact In New Business Models? The Case Of A Collaborative Initiative For Reusing And Recycling Food Waste

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Extended abstract

Tackling the social, environmental, and economic consequences of food waste has become a crucial issue for governments and society. Progress in Target 12.3 of the United Nations Sustainable Development Goals (SDGs), which is about reducing food loss and food waste by 2030, has been slow both in developed and developing parts of the world (United Nations, 2021). Mobilization of the food supply chain actors, including industry stakeholders (producers, distributors, wholesalers, and retailers), consumers, and regulatory agencies, is necessary for initiating and sustaining a circular ecosystem (Bhattacharya & Fayezi, 2021). However, stakeholders' involvement and their claims and value propositions can diverge, obstructing the long-term sustainability of the ecosystem (Bonadonna et al., 2019).

The primary purpose of this study is to explore the conditions that facilitated a local initiative's progress to a circular ecosystem at the national level characterized by a co-designed circular business model with a broad range of stakeholders. In doing so, the study adopts a perspective to business models in which value creation happens *with* and *for* stakeholders (Freudenreich et al., 2020). In particular, the study asks how value is created for networks of stakeholders and how the beneficiaries perceive it? The study's secondary aim is to discuss the potential impacts of a collaborative food waste reduction initiative and identify the limits and barriers in measuring the impact of the business model in collaboration with the stakeholders. The primary concerns in answering the secondary aim of the study are: how can we measure the impacts so that they will be relevant to all key stakeholders, and how can we move from measuring economic impact to measuring the contribution to people's wellbeing? The study draws from the literature on new sustainable business models, sustainable food supply chains, and stakeholder management theory, examining one collaborative initiative that aims to reuse and recycle food waste in Turkey.

The "Soil-to-Soil Biodegradable Waste Management" project is initiated by Ebru Baybara Demir, a local chef, and entrepreneur. She is also a "social gastronomy entrepreneur" with several innovative projects in local gastronomy, women's employment, and biodiversity conservation (Eris et al., 2022). The initiative is purposefully chosen as a case study, because of its broad stakeholder involvement, high visibility and its geographical coverage. Beginning in April 2021, the waste management project was applied in the city of Diyarbakır, collaborating with Kayapınar Municipality. The initiative involves reusing and recovering food at farmers' markets and festivals and recycling food waste via composting. Since June 2021, the initiative expanded to the national level (e.g., Kocaeli, Mersin, and Istanbul), and new collaborations were established with municipalities, schools, and volunteers.

This study employs a two-step methodology, including a website and social media content analysis followed by semi-structured stakeholder interviews. The purpose of the website and social media content analysis is to document the evolution of the initiative, identify the stakeholders and beneficiaries, and list a set of activities that the stakeholders perform. The interviews allow discussing limits and barriers in measuring the impact of food waste reduction. The preliminary analysis points out that the initiative aims to tackle the pressing issues of poverty-hunger-access to food, food shortage, sustainable farming, and efficient water use. The preliminary analysis also

yields a list of the stakeholders and exemplifies the increasing numbers of volunteers and municipalities joining the initiative, the increasing media coverage, the shift in project outcomes from purely environmental to both social and environmental, and the lack of systematic impact measurement. An inquiry commissioned by the European Union reminds us that the evaluation of food waste prevention interventions is still at an early stage (Caldeira et al., 2019). And there are few studies on grassroots initiatives committed to reducing food loss and waste (Mariam et al., 2020); therefore; scholars suggest that we need more studies demonstrating the effectiveness of food waste initiatives (Chauhan et al., 2021; Goossens et al., 2019; Huang et al., 2021). The attempts in this study to examine and discuss the evolution, activities, and involvement of stakeholders in the circular business model of a collaborative initiative will contribute to our understanding of new business models in food waste management (Senanayake et al., 2021). More complete information on the initiative's effectiveness would make the impacts more visible at various levels and improve future action design by the partners.

Keywords

New business models, stakeholder theory, food waste management, SDG 12.

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At The Heart Of The Implementation Of A Disruptive Sustainable Business Model (SBM): The PSS-CIRCULAR Case

A structurationist analysis of the SBM ecosystem

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Extended abstract

The Sustainable Development is considered a major challenge of the 21st century (Jing, 2020) and several recent researches focus on sustainable innovations and how new technologies and social practices enable companies to become more sustainable (Boons & Lüdeke-Freund, 2013, Hernández-Chea et al., 2021). In this context, the Circular Economy - CE (Ghisellini, Cialani & Ulgiati, 2016) and the functional economy - FE (Stahel, 2005) appear as promising approaches to limiting raw material consumption while maintaining economic growth. The first one promotes a close product lifecycle loop by encouraging maintenance, remanufacturing of products, reuse of components, and recycling of materials or even by reducing the potential underuse of the delivered goods, where appropriate by their sharing (Agarwal & Steinmetz, 2019, Matsumoto & Umeda, 2011). The second one encourages "dematerialization" with the sale of Product-Service Systems - PSS (Kjaer et al., 2019, Tukker, 2015).

With such approaches, all economic actors must have an integrative representation of their own activity within an ecosystem (Bocken et al., 2013). A radical change is now required to move from a take-make-waste linear economy to a more resource preservation-friendly economy (Bocken et al., 2014). However, the operationalisation of the change needed is sorely lacking (Bocken, Weissbrod & Antikainen, 2021). The purpose of our exploratory research is to contribute to fill this gap. Our work consists in a longitudinal case study. It will participate to overcome the lack of

empirical studies in the Sustainable Business Model innovation field (Evans et al., 2017). We present a comprehensive analysis of the implementation process of a new sustainable business model ecosystem within a traditional firm of the sport equipment sector (SPORT-CORPORATE). This implementation occurs through an innovation project named PSS-CIRCULAR. The environmental benefit of this project lies in its ability to maximize the use of sports goods traditionally purchased by multiple customers. The objective of the PSS-CIRCULAR project is twofold: to allow customers to access a variety of products and to minimize the underuse of these products. Our study began in October 2020 and is still underway. Interviews are conducted regularly by two researchers with the company's managers and the project leader. In addition, all available public documents are collected and analysed.

Our main research objective is to qualify potential generic success or risk factors that could occur during the implementation of a new Sustainable Business Model (SBM). To reach this objective, we elaborated a conceptual and theoretical framework to grasp the change process and the previous and new Business Model ecosystems. The aim of this paper is not to design a new business model, but to understand how it works in a specific environment.

We place our work in the disruptive innovation field and more specifically in the "business model innovation" identified by Markides (Markides, 2006). Sustainable business models are an emerging research field (Reinhardt et al., 2020) to cope with the sustainability in organizations (Bocken, Rana & Short, 2015, Hernández-Chea et al., 2021). We are in the 7th category of SBM identified by Bocken and her colleagues (2014), "Re-purpose the business for society/environment". To qualify the existing business model (BM) and the emerging SBM, we consider the main blocks proposed by Osterwalder and Pigneur (2010) and redefined by Bouquin and Kuszla (2014):

- An offer for users with direct or indirect social/environmental impacts,
- A set of operational processes (internalized or not),
- Key available resources (human or not),
- Revenues (cash) or more exactly any kind of reward from any stakeholder,
- Costs (in cash or efforts),
- The resources' financing or capturing capability which is necessary to understand the "return" for any stakeholder.

We also adopt Boons and Lüdeke-Freund's (2013) interactionist approach of BM where social, technical and practical dimensions are embedded and co-constituted (Callon, 1991). The sociological theory of structuration (Giddens, 1984), whose benefits are recognized in both marketing and strategic fields (Williams, Davey & Johnstone, 2021, Whittington, 2010), has a double interest in this context:

- It inscribes the studied phenomenon in a time and in episodes of structuring and allows to qualify the internal consistency of these periods according three dimensions (legitimation, domination and signification). It is important to identify steps in the building of the new SBM of the PSS-CIRCULAR project.
- It allows to grasp the continuous interaction between individuals (for instance the project leader) and the structural context of their decisions and actions.

In a first phase, we reconstruct the history, the trajectory and the episodes of the SBM emergence. In a second phase, we analyse the traditional and innovative BM ecosystems, according to the dimensions of the structure of Giddens and in relation to the evolution of their environment.

During the analysis, we identified five stages or structuration episodes for the set-up of the SBM (outbreak, pilot experience, consolidation, implementation, integration). At each stage, the ecosystem of the involved stakeholders evolved. Different structural dimensions also were mobilized. And different elements of the business model needed to be unlocked.

The first results show the interest of the structuration theory framework to analyse a transformation trajectory of an economic model at a micro level. This framework allows to articulate the contributions of sociology and strategic management. Beyond the relevance and *a priori* consistency of a SBM, perceived as commendable and well designed, the understanding of the real individual objectives of decision-makers seems to be critical for the success. The role of incentive and control systems becomes fundamental, particularly when the main objectives focus on the financial return-on-investment.

Secondly the double analysis of the two BM ecosystems (SPORT-CORPORATE and PSS-CIRCULAR) with the Giddens' framework, highlights two main risks. The first risk deals with inconsistencies in terms of shared meaning and domination facilities given to the PSS-CIRCULAR project. For instance, the key resources are not adapted to the targets, and even they are not well identified. The second risk is related to the differences in terms of the evolution of the representation systems, and in particular the environmental legitimation of the actions of each actor. Finally, in the new SBM implementation process, the rhythm of the evolution of the multiple structuration systems and the identification of the main consistency moments are key strategic activities.

Keywords

Sustainable Business Model, Structuration Theory, Circular Economy, PSS.

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Enabling food surplus redistribution for social purposes through a blockchain-based platform: insights on emerging business models

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Extended abstract

Theoretical background

Worldwide Covid-19 pandemic exacerbated some social issues like poverty and food insecurity. Indeed, in Italy the number of individuals in absolute poverty raised in 2020 by over one million (Istat, 2021). Concerning food poverty, according to a report by ActionAid (2020) the requests for food aid in Italy have increased by up to 40%, making it difficult for local administrations and local authorities to respond quickly and effectively to these needs. In this context, an optimization of information flows and management of raw materials and stocks, involving various stakeholders - primarily local administrations - would make it possible to provide food to the neediest consumers and, at the same time, avoid the generation of further waste, contributing to the urgent transformation towards more resilient and sustainable food systems.

Constant monitoring and communication of the various stages of the food supply chain would allow an improvement in production with a view to sustainability and effective intervention to reduce economic inequalities among final consumers. In this sense, the coordination of food supply chains with the specific support offered by digital technologies, such as blockchain, represents an important opportunity, which has received limited attention so far both in the academic community and in the industry. The blockchain technology can "break" the food supply chain into smaller parts and help to manage in a better way the food flow control (Stroumpoulis et al., 2021), through an improvement in the stream of communications and information between the parties in the food supply chain (Legowski et al., 2019). In addition to this, the use of blockchain technology facilitate the sharing of information with food banks to facilitate the distribution of uneaten food, thus helping to reduce food waste (FW) (Stroumpoulis et al., 2021).

In this study, we focus on the advantages of using blockchain technology to support the redistribution of food surpluses along the entire food supply chain, with the specific aim of understanding in depth the implications for sustainability and the SDGs achievement.
The importance of examine FW reduction and redistribution through the adoption of innovative solutions fits under the sustainable business models innovation framework. The sustainable business model concept is used in reference to environmental and social aspects such as corporate social responsibility (CSR), business sustainability, sustainable supply chain management and food security (Franceschelli et al., 2018).

Indeed, Regusto, the platform analyzed in the present study, operates in a b2npo (business-to-non profit organization) business model, proposing a formula in which the local public administration manages the relationships between suppliers and non-profit entities by encouraging the donation and recovery of surpluses (Michelini et al., 2018). The emerging business model is currently being adapted to include not only food surplus, but also other types of non-food products.

Methodology
The present work highlights the results of a multidisciplinary project put forward by the University of Roma Tre, Tuscia and Trento in partnership with the start-up Recuperiamo Srl. The main aim is to analyze the Regusto platform and its business model. Regusto represents a responsible innovation based on the blockchain technology to tackle FW, while alleviating food poverty in Italy. To do so, we will put forward an in-depth analysis of the platform using both qualitative data (i.e., semi-structured interviews, secondary information), and quantitative ones (i.e., redistributed food volumes and specific key performance indicators).

Preliminary findings
The present research is still in progress. From the preliminary results it emerges that the business model adopted by the Regusto platform is in constant evolution due to the incertitude of the moment it will change on the basis of the stakeholders' requirements and resources, and the external contextual factors influenced by the pandemic. The value proposition of the platform remains unchanged: it combines food surplus management and non-profit sectors through an innovative food sharing business model and its potential is to amplify and digitize the recovery of food surpluses in favor of the most vulnerable individuals. The combination of food surplus management with digital innovation will benefit all the three pillars of sustainable development: society, economy, and environment in line with the SDGs by the UN (Stroumpoulis et al., 2021; Saberi et al., 2019). The first data revealed that the food flows monitored in 2021 amounted to 106,741 kg of food donations which translated into figures equate to 212,000 meals distributed. Considering the environmental impacts, thanks to the redistribution of excess food that was recovered and not thrown away, it was possible to avoid the emission of 21,348 kg of CO_2 equivalent.

Theoretical and practical implications
Unlike other studies in which the implementation of new digital technologies, such as blockchain, are mainly analyzed in terms of information transparency and traceability (Rejeb et al., 2020; Behnke et al., 2020), in this paper we analyze how the use of blockchain technology can support the transparent redistribution of food surplus for social purposes, developing a sustainable business model currently in evolution. This aspect of our study facilitates inter- and transdisciplinary research on new business models contributing to sustainable development.

The paper's novelty is both empirical and theoretical. From a managerial and food supply chain point of view contributions will be manifold: 1) the extension of integration and information exchange at supply chain level to cope with FW and support redistribution for social purposes; 2) the study of new dynamics related to of the supply chain and the relationships between the different actors that make it up, following the implementation of new digital technologies, like the Blockchain; 3) a contribution to the fields of Responsible Research and Innovation and Sustainable Supply Chain Management, with particular attention to the social dimension, still in the development and expansion phase, in connection with the Literatures of Sustainability Transition and CSR; and a 4) reduction of management and warehouse costs.

Practical implications concern the three areas of sustainability, in alignment with the triple bottom line and the Law 166/2016"Gadda" on FW: Social impact of support to non-profit entities and to categories of subjects in need; direct economic benefits of reducing the costs of managing the food emergency for public administrations and indirect losses resulting from the freezing of production chains; environmental in terms of prevention and reduction of FW, as well as planning of territorial fiscal policies based on the quantities donated, such as reduction of the waste tax. In sum, the project allows an approach to different SDGs #: 1, 2, 9, 10, 11, 12, 13. Finally, we believe that this study can contribute to the body of knowledge New Business Models in alignment with Sustainable Development Goal #12.

Keywords

New Business Models, Blockchain Technology, Food Waste Management, Food supply chain, Food surplus redistribution

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Mitigating Post-Harvest Food Loss: Business Model in an Emerging Economy Context

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Extended abstract

Literature Background and Research Question

Reducing food loss and waste in the agriculture value chain is necessary for emerging economies in achieving their sustainable development goals. Food waste is commonly found at the consumption level in developed and industrialised economies. In emerging and developing economies, food loss is common in the upstream value chain due to unpredictable climatic conditions, lack of infrastructural and technological strength, poor quality logistics, regulatory gaps, and lack of transparent marketing systems (Gustavsson et al., 2011; Lipinski et al. 2013; Kaza et al. 2018). Food loss refers to the decrease in food mass made for human consumption, occurring mainly during production, post-harvesting and processing (Dora et al. 2020). Market value of produce decreases due to spillage, damage, and degradation. While the state of the art focuses on industrial and institutional interventions for the prosperity and efficiency of global supply chains, there is insufficient research on business models for reducing upstream food loss in developing countries (Dora et al. 2020; Chauhan et al. 2021). Analysing the business model at the local level helps in learning which actors operate in the value chain, how value (monetary/economic) is offered in the network, and what practices and interventions can be incorporated (Ritter and Lettl, 2018). We have taken up India as a case context and seek to understand how this looks like. India losses 926 billion INR (Dollar 12 billion) in rejection of produce at farm gate and the across the distribution

channel.[34] We ask the following research question: What business model exists in the fresh vegetable supply chain and how do the actors make sense of solutions for mitigating post-harvest loss of fresh produce?

Methods

The methodology was qualitative to get a more nuanced understanding of the context (Eriksson and Kovalainen, 2015). We followed the paradigm of considering study participants as knowledgeable people who are capable of explaining their experiences (Gehman et al. 2018). Interviews of experts with contextual knowledge is a time tested method of data collection (Bogner and Menz 2009). We conducted semi-structured interviews (40 to 60 minutes each) with 15 supply chain experts. The interviews were recorded with consent, manually transcribed, and inductively analysed for identifying thematic patterns (Patton 1990). In interest of wordcount, the findings are briefly laid out. Thematic and data tables will be integrated while developing a full paper.

Findings: Actor Insights

Ownership

The value chain actors expect the local governments to take ownership of the loss of fresh produce, and play a key role in ensuring successful implementation and scaling of any new solution for mitigating post-harvest FLW. Governmental trust is essential for any innovation to be adopted by farmers and distributors. A collective ownership model is needed between farms, supply chain nodes, and market places, to form a production and market cluster for mobilising initiatives and investments in infrastructural solutions for better handling and sorting of produce. In a public-producer-private-partnership (PPPP) model, the state can lead multi stake holder ownerships for developing production clusters and integrating low and high tech FLW mitigation solutions. Farmer cooperatives can be empowered to become producer companies partnering with organized retailers and exporters for ensuring higher storage value of fresh produce.

Value addition points

The potential value addition points by implementing new interventions points have multiple aspects: increase in shelf-life, preservation and assurance of quality, reducing uncertainty in harvesting and pricing, data capturing for support systems, direct market linkages, and shortening cash cycles. Demand-supply-price uncertainty results in residual produce which needs to be stored and phased out. Varying harvesting time, uncertainty of transportation and labour, and retreating market prices call for localised and low scale storage solutions. Locally feasible temperature and humidity controlled units are needed to give 12 to 24 hours of pre-cooling for increasing shelf-life. Digital solutions need to increase reliability of projections. Timely transport depends on real-time information on harvest time, availability of transportation and labour, and identification of spot buyers (retailers, hoteliers, direct consumers, and food processor). Flattening the value chain with direct market linkages can help the value chain actors aggregate at a local level, strengthen B2B connectivity through partnerships and investment of resources, shorten value chains, and increase frequency of cash inflows.

Beneficiaries of value addition

Potential beneficiaries (who are also the most ignored ones) in an improved business model, are the unorganized and informal sector (push carts, local markets, petty shops), and small size rural retail, who have a common practice of dumping unsold produce. They operate in enormous volume

[34] Steps Taken to Reduce Post Harvest Food Losses, PIB, Feb 2016

with zero temperature control or data driven solutions. Though indigenous and affordable solutions are useful to them, they are an ignored market due to low returns. Organised farmer groups and market agents will also be the beneficiaries of portable off-grid cold chain solutions, as there is no value addition beyond aggregation for sorting and grading.

Operations and value delivery mechanisms

The time between demand estimation and sowing of seeds is a three-month period, that can be used for planning the access and distribution of produce. In the time between crop cycles, data science solutions can be used for information on market conditions (price and demand) and for informing farming decisions. IOT based platforms mapping market order, harvested produce, and pre-cooling arrangements, will help in addressing the embedded perception that a produce does not sell unless it is freshly harvested. Making affordable low-tech solutions available at farm gate may create a pull oriented value chain where the downstream demand drives the upstream supply. Beginning with a network of innovative off-grid modular cold solutions for maintaining moisture levels in tomatoes when stored for some time, and gradually scale up by exploring high valued crops, such as tamarind or turmeric.

Discussion

Given the increasing interest in large scale technological solutions for large retailers in agriculture value chains, there is a need for reducing post-harvest food loss in small-scale farming and in the other value capture points in the upstream supply chain (Dora et al. 2020; Chauhan et al. 2021). This study reinforces the need for new information and knowledge on the value chain of agricultural produce in emerging economies, with India as a case, and identifies what is needed for a sustainable business model to deal with post-harvest loss of fresh produce. The business model framework (Figure 1) tell us who the primary actors are, what are their value creation activities, and how certain interventions can help in reducing post-harvest FLW. Low scale modular cold chain solutions would enable wastage reduction and digital interventions would reduce cost of production by bringing in demand predictability, shorter cash cycles and a transparent price discovery mechanism. This will enable the upstream value chain actors implement transformative, equitable and sustainable business models (McElwee et al. 2020) for sustainable agricultural practices. This is not to propose this as the only business model for combating food loss in emerging economies like India, but it sets the background for expanding this as well as for informing other research efforts in this direction.

Keywords

business model, food loss, value chain, agriculture, emerging economy

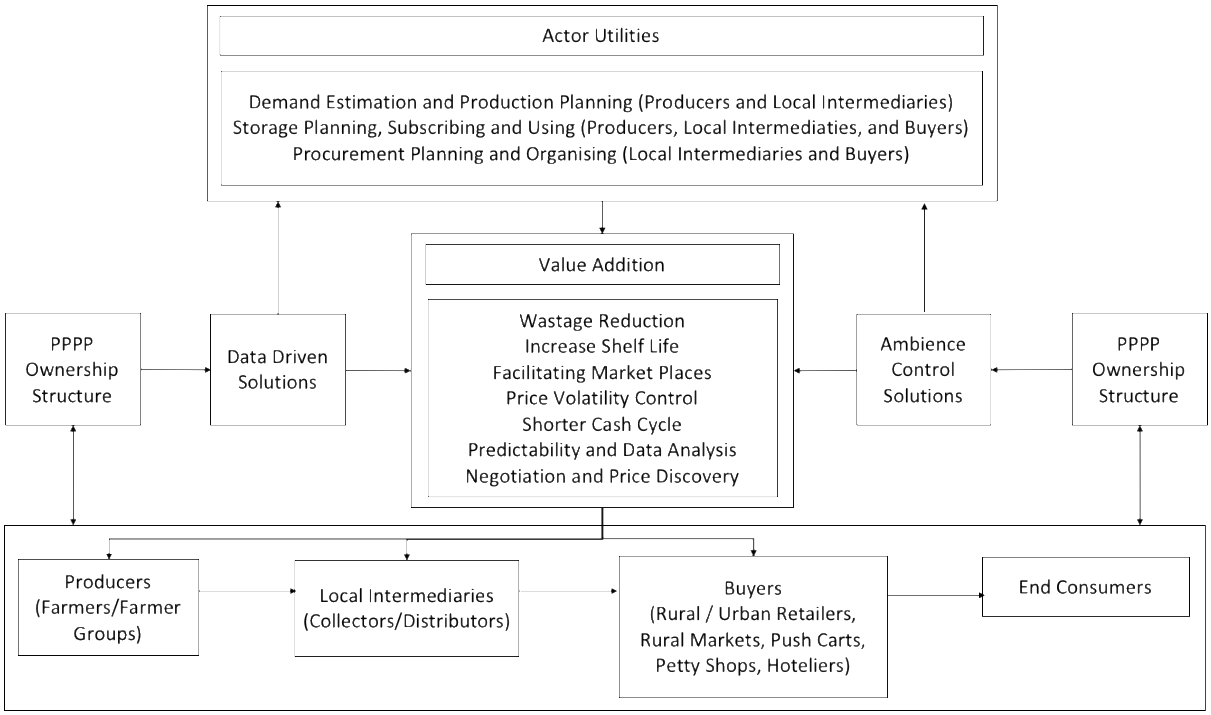

Figure 1: Business model for integrating post-harvest FLW mitigating solutions with existing practices

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Food recovery ecosystem: a systematic literature review

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Abstract

The problem of poverty and the resulting problems of food insecurity have been increasingly relevant in recent decades. Moreover, the emergence of digital technologies and the sharing economy has made this issue even more relevant in recent years, and it has reached even greater relevance with the advent of the Covid-19 pandemic, which has significantly worsened the conditions of those who were already poor, while at the same time making poor people who were not poor before the pandemic. This research uses a systematic literature review approach to analyse the academic production of the last ten years on the themes of food recovery and food sharing, in order to outline the main actors and practices.

Track 4.1 - New Theoretical Foundations of Business Models for Sustainability as Social Action

Track chairs: *Florian Lüdeke-Freund, Tobias Froese (ESCP Business School)*

This track explores the status quo and future directions of research on business models for sustainability as social action. Building on the prominent activity-based perspective of Zott and Amit (2010), business models realize their sustainability effects in and through social activities.

We therefore invite research that develops the conceptual foundations for a better understanding of business models as the complex socio-cultural phenomena that they are at the level of real organizations. Theories that lend themselves to this endeavor include theories of social practice, Alexandrian pattern theory, and social mechanism theory. Similarly, we invite research that applies these theories to explore how business models for sustainability can contribute to a sustainable transformation of their socio-ecological environment.

Greenwashing: A Broken Business Model

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Abstract

Is greenwashing a business model? The paper is a conceptual effort to advance the discussions of greenwashing though the lenses of business model thinking. We argue that the business model literature can offer a useful supplement to the existing conceptualisations of greenwashing by linking talk-action disconnects to the broader business architecture. Essentially, greenwashing is considered as a broken business model, which characterizes organisations that deliberately disconnect the promises to the stakeholders (i.e. value proposition) from the underlying business architecture. We also argue that the concept of grenwashing can contribute to the business model literature by drawing attention to organisations with imperfect business achitetures, which fail to deliver on the value proposition communicated to their stakeholders. Fundamentally, greenwashing calls attention to the multitude of organisations with limited integration beween the individual building blocks of a business model.

Key words

Greenwashing, business models, corporate sustainability, dissonance.

Introduction

The integration of social and environment issues within the organization and in its external stakeholder relationships is often considered as a key goal of corporate sustainability (Hengst et al., 2020). However, it is also widely acknowledged that many companies pay only lip service to the sustainability agenda. The inconsistency between corporate "talk" and "action" when it comes to sustainability has led to accusations of greenwashing, which can be broadly defined as: *"(…) communication that misleads people into adopting overly positive beliefs about an organization's environmental performance"* (Lyon and Montgomery, 2015, p. 226). Greenwashing is by no means marginal phenomenon (Kim and Lyon, 2015). On the contrary, the literature has reported product greenwashing of more than 90 percent (Delmas and Burbano, 2011; Lyon and Montgomery, 2015). Most recently, the European Commission (EC) concluded that 42 percent of green online claims

were exaggerated, deceptive or false (EC, 2021). Therfore, greenwashing often seems to be 'business as usual' rather than an exceptional case at the fringes of the business community.

The aim of this study is to advance the study of greenwashing through the lenses of business model thinking. The literature on greenwashing has made significant progress in categorizing different types of greenwashing "talk" whereas it has paid less attention to origin of the organizational "action" to which the talk relates (e.g. manufacturing processes, distribution processes, partner relations etc.). Here, the business model literature holds potential for enriching the greenwashing debate with its emphasis on the different building blocks that enable value creation, value delivery, and value capture. Conversely, the greenwashing literature can contribute to business model thinking by drawing attention to the multitude of organisations with inconsistent, unbalanced, and broken business models. Ultimately, greenwashing can be seen as a special case for organisations, which fail to align the communicated value proposition with its underlying transformation system and stakeholder relationships.

The remainer of the paper is structured as follows. The paper will begin with a general introduction to greenwashing, its core characteristics and relationship to other theoretical concepts addressing talk-action disconnects, such as decoupling (Crilly et al., 2016) and corporate hypocrisy (Higgins et al., 2020). No claim is made that the theoretical overview covers the entirety of concepts in the academic literature which somehow addresse talk-action inconsistencies in organisations. The conceptual introduction is subsequently used as a springboard for proposing a new categorization of greenwashing, which takes the point of departure in a business model perspective. The fashion industry is used as a short case example for illustrating the different components of greenwashing from a business model perspective. The conclusion section will summarise the main findings from the paper and suggest future avenues for advancing greenwashing research.

Greenwashing and Related Concepts

There is limited consensus about the meaning of greenwashing in the academic literature (Seele and Gatti, 2017; Zharfpeykan, 2021; Kassinis and Panayiotou, 2018). A few examples of greenwashing definitions are provided in Table 1. In general, greenwashing is considered as the act of misleading people into forming positive opinions about the environmental performance of an organisation or its offerings (Delmas and Burbano, 2011; Lyon and Montgomery, 2015). Greenwashing comes in many shapes and forms, ranging from the selective use of vague sustainability claims to outright lies about the sustainability performance of a product or an organization (Gacek, 2020; Lyon and Montgomery, 2015; Siano *et al.*, 2017). As an example of greenwashing, Marquis et al. (2016, p. 483) mention selective disclosure of companies, which: *"(…) disclose positive environmental actions while concealing negative ones to create a misleadingly positive impression of overall environmental performance (…)"*. In other words, greenwashing is not an unfortunate mistake but a deliberate attempt to mislead stakeholders. An well-known example is the Volkswagen scandal where the automanufacturer manipulated the emission data of their cars (Aurand et al., 2018; Lane, 2016; Siano et al., 2017).

Table 1: Examples of Greenwashing Definitions	
Definition:	**Source:**

"(…) the act of misleading consumers regarding the environmental practices of the company (firm-level greenwashing) or the environmental benefits of a product or service (product-level greenwashing)."	(Delmas and Burbano, 2011, p. 66)
"(…) a co-creation of an external accusation toward an organization with regard to presenting a misleading green message."	(Seele and Gatti, 2017, p. 248)
"(…) any communication that misleads people into adopting overly positive beliefs about an organization's environmental performance, practices, or products."	(Lyon and Montgomery, 2015, p. 226)
"Greenwashing refers to the practice of "not walking the talk", which means that a company's sustainability claims are at variance with its actual corporate activities (…)."	Pizzeti et al., (2021, p. 22)
"(…) downplays unfavourables and high-impact domains and highlights favourable but less relevant points".	Zharfpeykan (2021, p. 2209)
"(…) disclose positive environmental actions while concealing negative ones to create a misleadingly positive impression of overall environmental performance (…) ".	Marquis et al., (2016, p.483)
"(..) a communication practice that consists of the deliberate and voluntary disclosure of environmentally misleading (or even false) information by a firm and which the public understands to be deceptive".	Ferrón-Vílchez et al. (2021, p. 860)
"(…) selective disclosure on sustainability issues without full reporting of material sustainability issues to overstate its true sustainability performance".	Hummel and Festl-Pell, 2015, p. 372)

Over the years, there has been a mushrooming of more specific types of greenwashing, including CSR-washing (Pope and Wæraas, 2016), Blue washing (misuse of United Nations Global Compact) (Berliner and Prakash, 2015), and SDG washing (misuse of SDGs) (Heras-Saizarbitoria et al., 2022). Moreover, overlapping concepts like window-dressing and smokescreening are sometimes used as synonyms of greenwashing to describe selective disclosure of favourable environmental information, which fail to provide an accurate picture of the actual environmental performance of a product or a company (Pedersen, 2006). Last, scholars have introduced terms which represent the antidotes to greenwashing, where companies intentially under-communicate their environmental practices. For instance, the concept of brownwashing cover undue modesty to disguise the costs of sustainability activities (Kim and Lyon, 2015). Other concepts describing companies underreporting rather than overreporting environmental performance include greenhushing (Font *et al.*, 2017) and strategic silence (Carlos and Lewis, 2018).

Greenwashing cuts across a number of different academic disciplines (Lyon and Montgomery, 2015). Theoretically, greenwashing is also only one of many concepts which addresses the disconnect between the organisational talk and action. Most notably, there is a rich academic literature on *decoupling*, which was originally used to describe how organisations protected core operations from external expectations by symbolically adopting "inefficient" policies and structures (Meyer and Rowan, 1977). Here, decoupling is essentially about a disconnect between a policy and

its implementation, which allows the organization to continue daily operations while at the same time meeting the multitude of expectations from the environment (Bromley and Powell, 2012; Hengst et al., 2020). Decoupling has also be applied in the study of sustainability and greenwashing, e.g. when oil companies draw attention away from crises and environmentally harming business activities (Bromley and Powell, 2012; Kassinis and Panayiotou, 2018). More recently, scholars have also talked about means-ends decoupling, where there is actually an element of consistency between saying and doing but where the latter has little to do with the core goals and processes in the organization (Bromley and Powell, 2012). For instance, fast fashion companies producing cheap clothes at high speed organize means-ends decoupling through compartmentalization of their circular economy activities from core business practices (Stål and Corvellec, 2021). However, decoupling is only greenwashing when an organisation actively tries to mislead stakeholders about its conduct regarding sustainability in order to improve reputation, attract resources, or hide controversial activities (Crilly *et al.*, 2016). For instance, means-end decoupling can also cover situations where the consistency between talk and action is complex, ambiguous, and uncertain, and where it is unclear what actions will allow the company to deliver its promises (ibid.). In the words of Hironaka and Schofer (2002, p. 215):

> *"In certain cases, decoupling may be the product of strategic action. However, it may also reflect altruistic or norms-based action, or even incompetence, accident or chance (…). Whether or not strategic action is involved is an empirical question, not something that should be presumed."*

Another literature addressing the talk-action disconnect concerns organisational *hypocrisy* (Brunsson, 1993, 2002). The literature on hypocrisy rest on the assumption that talk-action consistency is difficult, e.g. due to lack of knowledge, resources, time, feasibility etc. (Brunsson, 1993). For instance, organisations are met with multiple, and not necessarily consistent stakeholder demands, which make it necessary for the organization serve different interests with different types and talk, talk-action, and/or action (Christensen *et al.*, 2019). Moreover, talkers in organisations may be different from the people who act, which are likely to produce inconsistency in saying and doing, promises and practices. In the words of Brunsson (1993, p. 496): *"(…) people who are free to express ideas without having to take action can often afford to defend view that are more moral, beautiful or true, and less feasible, than the view that the actors have to be guided by".* Where hypocrisy is usually thought associated with a lack of moral integrity, organisation scholars argue that an element of inconsistency between talk and action is unavoidable and a normal organisational practice (Christensen *et al.*, 2020; Higgins et al., 2020). In some cases, hypocrisy may even create opportunities for change that was not possible without it (Cho et al., 2015). In summary, the concept of hypocrisy overlaps with greenwashing only when discrepancies between talk and action are rooted in duplicitous attempts to mislead stakeholders about the organisation's sustainability performance.

There is also a small, but growing, literature on organisational *bullshit*, which can be seen as a catch-all phrase for corporate rhetoric which creates a positive image of someone of something irrespective of the actual organizational reality. From mostly being associated with the spoken language, the concept of 'bullshit' has lately been subject to scholarly inquiry in the management and organisation literature (Spicer, 2013; Morgan, 2010). The distinguishing characteristic of a bullshitting company is the general disregard of the truth and the organisational reality (Frankfurt, 2005; Morgan, 2010; Spicer, 2013). As noted by Spicer (p. 657): *"(…) a good portion of talk and text*

in organisations seems to be fundamentally 'empty', bearing little relationship with the reality of what goes on in the organisation". Bullshit can thus be seen as talk and text unconcerned with truth (Spicer, 2013, p. 664). However, not all bullshit in organisations is part of a deliberate attempt to mislead others. For instance, corporate lingo about "disruption," "resilience," and "agility" is not necessarily about plotting against others or oneself. While bullshit arguably benefits the bullshitter, some 'empty talk' and 'hot air' in organisations can also be socially acceptable codes that reflect membership of a community irrespective of its proximity to the truth. Unlike a greenwashing organisation, which is intentionally misleading stakeholders about its environmental practices, a bullshitting organisation is simply quite indifferent about the truth and the organisational reality what goes on in the organization (Morgan, 2010, p. 1577). In the words of Frankfurt: (2005, p. 13):

> *"The fact about himself that the bullshitter hides (…) is that the truth-values of his statements are of no central interest to him; what we are not to understand is that his intention is neither to report the truth nor to conceal it. This does not mean that his speech is anarchically impulsive, but that the motive guiding and controlling it is unconcerned with how the things about which he speaks truly are."*

In summary, a number of terms in the academic literature address talk-action disconnects between and organisation's communication and its actual practices. What separate greenwashing from the concepts described about is its thematic focus on environmental issues and the emphass on deliberate efforts to mislead customers or other stakeholders. However, as a Seele and Gatti (2017) correctly point out, greenwashing cannot be fully understood without paying attention to the individuals or groups accusing the organisation as a greenwasher (activists, media, consumer agencies etc.). Just like one organisation may have an incentive to greenwash, so may another organisation have an incentive to accuse others of greenwashing, e.g. by blaming them for not doing enough or failing to 'walk the talk'. Therefore, an analysis og greenwashing have to pay attention to the accused as well as the accuser.

A Business Model Perspective on Greenwashing

The concept of greenwashing has rarely been analysed through the lenses of business model thinking, even though the latter provides an interesting new perspective for understanding different types of talk-action disconnects. More specifically, the academic greenwashing literature is often conceptual in nature and focusing on developing different categories of greenwashing, rather than looking at their connection to overall business architecture. Distinctions between talk-action disconnects are mostly linked to the talk rather than the action, e.g. manufacturing activities, input materials, or supplier relationsips. Here, the greenwashing literature can learn from the various frameworks proposed for conventional as well as sustainable business models (Johnson et al., 2016; Lüdeke-Freund, 2009; Osterwalder and Pigneur, 2010). What these frameworks have in common is that they try to outline the fundamental building blocks necessary for creating, delivering and capturing value. While the original business model literature emphasised the company and its customer relationships, the literature on sustainable business models adopt a broader and more holistic perspective, which give priority to economic, social, and environmental value, and a broader range of stakeholder relationships (Freudenreich et al., 2020; Pedersen et al., 2018). According to Lüdeke-Freund et al. (2018, p. 147): *"A sustainable business model is about*

creating significantly increased positive effects and/or significantly reduced negative effects for the natural environment and society through changes in the way a company and its network create, deliver, and capture value".

While acknowleding the differences between the various business model frameworks, we will distinguish between building blocks: - the value proposition, the customer interface, the business transformation system, the finance and accounting system, and the non-market stakeholder environment. The *value proposition* covers how the company's business activities create benefits for customers and other stakeholders. In the case of greenwashing, companies deliberately create misalignment between the communicated promises and the realised benefits. The *customer interface* is about the relationships that companies establish with their customer segments. As an example of greenwashing, the company may try attract environmentally conscious customer segments through misleading marketing. The *business transformation system* covers the infrastructure which enable the company to transform inputs into outputs. Central components of the business transformation system is the key resources, core activities, and strategic partner relationships (Osterwalder and Pigneur, 2010). The *finance and accounting system* addresses the economic, social and environmental impacts from operating the business model. The impacts do not only cover the costs and revenues, but also the intended and unintended effects on the stakeholders, society and the environment. In the case of greenwashing, a company may hide important environmental impacts in the upstream supply chain in their sustainability report. Last, the *non-market stakeholder environment* covers the relationships with stakeholders beyond the constituencies directly involved in the core business activities. Examples include for instance regulatory authories, labour market organisations, community groups, and non-governmental organisations. An example of greenwashing is companies, which oversell participation in sustainability initiatives (e.g. certifications, labels, and multi-stakeholder initiatives) which require only limited commitment or cover only a fraction of the business activities. Figure 1 shows how greenwashing can emerge in different components of the business model. Moreover, in Table 1 we use the fashion industry as an example to illustrate the different types of greenwashing.

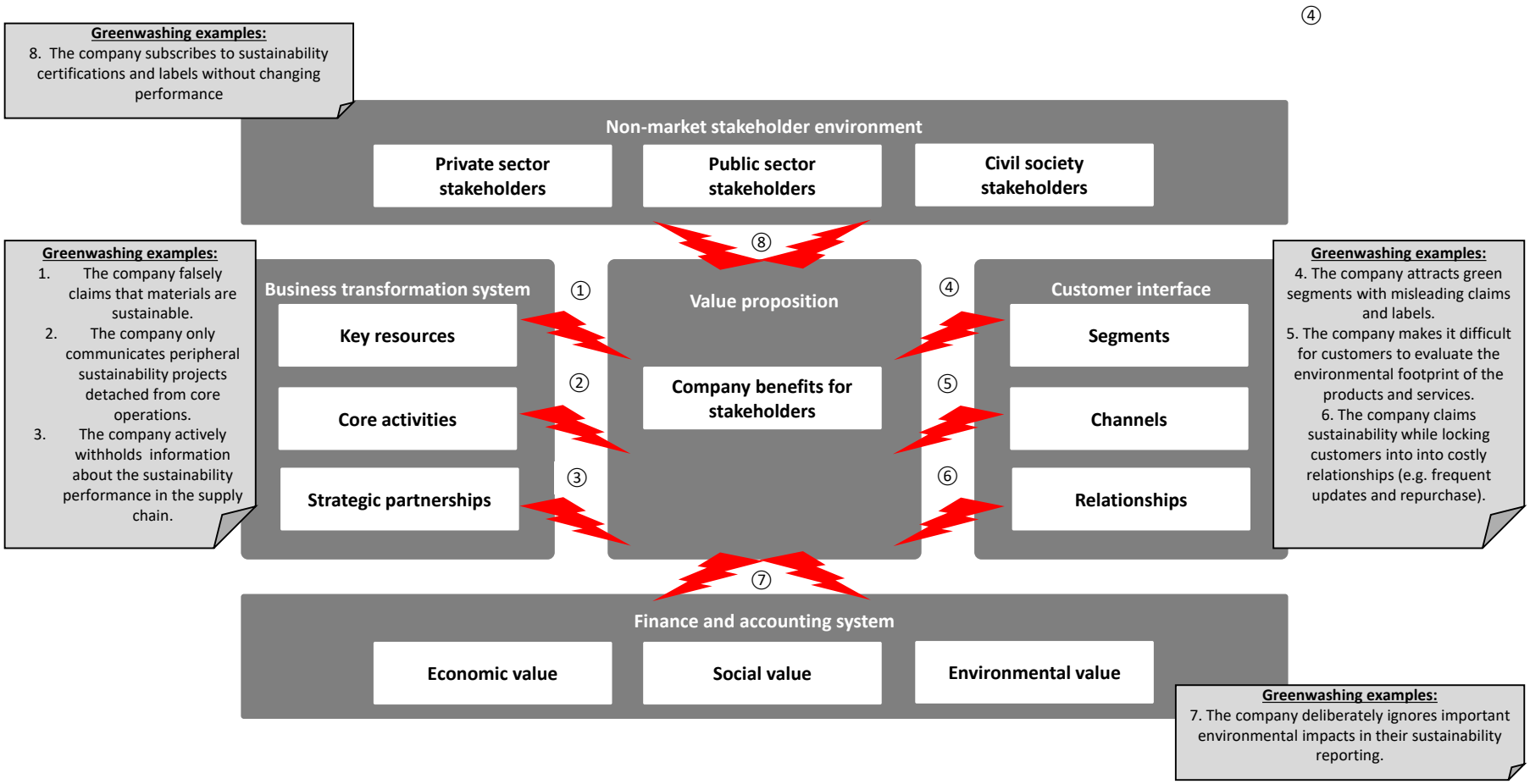

Figure 1: Greenwashing from a business model perspective.

TABLE 1: Case example: Greenwashing in the Fashion Industry

As a high-profile, consumer goods sector with a significant environmental impact, the fashion industry has often been accused of greenwashing by non-governmental organisations, journalists, public agencies and community groups. Overall, the sector desperately needs to step up on the environmental agenda and make meaningful actions to meet with stakeholder demand (McKinsey, 2020, s. 52). However, as the field of sustainable fashion develops, brands also need to to be increasingly careful in their claims to sustainability (Butler, 2022).

When it comes to the *value proposition*, the very concept of sustainable fashion has been rejected by some stakeholders as an oxymoron, a contradiction in terms, and especially the fast fashion business model has been described as being in conflict with the concept of sustainability. Therefore, Greenpeace (among others) calls for the fashion industry to ”slow the flow”, and argues that fashion brands are ”hijacking circularity for greenwashing” and states that: ”small pilot projects and fancy circular ”token” products, used mainly for marketing purposes or even greenwashing , are not enough and will not make a difference” (Greenpeace Germany, 2021, p. 24-25). Likewise, a Financial Times articles question the compataility between fast fashion and sustainability:

“If H&M really want to move towards a sustainable future, they kind of have to not exist. Or not in their current form, anyway. Clothing that is designed to be worn only a handful of times cannot be truly called “sustainable”, no matter how many times the material it’s made from has been recycled, or how little pesticide has been used on the cotton.” (*https://ftalphaville.ft.com/2019/11/06/1573073449000/When-fast-fashion-jumps-on-the-eco-wagon/*)

Looking at the *business transformation system*, fashion brands have often been criticized for lack of transparency regarding their supply chain and dubious claims about the sustainability of their products. For instance, a company like Canada Goose has been under attack for deceiving consumers about their fur and trapping methods (https://rabble.ca/environment/canada-gooses-greenwashing-marketing-strategy/). The fashion guide Good on You also accuses Lululemon for s misleading claims to sustainability. In their 2020 Impact Agenda Lululemon writes that: “We’ll adapt infrastructure to take back products after first use and recycle materials into a valuable next life, including fibre-to-fibre” (Lululemon, 2020, p. 31). However, Good On You highlights that this statement does not reflect any meaningful action and that Lululemom are silent about infrastructure they will be adapting, when it will happen, or what they consider to be a “valuable next life” (Rauturier, 2022).

In terms of the *customer interface*, fashion brands have often been accused of making misleading sustainability claims directed towards the consumers. As an example, H&M was accused by the Norwegian Consumer Agency for misleading marketing of their “conscious collection” (https://www.nrk.no/troms/forbrukertilsynet-refser-h_m-for-ulovlig-miljomarkedsforing-1.14578730). The company and the consumer agency later

reached agreement on how to communicate sustainability (https://melkoghonning.no/hm-refs-forbrukertilsynet/). Another company being accused of greenwashing is Zalando, Europe's biggest online fashion marketplace and platform (Bundgaard, Vang and Hansen, 2022). To give customers eco-friendly options, Zalando has introduced a sustainable range of garments on its platform. However, Zalando has been critizised for its use of the sustainability label: *"Calling a garment sustainable if 20% of it is made from recycled materials while the brand selling the piece is not showing any credible social or environmental efforts does not sit right with us."* (ASHIFT, 2021). The Danish publication *Tænk* also calls attention to the fact that of the 25 sustainability certifications that Zalando uses, the online platform has created half of them itself. Professor Jannick Schmidt highlights that while fulfilling one criterion, e.g. using organic cotton, is not enough to make a product sustainable, it is also very problematic to invent your own sustainability labels (Sæhl, Kristensen and Andersen, 2022).

In terms of the *finance and accounting system*, the reporting of fashion brands sometimes lack transparency and disclose only partial information. For instance, a fashion company may communicate the amount of used clothes collected as part of a recycling, but remain silent about how much the recycled clothes compare to the total amount of clothes sold. Moreover, the fashion brands may use questionable methods to measure the environmental impacts of their business activities. As an example, the company Allbirds was recently accused for greenwashing due to the use of questionable lifecycle assessment methodology (https://www.thefashionlaw.com/allbirds-is-the-latest-brand-facing-a-lawsuit-over-its-sustainability-centric-advertising/)

In terms of *non-market stakeholder environment*, fashion brands may oversell partnerships with public and private partners, even though these collaborative efforts do little to ensure the sustainability of their business activities. For instance, fashion brands may support organisations promoting living wages while operating their business in countries with minimum wages. Moreover, fashion brands have been accused of using third-party certification bodies, which fail to ensure the social and environmental performance in the supply chain. As an example, a garment supplier's factory in Pakistan burned down shortly after a third-party audit, killing hundreds of workers. https://cleanclothes.org/news/2017/09/11/five-years-since-ali-enterprises-fire-disaster-factories-in-pakistan-continue-to-be-unsafe

From a business model perspective, greenwashing represents a deliberate misalignment between the communicated value proposition and the underlying building blocks of the business model. However, greenwashing organisations also raises interesting questions to the underlying assumptions about consistency and coherence which often characterises business model thinking**.**

Idealtype business models often portray companies as having a coherent logic and a reasonable fit between the various building blocks. Attempts to formulate business model archetypes, typologies, configurations become more difficult, if the business models of most organistaions are imperfect, unbalanced, and broken. However, this view may fail to reflect the complexity and messiness which

characterises real-life organisations. Greenwashing, as well as decoupling, hypocrisy, bullshit, aspirational talk and other concepts, share a view of organisations as less integrated and more fragmented than assumed in much business model literature. In practice, consistent business models may be the exception rather than the rule. In the future, the business model literature could benefit from more studies into imperfect business models, which cover inconsistences between the various business model components.

Concluding Remarks

Greenwashing companies fail to perform on their promises regarding corporate sustainaiblity to their stakeholders. In this paper, we propose a new framework for categorizing talk-action disconnects regarding sustainability issues, which is based on the the various typologies of the business model literature. Where much research on greenwashing is rooted in the communication and marketing disciplines, we suggest in this paper that business model thinking also provide useful insights for understanding this type of organisational talk-action disconnects. Greenwashing can be seen as organisations with broken business models, which deliberately decouple different business model components. In general, the paper also **c**alls attention to organisations with broken business models, which seem to be a common phenomenon in the context of corporate sustainability.

Whether the talk-action disconnect is a deliberate attempt to mislead others (i.e. greenwashing) or a consequence of something else is an empirical question. However, the empirical question continue to be a key challenge for greenwashing research, which comes with a number of measurement difficulties (Hummel and Festl-Pell, 2015). A lot of empirical greenwashing research is retrospective and based on content analysis of corporate communication (Lyon and Montgomery, 2015, p. 231). Scholars in particular struggle with the deliberate component of greenwashing. Other concepts used to describe talk-action disconnects are more easily operationalized, as they do not require knowledge about the motivation between the talk-action disconnects. In the future, more research has to look into the practice of greenwashing even though this is not an easy endeavor, as greenwashing companies rarely provides access to the organisation.

Future research on greenwashing also have to look into the organisational factors, which enable and constrain greenwashing practices. The scale of greenwashing itself also raises the fundamental question if the predominant business models we know today come with a propensity for over-selling performance? After all, greenwashing is often a collective effort, which requires the involvement of multiple actors across functions, professions, and/or organisations. As an example, the Volkswagen emission scandal was not just the result of a scrupulous individual who singlehandedly plotted against the customers and the general public by manipulating the numbers (Higgins *et al.*, 2020). Therefore, the widespread use of greenwashing is likely to be related to the current organization of business, e.g. the division of labour, resource infrastructures, customer interfaces, and management control systems. While the separation of business models into interdependent building blocks brings analytical clarity, they may also inadvertently draw attention to the silos of modern organisations, which hamper coordination, collaboration, and knowledge sharing. After all, greenwashing works best in organisations with impermeable boundaries, which obstruct faccess to reliable information about economic, social and environmental performance.

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Pattern cards to foster analogical reasoning in business model innovation

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Abstract

Business model patterns are a common tool in business model design. We provide a theoretical foundation for their use within the framework of analogical reasoning as an important cognitive skill for business model innovation. Based on 12 innovation workshops with students and practitioners, we discuss scenarios of pattern card utilization and provide insights on its evaluation.

Keywords

business model pattern, design fixation, analogical reasoning, business model design, capabilities

Introduction

Companies are faced with the complex challenge of managing phases of uncertainty that arise today as a result of digitalization, unexpected events, or changing value paradigms in society. In addition to economic growth, the social and environmental impacts of a corporation are increasingly at stake. This often means that the entire business logic has to be transformed and companies have to try to redesign their business models. In theory, it is assumed that, in addition to exogenous shocks, active design, based on existing knowledge, plays an important role in this process (Martins et al., 2015). Here, business model patterns should facilitate the transfer from other domains and industries (Gassmann et al., 2014, Lüdeke-Freund et al., 2018). Nonetheless, design by analogy can lead to design fixation which might diminish creativity (Moreno et al. 2018). This brings us to our research question:

RQ. How is the use of patterns in business model innovation to be theoretically and empirically justified?

To answer this research question, first, the related work section provides a theoretical justification for the usage of patterns as analogies within business model innovation (BMI) process. In a second step, the methodological approach is presented, describing the exploration of the usage of patterns

within three real-world BMI projects. Then, we present the initial empirical insights of our research, before the conclusion and a future research outlook are provided.

Related Work

Business model design

A business model represents the rationale of how an organization creates, delivers, and captures value (Osterwalder & Pigneur, 2010). As Zott and Amit (2010) propose, the design of a business model is a "key managerial/entrepreneurial task". The task can be separated into diverse design elements, which are operationalized on different granularity levels. From a design science perspective, the elements of a business model can be separated into interconnected building blocks (Osterwalder, 2004) (e.g., value proposition, customer segment, revenue models, partner, key resources). In addition, research in recent years has crystallized a consensus on three overarching fundamental pillars of a business model. These include value proposition, value creation, and value capture (Bocken et al., 2014).

Ultimately, companies try to differentiate themselves in the market by innovating their business model which is accompanied by a reconfiguration of named business model elements (Amit & Zott, 2012). Design decisions can be used to adopt innovative design elements, retain customers, bundle activities or reduce transaction costs (Zott & Amit 2010). A modularity perspective might enable an effective and efficient approach to business model design and innovation (Aversa, 2015). Basic elements of the business model are hereby modified and reconfigured by operators just as splitting of business model elements (e.g. value proposition) by identifying new products and services. The adoption of known business model elements is seen as a key capability of individuals on the micro-level within business model innovation (Loon et al., 2020) (Figure 1).

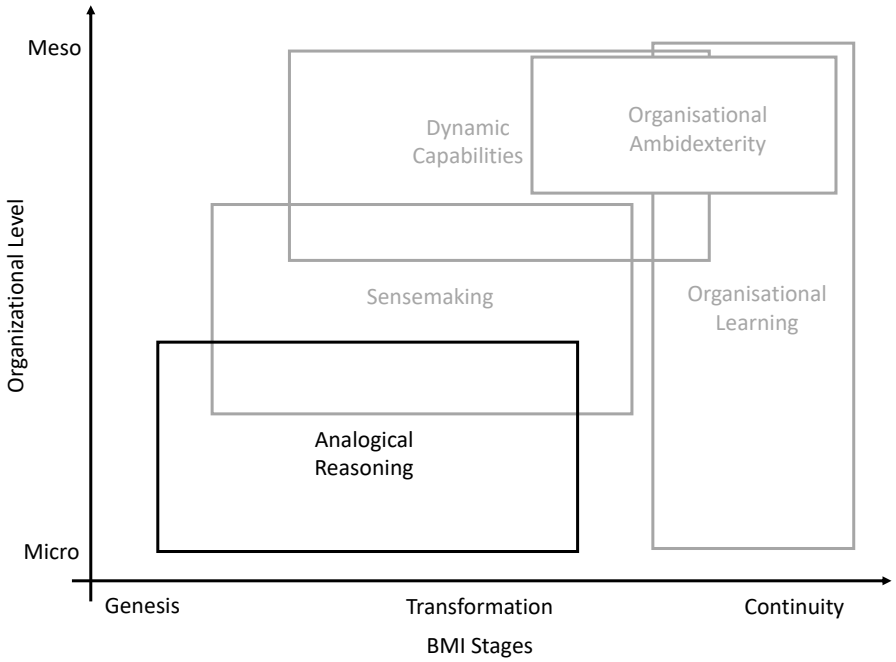

Figure 1: Analogical reasoning as a key capability in business model innovation (Loon et al., 2020)

Analogical reasoning in BMI and possible design fixation

Managers involved in business model innovation face a series of cognitive barriers during the innovation process (Frankenberger et al., 2013; Täuscher and Abdelkafi, 2016). Managers should aim to generate several creative ideas outside of the dominant logic, thinking "out of the box". The cognitive ability of analogical reasoning is hereby seen as a crucial capability on the individual level within new (i.e., new to market and industry) business model design (Loon et al., 2020). Analogical reasoning is understood "as the application of structured knowledge from a familiar domain to a novel domain" (Martins et al., 2015). Early on, cognitive psychology demonstrated that solutions to problems can emerge using examples from different domains. For example, Gick and Holyoak (1980) demonstrated the influence of stories from military operations as a means for analogical problem-solving in the medical field. Following Yilmaz et al. (2016) analogies lead to a more thorough and extensive search of solutions in a solution space that is not limited to obvious solutions (Figure 2).

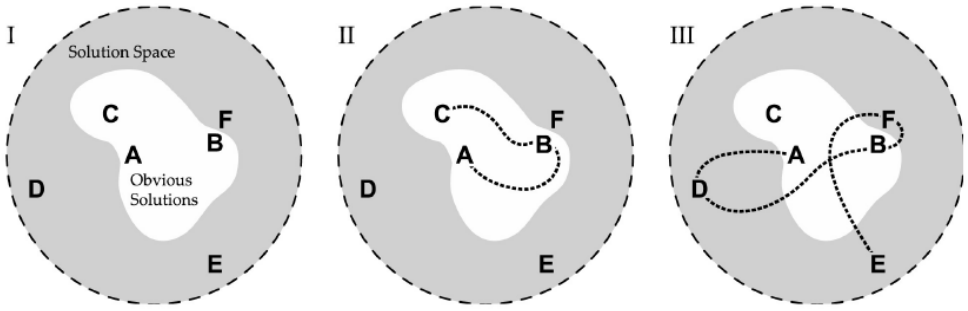

Figure 2: Possible solution space (I), typical path in ideation (II) and suggested impact of analogies (III) (Daly et al., 2016)

However, maladaptive "defence mechanisms" can emerge (Bovey & Hede, 2001), filtering information that is not aligned with the dominant business logic (Chesbrough, 2010). This phenomenon is directly related to the cognitive barrier of "design fixation", which occurs when the "exploration of the solution space is unintentionally constrained by designers' knowledge of prior solutions" (Crilly, 2018, p. 52). Design research has studied the use of analogies during ideation to reduce design fixation. Despite the potential danger of being stuck with known solutions, design by analogy has proven to be effective to generate novel and high-quality ideas (Moreno et al., 2016). In the domain of business model design, the research on this topic is in its infancy.

Business Model Patterns

Business model patterns have been popularized in traditional management fields thanks to Osterwalder & Pigneur (2010) and Gassmann et al. (2014), and have been explored prominently in the field of sustainable business models (Bocken et al., 2014; Lüdeke-Freund et al., 2018).

Patterns deliver *"insights into design problems, capturing the essence of recurring problems and their solutions in a compact form"* (Chung et al., 2004, S. 233) and have already proven to be efficient and valuable for systematic innovation (Bocken et al., 2014; Lüdeke-Freund et al., 2019; Ebel et al. 2022). Following Lüdeke-Freund et al. (2018), pattern classification is useful in a variety of dimensions (e.g., storing information, simplifying cognition, providing a basis for midrange theory, inspiring creativity, and guiding practitioners).

Business model patterns classifications have been transferred into cards by several authors (e.g. Gassmann et al., 2014), to facilitate the conceptualization of novel business model configurations in workshop settings with practitioners (Figure 3).

Figure 3: Pattern cards for use in workshops (e.g., Yilmaz et al., 2016; BMI Lab, 2022; Ebel et al., 2022; Breitfuss et al., 2020; Santa-Maria et al., 2021)

Method

To explore the use of patterns within business model innovation activities we have applied a multiple case study approach and used patterns within different workshop scenarios (Yin, 2014, Bocken et al., 2015). Hereby student groups, as well as practitioners, participated (see Table 1). We analyzed the results of three independent business model innovation workshop designs that apply three different sets of pattern cards to support analogical reasoning within an ideation activity. Each of the three authors has been independently involved in the design, testing and refinement of a set of pattern cards and has facilitated the workshops considered in the study. In total 12 online workshops, involving 166 participants divided into 28 groups were considered for this research (see Table 1).

The first case considers the use of 7 circular business model pattern cards to support the ideation of novel circular business models, within the "Circular Sprint" design thinking-based innovation process (Santa-Maria et al., 2021). The second case considers the use of 12 smart service pattern cards to support the ideation of value propositions within the "Pattern-Based Smart Service Innovation method" (Ebel et al. 2022). The third case considers the application of 55 "Data Service Cards" (Breitfuss et al., 2020) to facilitate the process of developing data-driven service ideas, use cases or business models. The 55 cards are grouped into 5 main categories, each describing a key

element of a data-driven business model (i.e., Data Sources, Data Analytics, Data Service, Benefit, and Revenue Models).

Table 1: Case and workshop descriptions

Case	Pattern usage	ID	Workshop setting	Goal	Participants profile	Ideation activity	Participants count	Groups count
1	Ideation supported by 7 circular business model pattern cards	A	Academic conference	Improve the sustainability impacts of urban mobility in the city of Graz using circular patterns	15 researchers, 5 private sector practitioners, 2 public sector representatives and 1 non-profit employee	30 min	24	5
		B	Master students course	Improve circularity and sustainability of 4 real case studies	Students of Master Circulaire Economie, HAN University of Applied Sciences, Netherlands	25 min	29	4
		C	Master students course	Improve circularity and sustainability of 3 circular business model case studies	Master students in the course Sustainable Business Models, University of Graz, Austria	20 min	20	3
		D	Workshop with a Start-up	Develop a business model based on a waste-to-bioplastic technology	CEO, trainee, advisor, mentor	40 min	4	1
		E	Workshop within a corporate project	Develop a business model based on EVB second-life technologies	Representatives of 5 project partners (4 private companies and 1 public agency)	45 min	8	1
2	Ideation supported by 12 smart service pattern cards	F	Workshop with SME in manufacturing	Customer-centric smart service innovation	Teamlead R&D, Senior Developer, Lead Product Management, Product Manager, Innovation Manager, Service Manager	30-40 min	6	1
		G	Workshop with SME in manufacturing	Customer-centric smart service innovation	Consultant, Project Manager, Technical Director, After-Sales Manager, Project Lead, Sales Representative	30-40 min	6	1
		H	Workshop with SME in manufacturing	Customer-centric smart service innovation	Service Manager, Product Manager, Customer Interaction Manager	30-40 min	3	1
3	Ideation supported by 55 data service cards	I	Workshop within a collaborative research project	Development of data-driven use cases	6 researchers, 2 consulter	90 min	8	1
		J	Master students course (automation engineering)	Development of data-driven use cases	32 part-time students, all participants are full time employed in various industry companies	150min	32	5
		K	Master students course (business admin.)	Development of data-driven use cases	16 full-time students	120 min	16	4
		L	Workshop within a collaborative research project	Development of data-driven use cases	8 researchers, 2 SME employees	120 min	10	1

The ideas generated in each of the ideation activities were documented and analyzed, to explore the study workshop output. In addition, a feedback survey with open-ended qualitative questions (Case 1 & 3) or interviews (Case 2) was conducted with participants. The present research-in-process manuscript considers an initial content analysis of the qualitative data from the surveys.

Results

Different approaches to using patterns within business model innovation

Three distinct methods of applying pattern cards to support ideation activities were identified, which have implications for the activity outputs. The descriptions follow.

In the first case, within a broader workshop that at least considered an introduction to circular economy business models and a problem exploration and re-definition phase, the ideation activity consisted of 30 to 45 minutes of brainstorming supported by the seven circular business model pattern cards. After 10-15 minutes of individual silent brainwriting, an open discussion to build and expand on each other's ideas followed, closed by clustering and then voting activity. The use of the patterns was not enforced, only suggested for inspiration.

In the second case, after an exploration phase to capture a customer's problem, the twelve smart service pattern cards were used to generate ideas. In the workshop, which was accompanied by a video meeting and a virtual whiteboard, the sample cards were first briefly presented to all participants. After that, the participants were each assigned 4 of the 12 pattern cards. The activity started with 7 minutes of silent brainwriting to generate as many ideas for new service concepts as possible with the help of the four assigned patterns. After a first round, participants briefly presented their ideas to the group. In a second round, the participants were then allowed to build on the ideas presented to them from the first round and were asked to generate further ideas in a second ideation round. In a final step, the ideas generated were discussed and clustered.

In the third case, the 55 data service cards were applied. At the beginning of the workshop, the card-set were introduced by explaining the characteristics of the cards and the main categories via an online whiteboard tool. In the workshop participants were divided into sub-groups (4-6 participants) and had to complete two tasks. First, the participants were asked to reconstruct and extend a well-known data service (e.g., Netflix) using the cards. In the second task, the participants developed new data-driven service ideas for a fictitious company. Finally, the participants presented their ideas and results.

Evaluation results on pattern usage

The most relevant insights from the initial qualitative analysis of the feedback surveys and interviews, including exemplary quotes, follow.

First and foremost, our analysis shows that, overall, pattern usage in business model design has a positive contribution to creativity.

"I find this tool very helpful, especially if you have no experience in this area." (Case 3)

"The whole process of brainstorming and implementation is not only made easier but also more exciting." (Case 3)

However, the risk of idea fixation and possible restrictions on creativity was mentioned by some participants after using the patterns.

"It was useful to get a first idea on possibilities, but it's very easy to keep hanging on to those ideas instead of getting more creative. "(Case 1)

"Especially with inexperienced users, I can imagine that creativity could be somewhat restricted [...] by only searching within the proposed solutions." (Case 3)

As noted by some participants, time constraints seemed to particularly discourage them from using patterns.

"Cards are inspiring, but I would say that they [...] were just additional information that could not really be used due to the limited time." (Case 1)

Concerning time constraints, a clear allocation of a subset of patterns, or enough time to prepare participants can improve outcomes.

"That everyone focused on one group [of pattern cards] and not everyone kind of ran off in the same direction. That was quite helpful." (Case 2)

With regards to the presentation of the cards, it became apparent that participants used patterns differently. Especially the title, visualizations, explanation text and relevant practical examples seemed helpful.

"The title already gave me such an impulse and in combination with the examples it was actually enough for me. I didn't read the complete text in the workshop." (Case 2)

Outlook and Conclusion

By comparing the cases, it was found that patterns can be used in various ways. On the one hand, they can be presented as a rather open and possibly subtle source of inspiration, to stimulate divergent thinking. On the other hand, they can be used to actively encourage participants to use patterns to systematically generate modular solutions, through convergent thinking. Furthermore, the third case shows that patterns can be used both ways, boosting ideas and structuring ideas into concrete use cases. In Table 2 the different approaches are shown. It is important to add that there is no evidence yet on which approach is most helpful, nor whether these approaches can be combined.

Table 2: Three approaches to applying pattern cards to support analogical reasoning in an ideation activity

Approach	Description	Questions occurring

Suggested usage	Pattern cards are just seen as a possible means that can be used for ideation purposes.	How to investigate the effect of the patterns?
Prescribed usage	Participants are expected to develop ideas using specific pattern cards.	Is a possible design fixation more likely?
Process model	Pattern cards follow a complementary logic that also proposes a procedural application.	How to separate the effects of the process and the patterns?

Despite the approach used, the evaluations showed that participants perceived patterns as useful and easy to use. The cards allowed not only to "copy and adapt" patterns into the respective context but to allow new ideas to emerge, not necessarily associated with the patterns. Our empirical results support that patterns stimulate the cognitive process of analogical reasoning within idea generation in a predominantly positive way. Very few participants expressed concerns about design fixation or creativity restrictions. However, based on the initial results, this can only be formulated as a hypothesis that needs to be tested in future projects.

H1: Business model patterns support to a high degree the process of analogical reasoning and hardly lead to design fixation.

As a first theoretical implication, we argue that analogical reasoning is a relevant cognitive skill for business model innovation and can be applied through the use of business model patterns. Here, we have critically reflected on why it can be useful to structure knowledge in the form of pattern cards, and how this knowledge can be applied to support ideation in workshops, despite possible design fixation. In this way, business model patterns were given a further theoretical foundation, which until now has often only been anecdotal and based on practical experience.

As a second theoretical implication, our case study sheds light on the different understandings of business model patterns. Even if participants of mentioned workshops considered patterns as helpful, it was difficult to compare insights between cases. A clear delimitation and description, or even classification, of business model patterns, may be needed to make this possible. Leitner's pattern theory (2015) could help here, for example. As Abdelkafi (2013) has already pointed out, patterns can take on different levels of granularity in the context of business model innovation, and the number of patterns can quickly become confusing (Remane, 2017; Weking, 2018). In addition, it should be clarified to what extent their use and approach differ by domain.

Concerning possible design fixation, we discussed empirical findings from related, though not directly comparable, workshop settings. Through the three case studies, it became clear that patterns can be used very differently in the business model design process and that patterns themselves can also be understood differently. To be able to make more valid statements about possible advantages and disadvantages (i.e., about possible design fixation), there is a lack of studies that attempt to answer precisely this question for business model patterns. Even though we could only marginally contribute to this question, it offers the opportunity to address the question in future work and to further test our hypothesis. Therefore we look forward to rigorous experimental studies within the field of pattern cards. Interesting open research questions may

relate to the field of optimal processes to use pattern cards, influence on novice as well as experienced innovators and different ways of presenting and structuring pattern cards.

As a practical implication, we conclude that the use of business models patterns cards in workshop settings can be seen as helpful for business model design, especially when knowledge within the domain is rare. Nonetheless, patterns should only be seen as stimuli for new ideas. Their use should not lead to a false sense of confidence that business models developed with the help of patterns are undoubtedly desirable, feasible, and viable in the particular context of a specific organization.

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A business model innovation tool to explore opportunities for sustainability

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Abstract

Digital transformation, climate change and the recent Covid-19 pandemic crisis have heightened the awareness of companies, academics, and policy makers on the need to explore and exploit more sustainable forms of value creation, delivery, and capture. However, innovating business models is not a simple task, as every company approaches the challenge from different maturity levels and approaches. In response, researchers have recently highlighted the importance of business model innovation tools.

Moreover, business model innovation is very much subject to the regional and competitive context in which the firm is situated. Regional priorities and policies, as well as the networks and support for innovation that the company has in its area of activity, are key to fostering this transformation. Thus, it is essential to develop tools that support business model innovation from a sectoral and regional perspective, taking as a reference the competitive reality of a territory, as well as its public policies.

Building upon the Alexandrian pattern theory and following the Research Design Methodology that comprises a systematic literature review and a multidimensional scaling analysis of a sample of 216 companies, this document presents a tool that can help organisations and policy makers to assess and explore 28 business model patterns documented from the sectoral needs and strategic priorities of a region.

Keywords

Business model, innovation, tool, business model patterns, sustainability

Introduction

Today's competitive environment requires incumbent firms to strategically adapt their business models (BMs) to meet emerging challenges while maintaining a sustainable competitive advantage (Peñarroya-Farell and Miralles, 2021). Digital transformation, climate change and the recent Covid-19 pandemic crisis have heightened the awareness of companies and policy makers on the need to explore and exploit more sustainable forms of value creation, delivery, and capture. To address these challenges, researchers have recently highlighted the importance of business model innovation tools (BMITs) (Bocken et al., 2019; Pieroni et al., 2021). BMITs cover a wide range of methods, frameworks, or templates that serve different purposes within the business model innovation (BMI) process, such as exploration, analysis, ideation, design and evaluation (Bouwman et al., 2020; Massa et al., 2017). Among the different approaches and tools existing today, BM patterns seem to be key elements of the BMI process (Lüdeke-Freund et al., 2018, 2019; Pieroni et al., 2021; Remane et al., 2017).

Building upon the Alexandrian pattern theory (Alexander, 1977), BM patterns are described as BMITs for identifying, classifying and documenting problem-solution mechanisms or best practices (Lüdeke-Freund et al., 2018, 2019; Pieroni et al., 2021; Remane et al., 2017). BM patterns allow organisations to be inspired by successful business cases, which can help them to challenge the current dominant logic and help them to understand and learn from existing solutions, serving as analogies for creative imitation (Gassmann et al., 2020; Remane et al., 2017). Therefore, BM patterns are considered to support strategic decisions, reflective governance and innovation activities within organisations (Sarasini and Linder, 2018).

Despite progress in BMIT development, existing approaches are still general, conceptual and offer a limited practical application (Bocken et al., 2019; Pieroni et al., 2021). Moreover, companies still struggle to think in terms of BMs rather than technologies, products or processes (Frankenberger et al., 2013). Furthermore, BMI is very much subject to the regional and competitive context in which the firm is located. Regional priorities and policies, as well as the networks and support for innovation that the company has in its area of activity, are key to fostering this transformation. Therefore, easy to use BMITs that support companies in decision-making and configuration of BMs for specific sectorial and regional challenges are still required (Pieroni et al., 2021).

As part of an ongoing research, this short paper, responds to the call for "knowledge for action" (Lüdeke-Freund et al., 2019, p. 29), applying the BM pattern language to develop a practical BMIT. The tool seeks to guide companies in the assessment and exploration of BMI opportunities aligned with the strategic priorities of a specific region, through the characterisation of current and potential business models that can be economically-, socially-, environmentally-oriented or some combination of the three aspects. In the following lines, the method followed to define, develop, and test the BMIT, and the preliminary results of the research are presented.

Method

In line with other studies on sustainable BMITs, this ongoing research has adopted the Design Research Methodology (Blessing and Chakrabarti, 2009; Pieroni et al., 2021). The following lines describe the four stages (Figure 1) that comprise the method:

1. Criteria definition: Defines the research objective and the measurement criteria

The aim of the research project is to develop a BMIT that guides companies towards BMI for sustainability. The BMIT should allow companies to discover and implement sustainability opportunities to innovate their BMs according to the strategic priorities of an European region (Gipuzkoa, Basque Country). Based on the *Regional Innovation Smart Specialization Strategy* of the Basque Country and the *Strategic Plan* of Gipuzkoa, sustainability opportunities (economically-, socially- and/or environmentally-oriented) opportunities are explored based on six strategic areas: Competitive Strengthening, Smart Industry, Resilience to Covid-19, Digitalisation, Servitisation and Circular Economy.

The BMIT should meet the following criteria: 1) Enable the self-assessment of organisation's BMs, 2) visualise current and potential BM patterns of different sectors in different strategic areas, 3) describe the innovative potential of each pattern, its impacts, and challenges, and 4) show the interrelationships between different BM patterns to help companies establish pathways towards BMI.

2. Descriptive Study I: Establishes the requirements for the development of the BMIT.

First, the methodology for designing a self-assessment tool and characterising current and potential BM patterns is defined. Building upon the systematic literature review of journal articles on BM patterns conducted by Ibarra et al. (2021), the methodology suggested by Amshoff et al. (2015) and lately adopted by Curtis (2021) and Pieroni et al. (2021) was chosen as the most suitable approach to address this task. This method involves 1) the definition of a framework comprising the BM configuration options to be analysed, 2) the collection of data from a sample of companies based on the elements of the framework and 3) the application of the multidimensional scaling analysis to map recurring BM configuration combinations in the sample.

Second, the design specifications for the development of the BMIT were established (Pieroni et al., 2021). For that purpose, Research projects, organisations and websites providing BMITs were studied including *The Circit Research Project* (https://circitnord.com/), The Business Model Navigator (https://businessmodelnavigato r.com/), *Business Model Zoo* (https://www.businessmodelzoo.com/), *Strategyzer* (https://www.strategyzer.com/), *The Business Model Toolbox* (https://bmtoolbox.net/) and *Sustainable Business Model Design* (https://www.sustainablebusiness.design/). Additionally, the checklist for BMIT development suggested by Bocken et al. (2019) was adapted to ensure that the tool was rigorously developed and tested, was adaptable to different business contexts, easy to use and inspires BMI for sustainability.

3. Prescriptive study: Conceptualization and development of the BMIT.

Considering the requirements established in the second stage, the key functions and architecture of the BMIT were specified. The number of sections and the navigation between them was defined. The functionalities of each section were defined, describing the content of each section and the steps that users must take in each of them to exploit the potential of the BMIT. Finally, the logic

and scalability of the BMIT was ensured. Front-end, back-end, requirements for responsive web, platform administration and data logging were established.

4. Descriptive Study II: The tool is tested and validated.

In this last stage, the BMIT was validate considering three aspects: 1) the usability of the website (comprehension, content structure and navigation logic) and its performance, 2) the reliability of the results obtained in the self-assessment module, and 3) the relevance, interest, and usefulness of the tool for organisations.

As the present study is part of an ongoing research, the BMIT is currently being tested with two participants: 1) The social innovation process manager of a Social Foundation that promotes the 2030 Agenda at county level, and 2) a specialist engineer of a manufacturing firm dedicated to the development and manufacture of automation and machine control products. These companies were selected as representative of the region.

Data was collected during a workshop. Participants interact on their own with the different modules of the BMIT for an hour while two researchers observe and take notes. Then, an interview of half an hour was conducted with each participant to discuss the results of the analysis and collect suggestions and improvements.

Results

This section shows the results obtained in the stages described so far.

Methodology applied for the development of the BMIT (Descriptive Study I):

Based on the analysis of 38 studies identified by Ibarra et al. (2021), a research framework containing eight BM dimensions was defined: 1) offering, 2) value proposition, 3) customers and market segments, 4) key communication and distribution channels, 5) key activities, 6) key resources, 7) key stakeholders and 8) revenue mechanisms. For each dimension, potential configuration options were specified. To analyse and map the BM patterns in the Region of Gipuzkoa, a random sample of 216 companies was selected from the SABI database (Li et al., 2011). Based on secondary research (i.e., corporate websites and annual reports), the configuration options used by each firm in their BMs were compiled into a binary table. A total of 49 configuration options were obtained through several iterations including expert contrast and the results of the empirical analysis itself. These configuration options were used to develop the self-assessment tool. To map the BM patterns of Gipuzkoa, multidimensional scaling was used to analyse the binary table with the XLSTAT software. Multidimensional scaling is a statistical analysis that provides a visual representation of the pattern of proximities (i.e., similarities or distances) between a set of objects. Configuration options with a high similarity value were visualised on a two-dimensional map, creating different BM patterns (Figure 6). A total of 28 BM patterns were identify after triangulating the empirical data with existing BM patterns from literature. Each pattern was then described following the Alexandrian pattern language, i.e.: pattern name, problem statement, context description, solution statement, real case examples and related patterns (Figure 1).

Strategic area	Pattern name	Context description	Problem statement	Solution statement	Case examples	References
Resilience to Covid-19; Circular economy	0 Km	In today's economy companies products travel long distances from their place of extraction/production to the point of final use/sale.	Negative environmental impact, energy consumption and waste generation associated with transport. Covid-19 has triggered relocation decisions due to supply failures	Use of local resources in a geographically close environment (for example, at a distance of less than 100 km), eliminating intermediaries and encouraging new forms of exchange and cooperation.	Baserriak KM (https://www.baserriakm0.com/)	Takacs et al., (2020); Garcia (2016)

Figure 1: Example of BM patterns' definition

Conceptualisation and development of the BMIT (Prescriptive Study):

The final BMIT prototype is named NEBA and includes four modules (Figure 2), around a landing page with a short presentation of the BMIT and the sections the user can access.

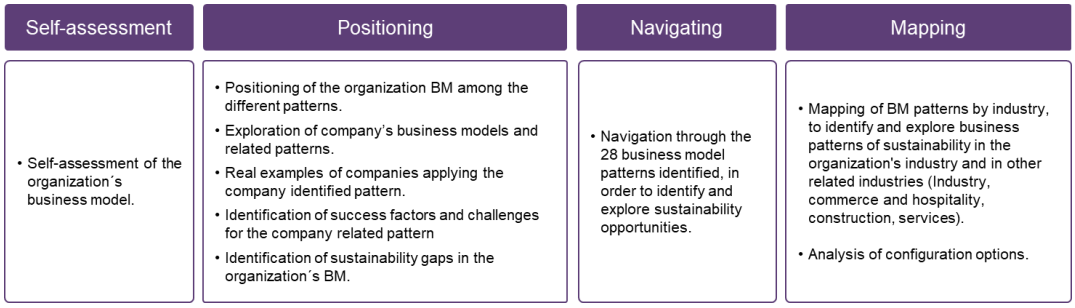

Figure 2: NEBA tool modules

Self-assessment:

The self-assessment module was developed in the form of a questionnaire divided into eight blocks. Each block includes a question that corresponds to one of the eight dimensions of the BM. For example, the question for the dimension Value Proposition is: *What is the differential value of your organisation's offer? What makes customers choose your organisation over the competition?* Users can select all those answers that are part of their main offer, which represent the configuration options (from the 49 options identified) corresponding to that dimension. For example, in the case of Value Proposition, seven responses are shown: 1) Quality, 2) Branding, 3) Design, 4) Customisation, 5) Integral solutions, 6) Sustainable/Circular, 7) Experience selling. Each answer includes a brief explanation to make it easier for users to understand. E.g. *Quality* is defined as follows: *Quality raw materials, products, and services, based on efficient and cost-competitive processes.* At the end of the questionnaire, companies can see the BM patterns associated with their answers. Companies can go deeper into each pattern by selecting them.

Positioning:

This module positions the organisation within a specific business model pattern, out of the 28 patterns registered in the BMIT. As shown in Figure 3, the identified pattern is accompanied by an image, a name, and a brief description. The description was adapted from the problem and solution

statements described in the worksheet (see Figure 1) to provide a more understandable language for firms and a more user-friendly solution within the NEBA online tool.

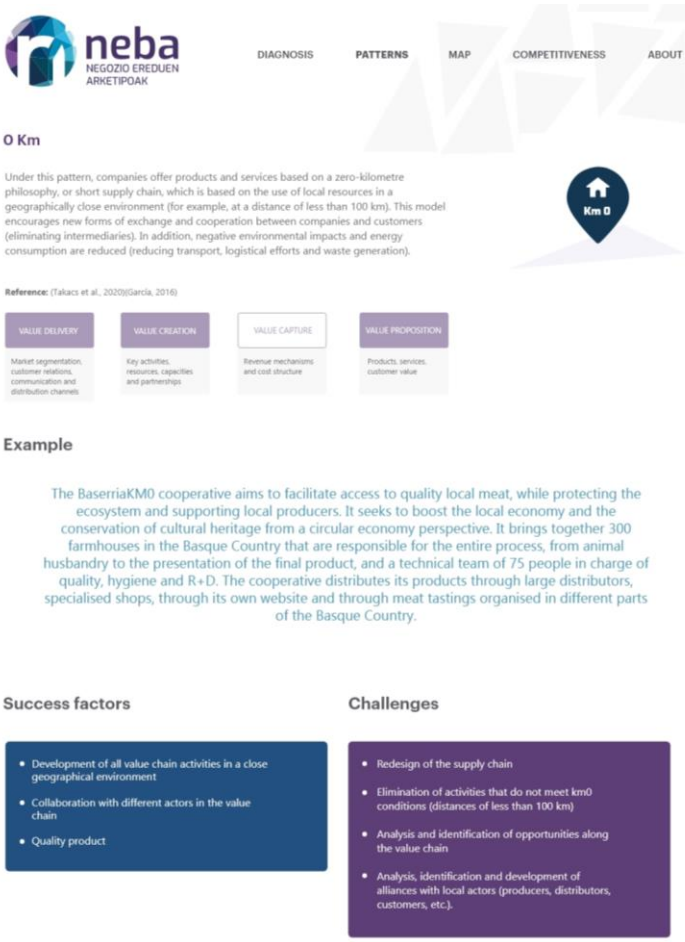

Figure 3: NEBA Positioning: Pattern identified

The module also describes the key BM dimensions affected by the pattern, real examples of companies that are categorised under this pattern and the success factors and challenges related to it, which represent key aspects related to sustainability and other European challenges for the region.

Finally, the module shows other related patterns (Figure 4), in order to encourage organisations to explore and analyse business model opportunities and establish pathways towards BMI.

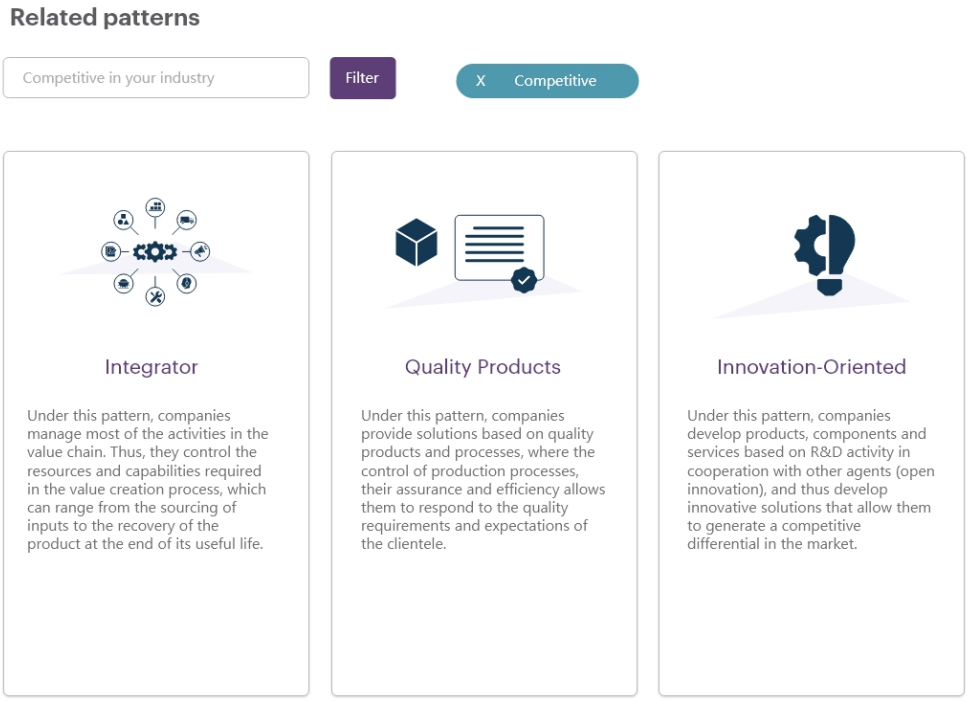

Figure 4: NEBA Positioning: KM-0 BM related patterns

Navigating:

This module contains the description of the 28 identified BM patterns. The section contains descriptive text about their content and functioning. The patterns are described with a picture, a name, and a short description. These patterns can be filtered by sector and by strategic area. The sectors by which the patterns can be filtered are: Industry, commerce and hospitality, construction, and services. On the other hand, the strategic areas by which the patterns can be filtered are: Competitive Strengthening, Smart Industry, Resilience to Covid-19, Digitalisation, Servitization and Circular Economy.

In Figure 5, the industry sector (purple) and circular economy strategic area (green) filters are applied. Users can select a pattern for a more detailed description.

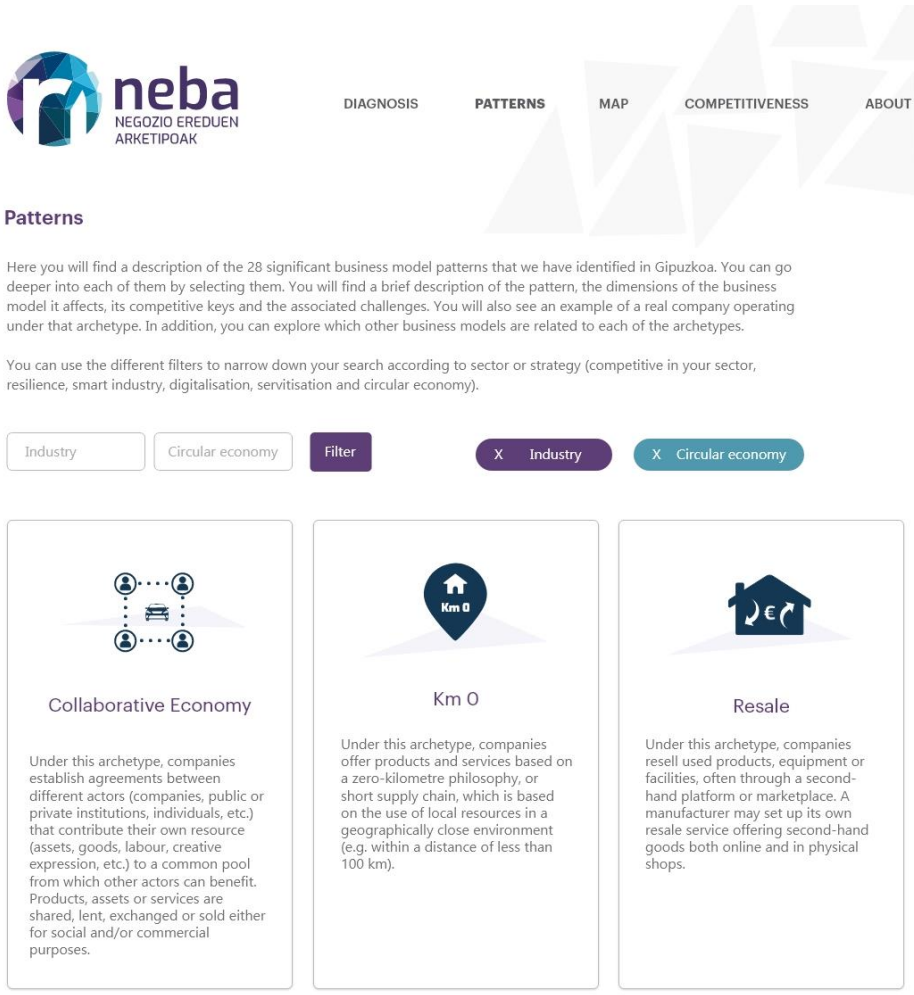

Figure 5: NEBA Navigating

Mapping:

This module presents the results of the multidimensional scaling analysis. Figure 6 shows the map obtained from the analysis of the Industrial sector, which contains 11 of the 28 identified patterns, and the configuration options characteristic of each of the patterns.

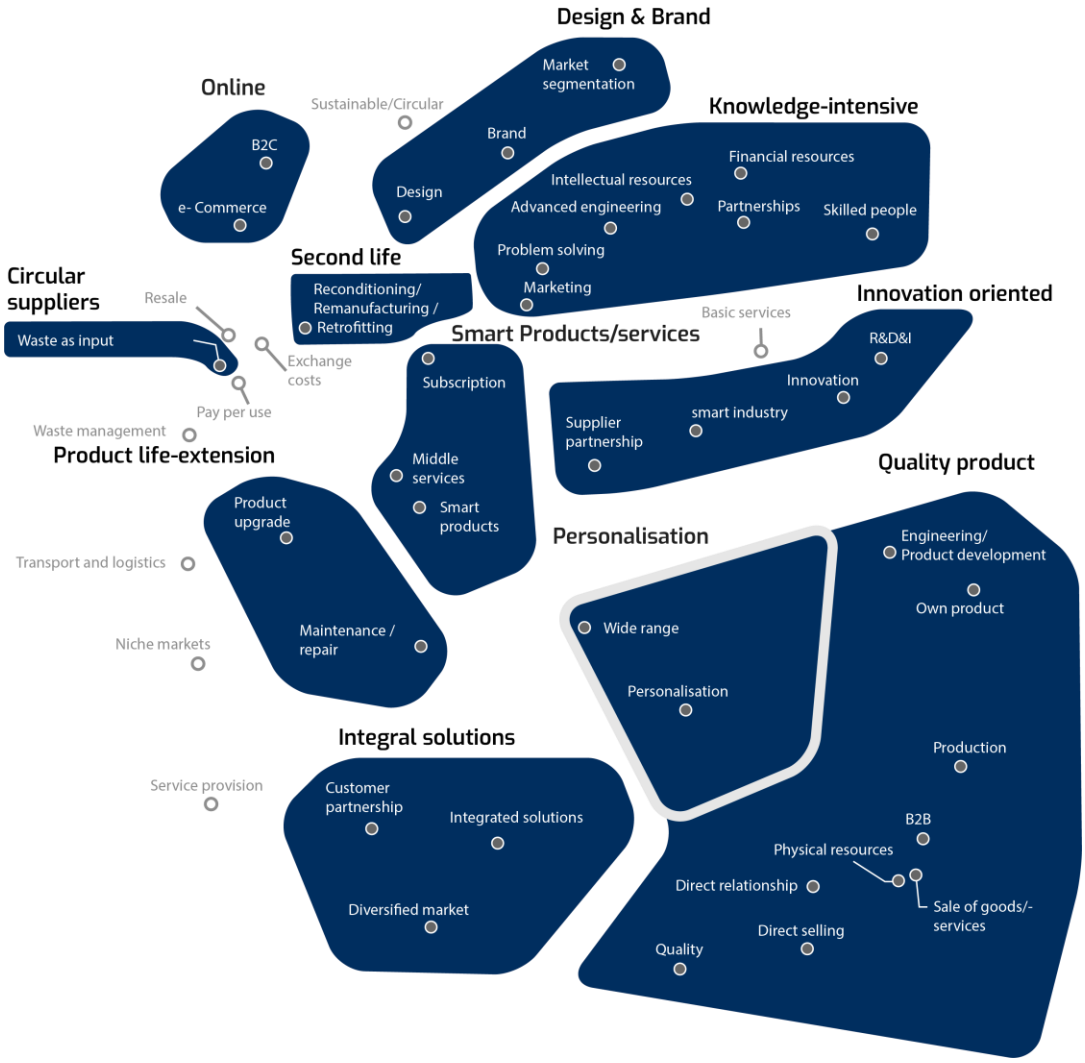

Figure 6: NEBA Mapping (BM patterns in the industry sector)

Test results, suggestions, and improvements to the BMIT (descriptive Study II)

Overall, the BMIT was considered easy to use. Minor changes in navigation and the need for additional information in certain sections were identified. The results obtained in the *Self-Assessment* and *Positioning* modules were rated positively by the participants, confirming that the results reflected their BMs. The Social Foundation's process manager commented on its usefulness: *"It is a useful tool to understand our BM, how we are positioned and to reflect and think about how to move from one pattern to another".*

Certain aspects for improvement have also been identified. In the case of companies with more than one business unit and diverse activities , the self-assessment resulted in too many patterns that although being representative of the companies' BMs, made it difficult to understand and use the BMIT (this is the case of the manufacturing company). Moreover, the BMIT aims to represent the BMs of the industrial fabric of Gipuzkoa's region. Thus, it does not accurately capture patterns of organisation that prioritise the creation of social value (e.g. educational centres or foundations).

Finally, it is considered that NEBA can be used autonomously by organisations when they have sufficient knowledge and understanding of BMs. However, companies with little knowledge may

require facilitation and guidance from an expert to use the BMIT and exploit its full potential. An intermediate solution to maintain autonomy would be to include a training module.

Conclusions

This short paper presents the process followed to define, develop, and test a BMIT that seeks to support organisations in the assessment of their BMs and the exploration of current and potential BM patterns.

The BMIT is based on data obtained from local companies and refers to the strategic priorities of the region. Thus, the BM patterns identified are representative of the sectoral and regional reality. Moreover, to the author's knowledge, it is the only BMIT in the literature that provides a self-assessment tool that suggests to the company its positioning with respect to its BM.

The BMIT enables organisations to raise awareness and reflect on BMs. Companies can self-train themselves on the basis of real cases closer to their context and situation. In addition, it provides practical support for companies to identify sustainability opportunities, devise new BMs and share them within the organisation. In turn, policy makers can learn about existing BMs according to the strategic priorities of the region, identifying opportunities and gaps that will help them in the formulation of their innovation support policies. As academic contributions, the process followed in this research can be replicated and extrapolated to explore new BMs that can drive the transformation of socio-technical systems (e.g., collaborative or social business models). It thus contributes to the generation of further knowledge in the systematic identification, characterisation, and analysis of business model patterns as well as to the development of BMIT tools.

As this is an ongoing study, the tool has only been tested in two companies. Further validation should be carried out with a set of representative companies from the four sectors analysed. Similarly, the potential of the tool should be explored with intermediary actors and policy makers. Whether the BMIT could be used autonomously or would require expert guidance needs to be further explored. Another area for future development concerns the development of additional frameworks and templates to enable the assessment of performance and sustainable impact, as well as the design, testing, scaling up and implementation of new business models. Finally, further research is needed to examine the social, economic, and environmental impacts of the identified BM patterns.

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How To Do More With Less: A Sufficiency-oriented Innovation Process for Business Practices

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Extended abstract

Sufficiency principle advocates for the transformation of both production and consumption practices towards an economy that operates within planetary boundaries (Reichel, 2018; Schneidewind & Zahrnt, 2014). Sufficiency calls for social and environmental justice, for example, through fair redistribution of wealth, universal satisfaction of basic human needs, and an absolute reduction of consumption volumes in most affluent countries in the world (Spangenberg, 2018; Wiedmann et al., 2020). Amid the ecological and climate crisis faced by humanity, economic recovery from the Covid-19 pandemic did not solely concentrate on economic growth indicators without challenging current unsustainable business activities. While the principles of efficiency and consistency have gained a lot of attention in research on circular economy, sufficiency in production and consumption practices lacks a systematic understanding and a widely shared definition. Both are essential for the integration of sufficiency in research and transition practices towards a circular economy.

Recent studies have defined businesses as sufficiency-oriented if they apply sufficiency-oriented strategies, such as sharing, open-source creation, or moderate promotion (Bocken & Short, 2016; Schneidewind & Palzkill-Vorbeck, 2011). However, businesses are social organizational forms that are more complex than lists of strategies, competitive advantages, or core activities (Massa et al., 2018). Businesses can be described as complex sociocultural phenomena that consist of various social meanings, competences, and material arrangements, which are embedded in societal and political settings (Jaeger-Erben et al., 2017). The connection and interactions between these elements create the practice of doing business. To define sufficiency-oriented businesses, it is necessary to go beyond strategies and observe the essential elements and connections that characterize sufficiency in business practices. Based on the abductive approach of grounded theory methodology (Corbin & Strauss, 1990), this study offers the first conceptual foundation to recognize sufficiency in current business practices and define essential dimensions required for the integration of sufficiency in production and consumption practices. Interviews and podcasts with businesses in the fashion and electronic sectors that experiment sufficiency-oriented strategies were analyzed through the lens of social practice theory. The examination of development paths

and current practices of businesses that experiment sufficiency strategies makes it possible to derive further research, conceptual needs, and organizational need as well as political requirements for dissemination and stabilization of a sufficiency-oriented circular economy.

The results showed that sufficiency in the business context does not correspond to a finite or static state. Rather, sufficiency in business practices consists of a social innovation process that is divided into phases such as identification of problems, experimentation of solution, and diffusion of new practices. Sufficiency emerges as the primary business purpose that aimed to counteract the problematic path-dependencies of affluence and growth imperative. During the innovation process, three fundamental sufficiency elements shape and influence the development of all sufficiency-oriented business practices: answering basic human needs, clustering production and consumption spaces, and projecting an end to material growth.

First, sufficiency practitioners design their products and services to satisfy basic human needs for good life rather than superfluous consumer wants. When focusing on the fulfillment of human needs, sufficiency practitioners select products and services that are strictly necessary and limit the production volumes to avoid excesses. In addition, by focusing on community needs, sufficiency practitioners find service solutions that entirely avoid new material production. Second, sufficiency practitioners cluster their consumption and production space to limit transport distances and create long-term and trustful relationships with stakeholders. Regional embeddedness plays a relevant role for sufficiency practitioners who do not envision the world as endless market opportunities that need to be conquered. Finally, sufficiency practitioners acknowledge the limitations of endless materials and financial growth. They expect to stop growing in organizational capacity and material production once a legitimate market size has been reached. The prosperity of a sufficiency-oriented ecosystem is more important than its organizational growth. Hence, collaboration with like-minded sufficiency-oriented partners is essential to the spread of sufficiency in society.

The sufficiency-oriented innovation process is without consequences for the role businesses play in society or the definition of value creation. Sufficiency practitioners in their innovation process rethink and question the fundamentals of business, which leads to redefinition of their practice not as doing business but as doing sufficiency. Sufficiency-oriented businesses serve society, the environment, and stakeholders. The purpose of collective impact with reduction of production and consumption volumes and creation of a safe operating space within planetary boundaries prevails over shareholder profit maximization. Collective value does not arise from the aggregation of individual successful businesses but from the participation in a collaborative and solution-oriented ecosystem. Sufficiency creates a variety of values beyond products, services, and financial revenues. Knowledge, education, consumer awareness, supply chain transparency, competences, and infrastructure to care for long-lasting material use are some of the values that sufficiency practitioners contribute to their communities. Sufficiency ensures the following: the ownership of an organization stays within sufficiency-oriented stakeholders; the purpose of sufficiency is integrated in organizational structures, and the financial revenues are reinvested in the sufficiency-oriented ecosystem.

However, sufficiency-oriented innovation process show ambivalence between the desire to integrate sufficiency into business practices and dominant growth-oriented capitalist norm. For

example, practitioners still lack success indicators that monitor their progress towards sufficiency. Successful business continues to be evaluated according to sales, market share, or revenue. Individually, the impact of sufficiency practitioners on achieving global reduction in material consumption is limited. Collaboration and ecosystem growth are currently the only possibilities for sufficiency practitioners to influence economic and political spheres and increase their societal impact. Thus, further research should concentrate on potential transformation paths of entire sufficiency-oriented networks and ecosystems so that the practice of doing sufficiency successfully disseminates and stabilizes in society.

Keywords

Sufficiency, Social Practice Theory, Circular Economy, Production and Consumption Practices, Social Innovation Process

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A business model patterns perspective on organizational value logics for degrowth

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Extended abstract

Organizations are exacted to both deal with change and change the deal for new ways of doing business. Particularly since, as Khmara & Kronenberg (2018: 722) point out, business activities are "a key driving force behind economic growth" while humanity approaches planetary and social limits of growth (Alvaredo et al., 2018; Steffen et al., 2015). Against this background, degrowth emerges as a new sustainability paradigm, a social movement, and a field of research focusing on how modern societies can become less dependent on economic growth and more future-proof in a socially sustainable way (Asara et al., 2015; Weiss & Cattaneo, 2017). However, while research on degrowth at the level of organizations is growing, it is dispersed and often builds on case studies that are predominantly explorative, presented in various formats, and set diverse foci (e.g., Bloemmen et al., 2015; Bradley, 2018; Schmid, 2018).

For gaining actionable knowledge on degrowth at the level of organizations, research on sustainable business models (SBM) provides relevant conceptual perspectives (Boons & Lüdeke-Freund, 2013). Business models present organizational designs and logics for value creation (Laasch, 2018). Khmara & Kronenberg (2018) as well as Hankammer et al. (2021) have begun to show that the conception of business models can be made fruitful for alternative economic paradigms such as degrowth.

However, a key aspect of applying the conception of business models to degrowth has not yet been sufficiently addressed. In fact, degrowth puts into question one of the most fundamental business model concepts: organizational value creation. That is because degrowth calls for a deep socio-ecological transformation. A transformation that fundamentally questions the classic understanding in mainstream business model literature according to which value creation – ultimately meaning value-added and, thus, growth – should be the primary objective of businesses and the business models they employ. While business models for sustainability extend this understanding of value creation, adding aspects of social and ecological value creation to it, they do not clearly and consistently alter it. Therefore, if value creation does not refer to the creation of

products or services for which an economic value-added can be realized, we are faced with the following research question: What do value and value creation refer to in the context of degrowth?

To identify degrowth-oriented forms of value creation, we use the concept of business model patterns (see, e.g., Abdelkafi et al., 2013; Remane et al., 2017; Lüdeke-Freund et al., 2018). A concept which is based on the architect and design theorist Christopher Alexander (1979), who understood and studied patterns in well-designed architecture as recurring problem-solution combinations. In line with this, Lüdeke-Freund et al. (2018: 148) have defined that a sustainable business model (SBM) pattern "describes an ecological, social, and/or economic problem that arises when an organization aims to create value, and it describes the core of a solution to this problem that can be repeatedly applied in a multitude of ways, situations, contexts, and domains." For example, sharing can be a solution to the inefficient use of idle resources.

Building on the notion of SBM patterns, we operationalize the phenomenon of organizational value creation through the conception that value is created when organizational activities interact in such a way that conditions, which certain stakeholders consider problematic, are (re)solved. It is important to note that the stakeholders concerned can include the focal organization itself. This rather generic and open understanding of value creation allows for inductively elaborating the meaning of value and the related forms of value creation in degrowth-oriented business models.

Building on this preceding conceptualization, we follow (Snyder, 2019) and engage in literature-based theory building through an integrative literature review of existing case studies on post-growth and degrowth enterprises. The research design is divided into two main phases. First, a systematic review on extant case studies on degrowth organizations has been conducted. To identify relevant case studies, this process mainly followed suggestions made by Tranfield et al. (2003). The identified single or multiple case studies have then been analyzed applying Alexandrian pattern theory (Alexander, 1979) and, in particular, the notion of SBM patterns (Lüdeke-Freund et al., 2019; Lüdeke-Freund et al., 2018). The first phase has resulted in a preliminary collection of 42 SBM patterns for degrowth. To give a brief example, the pattern 'Create moments to experience degrowth values' was found in articles written by Bloemmen et al. (2015), Bocken et al. (2020), Bradley (2018), and Chassagne & Everingham (2019). It addresses the problem that a lack of emotional knowledge and experience contributes to socially and ecologically unsustainable behavior and decision making. Here, organizations can create moments of deeper engagement by bringing together otherwise unrelated actors. For example, organizations can involve local communities in teaching tourists about the local culture and natural environment.

We are now in the second phase in which we identify forms of organizational value creation from the identified patterns and integrate these into a framework of organizational value logics. The underlying conception here is as follows: SBM Patterns for degrowth translate directly into forms of organizational value creation. Moreover, previous research has identified empirical regularities in how organizations create value for and with their stakeholders (e.g., Lüdeke-Freund et al., 2018; Bocken et al., 2014; Ritala et al., 2018). Thus, organizational value logics refer to higher level patterns in the way organizations function in creating important differences for (and with) specific stakeholders (cf., Laasch, 2018; Freudenreich et al., 2019). We are currently beginning to identify organizational value logics for degrowth, such as 'Value access: Creating inclusive access to products and services' or 'Value extension: Extending the functional value of products', to which we can assign different SBM patterns and forms of organizational value creation.

The findings of our research speak to both business model theory as well as scholars and practitioners engaged with degrowth-oriented businesses. As our research shows, the fact that degrowth radically challenges the value creation logic of modern economies is more than just rhetoric. Our research demonstrates a differentiated understanding of value and reveals new value-logics forming the essence of business models for degrowth.

Furthermore, while it is not assumed that our research will reveal a nearly exhaustive collection of SBM patterns for degrowth, it certainly contributes to building theory on organizational degrowth. According to Meredith (1993), research develops towards theory building as it cycles along phases of description, explanation, and testing. Already now our preliminary findings indicate the degrowth concept's stage of development with regards to organizational designs and value logics. The results expose knowledge gaps as well as some contradictions which must be addressed in order to develop the existing body of knowledge further. Hence, the results reveal relevant avenues for future research.

Keywords

Alexandrian pattern theory, sustainable business model patterns, value creation, degrowth.

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Ethnographic Method as a Tool for Green Business Model Innovation

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Extended abstract

While research on how new business models are developed has progressed considerably during the last decades, perspectives on how qualitative approaches such as ethnography can be applied to enhance the understanding of (green) business model innovation processes are still very limited. The focus on sustainable and green business models has been on a rise and today it is commonly agreed that combatting challenges such as climate change and poverty also requires the efforts of businesses. To understand the challenges, businesses encounter in innovating their business models towards more green versions, this paper argues that ethnographic methods can contribute additional insights on this topic and shed light on areas such as the management and leadership of the green business model innovation processes, i.e., by whom and how is the process lead? Where do the businesses encounter challenges in their efforts to become green? As Amit and Mitchell point out, ethnographic case studies can contribute to broaden the insight into larger issues (Hannerz 2010).

Background: This study aims to explore what insights about green business model innovation processes ethnographic methods can provide. The most common methods to gather data within ethnography are observations and interviews. One of the foundational methods in ethnography is participant observation as it gives researchers unique access to get close to the group they want to study and learn the cultural language of the group (O'Reilly 2012). Through participant observation, it is possible to understand people in their own settings and vary the degree of a researcher's involvement according to the context of the study (Spradley 2021). Interviews can take different forms, from informal conversations to structured interviews that follows an interview guide (O'Reilly 2012). The purpose is to understand the people that are the object of the study's world from their own viewpoint. Similarly, in this study the focus is on what can be learned about the businesses representatives' engagement in and understanding of green business model innovation through their participation in the processes.

Business Model is defined as the rationale of how organizations generate, capture and deliver values to their customers (Osterwalder, Pigneur, and Tucci 2005; Osterwalder et al. 2010). *Green* refers to considering environmental aspects of the business model, and a typical business model can transform into a green business model by changing its dimensions to create, capture, deliver, receive, and consume both environmental and economic benefits (Sommer 2012; Abuzeinab et al.

2016; Lindgren 2021). Business models of organizations can be studied using tools such as the B-star (see Fig.1), which describes business models along seven dimensions (Lindgren and Rasmussen 2013). These are value proposition, user and customer, value chain, competences, networks, relations, and value formula. In addition, the business model also has different components within the seven dimensions. Innovation in a business model can occur along any of these seven dimensions and within the components.

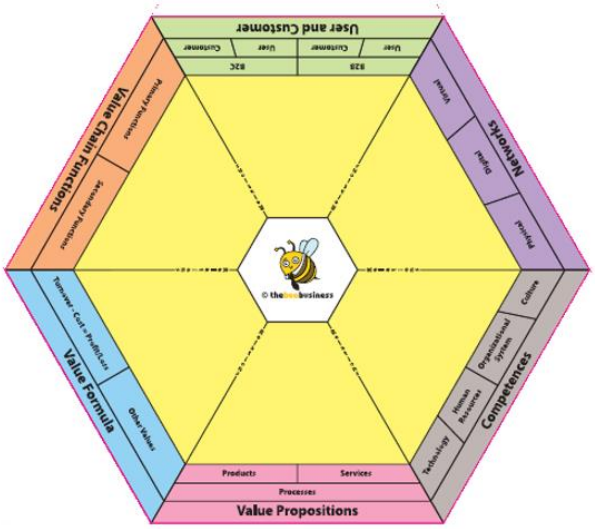

Figure 1: The B-star with the 7 dimensions

The physical manifestation of the B-star is the B-lab. The lab has the shape of a hexagon similar to the B-star and is equipped with tools for businesses, organizations, and networks to work with. A standard lab includes a B-star table, a B-board, several whiteboards, and a screen that can connect to other devices. The lab offers a framework to understand, discuss, learn, engage, and play with Green Business Model Innovation. The room can seat six people around the B-star table also shaped like a hexagon. Many of encounters with the businesses in the project takes place in these B-labs, and they thus become the 'ethnographic field' of research.

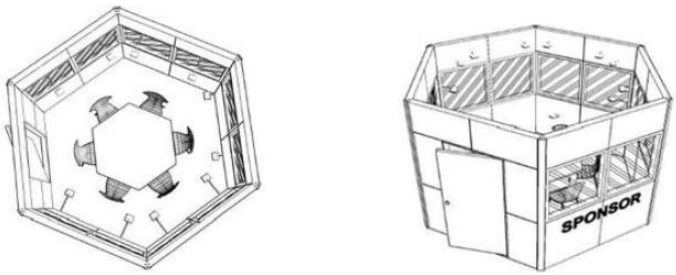

Figure 2: The B-lab seen from two different viewpoints (Figure 2 in (Thorhauge, Kumar, and Lindgren 2018)

In the B-Lab, the businesses can work with green business model innovation to get hands-on experience with the process. The researcher can facilitate the innovation process or can be an 'outside' observer without intervening in the innovation process. Consequently, researchers can comprehend the behavior and the social interactions in creating green business model innovation.

Design and Methodology: To explore what can be learned about green business model innovation processes through the application of ethnographic methods, business participating in the Greenbizz project will be used as cases, where data is collected through meetings, discussions, workshops, participant observations, and semi-structured interviews. Greenbizz is a cross-border EU Interreg Kask project aiming to support start-ups and SMEs in reducing the total energy consumption and CO_2-emissions by 15 to 20% and to convert towards renewable energies. The project aims to collaborate with a total of 60 start-ups and SMEs in Denmark, Sweden, and Norway (Greenbizz 2020). Several rounds of collaborative meetings are held with each business. Typically, the first meeting will occur at the business, where the researcher also gets a tour around in the business. Hereafter the meetings can take place either at the premises of the universities, at the business, or at any location that preferably has a B-lab or the related tools. The first phase of the research includes a process of gathering data through (participant) observations in the B-lab during meetings with businesses and a business model analysis of selected businesses. As of February 2022, more than 50 meetings have been conducted in the Greenbizz project, and 15 of them have been conducted in a B-lab where the tools have been actively used. The second phase involves interview with participants in the meetings in the B-lab to gain insights on their experience working in the B-lab compared to the observations made. This is further supported by expert-interviews with researchers who facilitate the meetings in the B-lab.

Preliminary results and relevance: Preliminary results show that ethnographic methods could shed light on how the Green Business Model Innovation process takes form and progress when businesses aspire to embark on the green journey and what challenges they have to overcome in this process. It can elaborate on what aspects are discussed, such as areas of the seven dimensions on the B-star that get more attention from the participants thus also highlighting the different understandings of central concepts such as ‘green’, ‘sustainability’ and ‘innovation’ in a group, and how different actors ‘view’ a green business model innovation process i.e., what dimension in a business model gets the most attention from the business, where/ in which area do they see a value with regards to green transformation and who of the participants from the businesses that are the active ‘agents’ leading/ influencing the processes in becoming a more green business.

Acknowledgement

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Keywords

Green Business Models, Ethnography, Ethnographic field, business model cube

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Business models of sustainable fashion – the exploration from micro-institutional perspective

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Extended abstract

Introduction

Our study is part of a larger investigation into the institutional perspective of new business model development (Vaskelainen, Münzel, 2018). In this approach, the institutional environment, as well as the specific logics and individual institutions are viewed as an important social aspect that both enable and constrain the development of specific practices. Because of the innovative nature of the business model concept, we employ prior studies on embedded agency and efforts of institutional entrepreneurship (Greenwood, Suddaby, 2006) aimed at institutionalizing new patterns of action and obtaining or maintaining entity's legitimacy (Suddaby et al., 2017). Our research focuses on micro-level processes (Gray et al., 2015; Powell, Jeannette, 2008), which is becoming increasingly popular perspective. Our study is aimed at individuals who have decided to start a business using a new responsible fashion models.

In our research we strive to explain how entrepreneurs perceive and present their motivations and sources of involvement in activities that adhere to the relatively new principles of responsible fashion. We perceive their decision to use a specific business model as a result of institutional work (Lawrence et al., 2011) - the aftermath of exposing individuals to the influence of various elements of the institutional environment, the perception of certain pressures and reflection on their impact. The institutional portfolio we consider here as a collection of various mental patterns developed as a result of experience that an individual could use and mobilize in relation to a specific situation (Viale, Gendron, 2013).

Our study aims at investigation of the institutional biographies of entrepreneurs running startups of sustainable fashion. The choice of the fashion industry relates to the perception of this industry as an absorbing area that has undergone significant changes in recent years (Brydges 2021). However, they have an impact not only on the numbers illustrating the quantities of production and sale (Medcaffe, Miro 2022), the use of new methods of production, or digital transformation (Runfola, Guercini, 2013; Arrigo, 2022). What is similarly important is the growing concern about

the impact on water pollution, greenhouse gases, landfill waste, poor working conditions, etc. The requirement towards transition into slow fashion is expressed in thousands of scientific articles, media news, reports, or blogs (Li, Leonas, 2021). Sustainable (or: responsible, fair, or slow) fashion has been explored from the variety of dimensions, including business models (Pedersen, et al., 2016; Todeschini et al., 2017; Rinaldi, 2019).

In our paper, we focus on the interrelation between the conscious choice of a responsible business model and institutional context influencing the decision. We attempt to answer the question: what institutional elements entrepreneurs mobilize when they publicly present their motivations for developing responsible fashion business models? The collected research material and the coding are aimed at the analysis of entrepreneurial institutional biographies: identification of the main sources of institutional impact, specific institutional patterns related to responsible fashion, and reflections that led entrepreneurs to consciously made and agency-motivated choices.

Research approach

Our study relied on secondary sources. The research material consisted of interviews with entrepreneurs running sustainable startups in the fashion industry. The primary requirement for including the material in the research sample was a narrative in the form of statements by the entrepreneurs depicting the image of the activity as seen through the interviewee's eyes. We were able to collect research material in the form of 105 interviews. We used NVivo 11 Pro software to code the research material, and we coded it focusing on institutional pressures and their subcategories (education, experience, family life, travelling, etc.), perceived contradictions, attitudes, and ways of justifying the entrepreneur's own life choices.

Findings

The multiplicity and variety of references in the respondents' statements reflect the complexity of the institutional environment. The respondents were mostly female entrepreneurs in the fashion industry, with an artistic flair, who strive to combine business with social and environmental goals, ensuring self-employment, personal development, and the ability to combine passion and family life. In accordance with the adopted theoretical perspective, we identify a wide range of pressures and interpret them as manifestations of institutional work, which led to the decision to use a new category of responsible fashion business models. We emphasize the significance of such an impact from two perspectives (see Greenwood, Suddaby, 2006): the institutional portfolio of entrepreneurs and the openness to alternative business models. The institutional portfolio perspective reflects the process of broadening the range of patterns mobilized in institutional work. In this context, we interpret the aforementioned sources of institutional impact as a manifestation of entrepreneurs' awareness of the possibility of alternative modes of operation, particularly the use of business models other than the currently dominant ones.

Contact with new patterns occurred as a result of both a temporary, radical change of the institutional field, such as moving or traveling, and an internal change within the current environment. It is worth noting that the new patterns emerged not only from an environment with a higher level of institutionalization of responsible fashion models (developed countries), but we also identified instances where the patterns were practices that resulted from a lower level of economic development (past or present). As a result, we can conclude that responsible fashion

models spread not only through diffusion, but also through the individual combination of various fragmentary patterns.

The theme of combining various institutional patterns is also reflected in the rationales for engaging in responsible fashion. Entrepreneurs pointed to the relationship of the adopted business model with passion or hobby, family traditions, broader social beliefs (healthy life), different life role (mothers, granddaughters), and the work-life-balance. All these factors are mobilized as arguments emphasizing the difference of the adopted business model from the dominant patterns. We interpret this perceived and emphasized contradiction between the logics of traditional and responsible fashion as a deliberate effort to loosen the embedded agency (Battilana et al., 2009).

The place of entrepreneurs in the field also demonstrates the importance of loosening embedded agencies. Because of their distinctiveness, we place them on the periphery of the institutional field. They are representatives of small businesses, starting out with limited resources. Moreover, the experience related to changing the environment enabled people to not only learn new patterns, but also to disassociate themselves from the existing institutional pressures. Changes in the course of a professional career, a new stage of education, travel or work away are perceived as facilitating the verification of existing patterns, making it easier to question them, and increasing the proclivity to seek alternatives.

Concluding remarks

The discussion of our research findings presented here emphasizes the importance of the institutional dimension in understanding the causes, progress, and directions of development of new business models, including those referred to as responsible fashion. We demonstrated, using the constructs of the institutional portfolio and embedded agencies, that the application of these models is not only the result of proactive targeted agency efforts, but is also deeply socially embedded. Our findings confirm the importance of conducting research on business models not only from the perspective of the impact of current institutional logics, but also from the perspective of personal experiences of individuals subjected in their lives to various sources and trajectories of institutional impact.

Keywords

institutional portfolio, institutional work, embedded agency, responsible fashion.

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Exploring Tensions of Early-Stage Ventures that strive for Sustainability

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Abstract

How to deal with tensions in corporate sustainability is an issue of high relevance for both, scholars, and practitioners. So far, however, research has focused mainly on tensions faced by large established firms in their transition from currently unsustainable to more sustainable business practices.

Since early-stage ventures that strive for sustainability have distinctly different characteristics, they cannot rely on any "ready-to-wear" strategy. In addition, sustainability-oriented ventures have extremely limited resources and often only one opportunity to establish themselves on the market. This puts them under enormous pressure and hampers the much-needed sustainable solutions that result from their entrepreneurial efforts.

In the current literature, there is far less attention dedicated to tensions sustainability-oriented ventures face in their early stages when developing their first viable business models. In particular, our understanding of the content and levels of tensions is limited.

To close this gap, the present study examines tensions faced by sustainability-oriented ventures during their (pre-) seed and seed phase. We put special emphasis on the tactical business model choices.

We sampled eight sustainability-oriented ventures tracing their business model development, the occurring related tensions longitudinally applying content analysis. We followed a four-step process consisting of material collection, descriptive analysis, category selection and material evaluation.

With this study, we want to deepen our understanding about the occurrence and changes of tensions, sustainability-oriented ventures face in their early stages.

Track 4.2 - Design Thinking, Actor Engagement, and Legitimation in the Context of Circular Business Model Innovation

Track chairs: *Francesca Ostuzzi, Katrien Verleye, (Ghent University) and Fatima Khitous (University of Oulu)*

This track aims to explore how the concepts of design thinking, actor engagement, and legitimation advance business model innovation in the context of a circular economy.

This track welcomes scholars from different disciplines, and it is open to conceptual and empirical papers that relate different topics like co-creation, design practices, legitimation mechanisms, engagement strategies, systems thinking, cybernetics, trust, collaboration, and self-sustainability to the circular business model innovation.

Mechanisms driving inter-organizational collaboration for sustainable business model innovation

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Abstract

This research adopts a qualitative ethnographic approach to explore how a business organization collaborates with its customers (B2B) when innovating toward sustainable business models. Investigating these supplier-customer collaborations is essential to uncover what and how these collaborations contribute to the sustainable business model innovation (SBMI) process of the supplier.

Key words

Sustainable business models, business model innovation, inter-organizational collaboration, business experimentation, customer engagement

1. Introduction

Due to various societal pressure (e.g. increased awareness and regulatory control resulting in market demand), business organizations are increasingly improving their environmental and social sustainability. Many companies commit to sustainability goals and targets. Frequently they use business model innovation as a vehicle to achieve these goals (Bocken & Geradts, 2019; Laukkanen & Patala, 2014). Sustainable business model innovations (SBMI) can be defined as "innovations that create significant positive and/or significantly reduced negative impacts for the environment and/or society, through changes in the way the organization and its value-network create, deliver value and capture value or change their value propositions" (Bocken *et al.*, 2014:p.44). Literature on SBMI emphasizes the need for business organizations to *collaborate* with external actors, such as their customers and suppliers. This inter-organizational collaboration (IOC) can enable firms to

achieve their sustainability goals by means of sustainable business models (SBMs) (Aagaard & Lodsgård, 2019; Bocken & Geradts, 2019; Evans *et al.*, 2017; Boons & Lüdeke-Freund, 2013; Geissdoerfer, Bocken & Jan, 2016; Dentoni, Pinkse & Lubberink, 2021; Arnold, 2017).

IOC can enhance SBMI through preventing silo thinking, utilizing interdependencies and synergies between stakeholders, and working together towards breaking complex, unsustainable cycles of production and consumption (path dependencies) (Bocken & Geradts, 2019; Breuer & Lüdeke-Freund, 2017; Escher & Brzustewicz, 2020). However, how IOC relates to the SBMI process and how it enables the design and implementation of SBMs has not been well addressed in the literature, in particular in the context of well established, incumbent firms. Previous studies either study IOC in relation to different type of innovations, for example, BMI (Nardelli & Broumels, 2018; Albino, Dangelico & Pontrandolfo, 2012; Sjödin *et al.*, 2020; Reymen *et al.*, 2017) and ecosystem innovations (Walrave *et al.*, 2017; Adner, 2017; Oskam, Bossink & de Man, 2021), or in different organizational settings, for example, startups (Bocken, Miller & Evans, 2016; Geissdoerfer, Savaget & Evans, 2017; Heyes *et al.*, 2018) and business-NGO partnerships (Aagaard & Lodsgård, 2019).

Therefore, our study seeks to develop an in-depth understanding of the collaboration dynamics as enablers of SBMI in the business-to-business context. We will focus on incumbent suppliers and their customers as the two main actors. The collaboration with the customer is crucial for developing novel business models (Sjödin *et al.*, 2020) to deliver societal and environmental value, while catering to the customer needs. The main research question thus is:

How can supplier-customer collaborations enable sustainable business model innovation for the supplier?

For this purpose, we seek to integrate lessons from the literatures on IOC and SBMI, with a focus on collaboration mechanisms and conditions needed for SBMI (section 2). Subsequently, we adopt a qualitative ethnographic approach to explore how a business organization collaborates with its customers for SBMI (section 3-5).

2. Theoretical Background

2.1 Sustainable Business Model Innovation

In recent years, increasing attention is being given to the SBMI process in understanding how organizations can create sustainable value. Scholars describe the SBMI process in highly similar ways, consisting of three broad phases of sensing / concept designing, seizing / detailed designing, and transforming / implementation (see Bocken *et al.*, 2018; Geissdoerfer *et al.*, 2017; Mendoza *et al.*, 2017; Pieroni *et al.*, 2019; Sjödin *et al.*, 2020).

The initial phase of sensing is about identification of sustainable value creation and capture opportunities, which are directed by both the sustainability goals of the organizations and the traditional customer demands in the market. The second phase (seizing) deals with designing and testing various business model concepts based on the opportunities identified in sensing phase. This step includes piloting and prototyping, which results in the selection of business models to be further detailed and developed. The third phase (transforming) results in the implementation of the selected business model concepts. This final step involves scaling-up and mainstreaming the developed and tested SBM concepts.

In order for organizations to innovate SBMs successfully, scholars have identified several enablers to SBMI (Sinkovics *et al.*, 2021; Breuer *et al.*, 2018; Bocken & Geradts, 2019; Velter *et al.*, 2020). Firstly, a systemic perspective is needed that considers the broader societal and environmental stakeholders' value in the SBMI. Secondly, having a clear sustainability vision and goals as part of corporate strategy is an important enabler for SBMI. Moreover, organizations should develop new knowledge, capabilities, skills and technologies, to design and implement innovative SBMs. Additionally, organizations should ring-fence resources, such as time and finances, to invest in SBMI. Lastly, to manage the impacts and outcomes of SBMs, organizations should set up performance metrics to measure sustainability performance of SBMs.

Another important enabler of SBMI is the collaboration among stakeholders. The SBMI process frameworks fail to provide insights into how various internal and external stakeholders are involved within SBMI (Berends *et al.*, 2016; Ciulli & Kolk, 2019). This is especially true for established firms because they have a myriad set of stakeholders, which often result in misalignments and lack of clarity on how different stakeholders participate in the SBMI process. There is a need for more research to understand the SBMI process from an inter-organizational perspective (Pieroni, McAloone & Pigosso, 2019). Additionally, scholars studying the SBMI have noted the reluctance of established firms to engage extensively with stakeholders and business environment as it often requires extra effort and time (Boons & Lüdeke-Freund, 2013; Evans *et al.*, 2017; Geissdoerfer, Vladimirova & Evans, 2018; Bocken & Geradts, 2019).

2.2 Inter-Organizational Collaboration

IOC is defined as a "recursive process where people or organizations work together in an intersection of common goals by sharing knowledge, learning, and building consensus" (Dietrich et al., 2010:p.60). A review of IOC process dynamics by Majchrzak and colleagues (2015), Dietrich et al. (2010), and Austin & Seitanidi (2012b) reveal four prominent dimensions which can be used to study the process dynamics of IOCs.

The first dimension is the IOC goal which, in the case of SBMI, refers to the goal set out by the collaborating organizations to achieve in the SBMI process. The second dimension is the nature and interaction style of the collaboration among partners, which can vary between transactional (formal) and relational (informal). For SBMI, more relational collaboration is preferred (Breuer et al., 2018; Breuer & Lüdeke-Freund, 2017; Velter et al., 2020). The third dimension are the roles and procedures followed in the IOC, including decision making and control (Dietrich et al., 2010; Austin & Seitanidi, 2012b). And finally, the fourth dimension is the composition of actors involved from both organizations.

These four dimensions are used to study the IOC empirical cases in this study.

2.3 Mechanisms enabling Inter-Organizational Collaboration for Sustainable Business Model Innovation

In literature several mechanisms are described that can influence successful collaboration and can enable SBMI. A number of (S)BMI frameworks highlight approaches on how to make the innovation process more collaborative (see Austin & Seitanidi, 2012a, 2012b; Baldassarre et al., 2017; Breuer & Lüdeke-Freund, 2017; Rey-Garcia et al., 2021; Rohrbeck et al., 2013). Additional potential collaboration mechanism can be found in different literatures: in SBMI literature (Bocken & Geradts, 2019; Dentoni, Pinkse & Lubberink, 2021; Oskam, Bossink & de Man, 2021), collaborative

innovation literature (Davis & Eisenhardt, 2011; Reficco et al., 2018; Austin & Seitanidi, 2012a, 2012b; Keeling et al., 2021), inter-organizational collaboration literature (Majchrzak, Jarvenpaa & Bagherzadeh, 2015; Dietrich et al., 2010; Sharma & Kearins, 2011), supply chain collaboration literature (Fawcett et al., 2012; Soosay & Hyland, 2015), knowledge management literature (Carlile, 2004), and in B2B service innovation literature (Heirati & Siahtiri, 2019; Lievens & Blažević, 2021; Kazadi, Lievens & Mahr, 2016). The mechanisms identified in these literatures are summarized in Table 1. We refer to these as 'theory-based mechanisms'.

Table 10: Theory-based mechanisms from literature

Theory-based Mechanisms	**Definition**
Developing shared vision/common sustainability goals	Co-creating and communicating clear sustainability goals and alignment of interests within actors
Purposive unlearning	Conscious challenging of mainstream ideas and mindsets
Marshalling internal and external resources	Bringing together the resources, skills and knowledge for co-creation
Intellectual transparency	Actors sharing learnings and co-creating knowledge transparently
Performance measurement	Monitoring and measuring the impacts of the outcome achieved – to measure how successful was the SBMI exercise
Mobilizing diverse actors	Actors from different management levels, organizations and capabilities need to be mobilized
Trans-disciplinary language	Language that goes beyond disciplinary silos and connects diverse set of actors
Clear roles and process for collaboration	Collaboration process and the roles of different stakeholders are clear, giving the actors clarity
Conflict resolution and trust	Collaborations with methods in place to resolve conflicts that arise during the process, result in higher trust within actors
Mutual respect and commitment	Partners with mutual respect and trust for each other, result in higher commitment and success of collaboration

The collaboration mechanisms presented in Table 1 are used as a theoretical lens to collect and analyze data in the empirical cases.

3. Methodology

In order to answer the research question, we adopted an embedded case study design, where multiple collaboration trajectories between an incumbent supplier and its customers are tracked. In total 9 different key customer accounts are studied of a global logistics firm, LogInc. The firm designs and integrates large complex logistic automation systems for the aviation, parcel, and warehousing sectors. These cases were selected using the following criterion: the collaboration within the key customer accounts must exhibit an instance (as a project or a tender) in which a new sustainable business model is offered to the customer, that is, a different value proposition to LogInc's traditional business model of selling and installing technical systems.

The strength of the case study method is its ability to deal with a substantial variety of evidence – documents, artifacts, interviews, and observations (Yin, 2003; Van Thiel, 2014). We study *diverse* cases (i.e., customers from different industrial sectors and with varying sustainability ambitions) to learn how various mechanisms play a role in the success or failure of the collaboration between the supplier and customer in achieving SBMI outcomes (Seawright & Gerring, 2008). This diversity in

cases allows a cross-case comparison, which should help in increasing the analytical generalizability of the findings.

Using an ethnographic lens and adopting process research methods (Langley & Tsoukas, 2017), the study's data collection is primarily based on qualitative data collection methods such as semi-structured interviews, company documents (presentations and reports) and participant-observation (e.g., in customer meetings). For each case, we draw on semi-structured interviews with four to six stakeholders, such as the key account managers, sales engineers, and sales managers from the supplier, and the procurement or innovation managers from the customer side. These multiple perspectives are needed to create a valid and reliable narrative of the collaboration process.

The data analysis of this study follows a three-step process. First, the analysis maps out the collaboration process across the three phases of the SBMI process (as identified in section 2.1) and the four dimensions of IOC (section 2.2). In this step, the data is transcribed and coded on the basis of the mechanisms discussed in section 2.3. The second step is the within-case analysis, which reveals the roles played by particular mechanisms in the case narrative. Thirdly, the cross-case analysis is undertaken to reveal patterns across different key accounts and what it means for the business model innovation process of the supplier organization. The cross-case analysis helps develop a deeper understanding of how each mechanism enables collaboration for SBMI in the empirical cases.

4. Results

4.1 Role of collaborations in the supplier's SBMI Process

The section presents a short summary of the results based on our ongoing analysis. First, the overall SBMI process of LogInc is described. This overall SBMI process also entails the two main collaboration approaches that are observed by cross-comparison of the nine embedded cases. These steps help to illustrate the role of IOC in LogInc's SBMI process.

The business model innovation process at LogInc is customer-centric, decentralized, and highly integrated with the sales function. The key account managers (along with sales and customer relations management teams) are engaged in constant decentralized experimentation with their customers. Each key account can be viewed as a rather independent arm of an octopus. The sales-customer interactions bring customer demands and co-created ideas (sensing / concept design phase of SBMI) to the internal core of the company who are responsible to develop the detailed solutions (seizing / detailed design phase of SBMI), see figure 1. The internally developed solutions are then taken back to the customer for testing and implementation (transforming / implementation phase of SBMI).

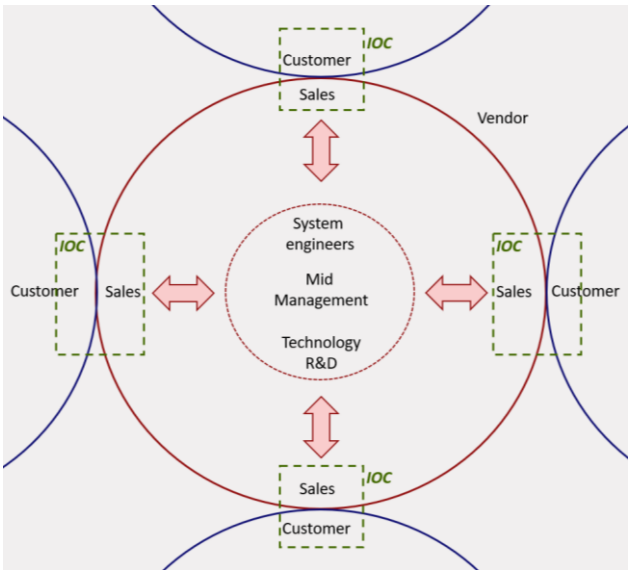

Figure 13: SBMI Process in Technology Incumbent firm

The collaboration of LogInc with its customers across the different key accounts illustrate two main collaboration approaches:

a. Formal, tender-based collaborations: These collaborations are observed at operational level with local/region-specific teams of customers. They include a formal tender process, which is highly regulated by the global market forces of the industry. The formal tender process follows similar phases to the three phases of SBMI (from section 2.1). These include pre-bidding, bidding, and post-bidding phases, which align well with sensing, seizing, and transforming phases of SBMI.
b. Informal, vision/trends-based collaborations: These collaborations are observed at a strategic level with future-looking stakeholders of customer organizations which are interesting in long-term trends of industry and society. They do not include a formal tender process, and usually take place with existing customers who have a strong relationship with LogInc.

4.2 Within-case analysis of the nine cases

This sub-section will include the narratives of each of the nine collaboration cases studied. Cases will be analyzed based on SBMI phases & IOC dimensions.

4.3 Cross-case analysis

Across the SBMI process and the types of collaboration approaches observed at LogInc, the theory-based mechanisms (Table 1) are used as basis to analyze and validate the effects of collaboration approaches. We are currently in the process of analysing the data collected. With empirical evidence, we intend to inductively identify practice-based mechanisms and subsequently narrow down to the most relevant mechanisms with a focus on their theoretical underpinnings.

Table 11: Theory-based and practice-based collaboration mechanisms for SBMI

Customer / Mechanisms	A	B	C	D	E	J	P	Q	R
Developing shared vision/common sustainability goals									
Purposive unlearning									
Marshalling internal and external resources									
Intellectual transparency									

Performance measurement									
Mobilizing diverse actors									
Trans-disciplinary language									
Clear roles and process for collaboration									
Conflict resolution and trust									
Mutual respect and commitment									
Practice-based mechanisms									

5. Discussion & Conclusion

The research contributes to literature in three ways. Firstly, the paper broadens the understanding of how IOC for SBMI in a supplier-customer setting looks like (Ciulli & Kolk, 2019; Berends et al., 2016; Pieroni, McAloone & Pigosso, 2019). Secondly, this research brings out unique learnings by synthesizing insights from the literatures on SBMI and IOC to identify collaboration mechanisms that can enhance the SBMI process (Dentoni, Pinkse & Lubberink, 2021; Reficco et al., 2018; Bocken & Geradts, 2019; Breuer et al., 2018). The study illustrates which and how mechanisms play crucial roles in enabling collaborations for the SBMI process. Thirdly, practitioners can use this study's findings to assess and enhance their collaboration processes with customer.

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The role of trust in service-based business models

The case of the fashion industry

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Abstract

The need for a more sustainable industry has led many companies to explore new business models that better support their strategies for sustainable value capture. Evidence suggests that service-based business models can enable product life cycle extension, strengthen relationships with customers, increase visibility of information and material loops, and reduce environmental impact. The fashion industry accounts for up to 10 percent of global greenhouse pollution, causing leading firms to explore greener alternatives. Digital platforms for sales and marketing can enhance trust and positively impact customer perception, thereby supporting the shift towards more sustainable businesses models. This study aims to understand the role of trust in service-based business models, mainly when addressing customers, using the case of the fashion industry to identify challenges and potential solutions. The method followed includes an integrative review of the role of trust in service-based business models and strategies used to develop trust. The findings from this review summarize the challenges faced by organizations when trust is missing, describe the role of trust in service-based business models along with identifying strategies that can support trust development. Further, the findings are positioned in the context of the fashion industry.

Keywords

Trust, service-based business models, servitization, sustainability, fashion

Introduction

The need to counteract the negative impacts from our linear economy call for immediate actions that promote more responsible production and consumption patterns. One of the strategies explored by firms is the shift to service-based business models, as it brings along benefits that include increased competitive advantage (Malleret, 2006; Kristensen & Remmen, 2019), new and

more stable sources of business income (Brax & Jonsson, 2009; Oliva & Kallenberg, 2003), extended lifecycle of product-service offerings (Mont, 2002), dematerialization through fewer tangible assets involved in economic transactions (Sharma & Singh, 2017), visibility of life-cycle data and increased sustainable value capture for stakeholders (Kristensen & Remmen, 2019).

Leading companies are adopting longer-term views with trust-based relationships that pursue mutually beneficial objectives through service-based business models (Evans et al., 2017). This transition is not always easy, close collaboration within partnerships can be difficult to achieve, requiring trust and holistic commitments (Kowalkowski, 2011; Zhang & Banerji, 2017; Polova & Thomas, 2020).

Research on trust in the marketing and organizational literature focuses on trustees' ability, moral integrity, and benevolence of trustors (Mayer, Davis & Schoorman, 1995; Alhabeeb, 2007). In the servitization literature, *trust* is highlighted as one of the success factors to design service-based business models and realise business model transitions (Fliess & Lexutt, 2019), especially for holistic solutions with sustainability placed at the core of their value proposition, but the role trust plays in the development of sustainable service-based business models is not well understood.

In the context of fashion, sustainability challenges and opportunities are high-priority (Forst et al., 2021), leading the industry to explore new and potentially service-based, business models. This paper aims to clarify the role of trust in service-based business development by bringing together different schools of thought through an integrative literature review and developing a thematic synthesis that identifies the challenges faced by organizations that experience a lack of trust in the relationships with partners, particularly with consumers, and by exemplifying the role of trust in the case of the fashion industry.

Conceptual framework

Trust and its parameters across disciplines

Trust has long been studied in the fields of Sociology, Psychology, Computer Sciences, Engineering, Management and Economics. One of the most used definitions of trust, by Sako and Helper (1998), defines it as "*expectation held by an agent that its trading partner will behave in a mutually acceptable manner, with the expectation that neither party will exploit the other's vulnerabilities*", which highlights the elements that relate to affective human nature (McKnight & Chervany, 1996), making it difficult to measure it (Glaeser et al., 2000).

In response to long-held criticism of research about trust, including lack of consensus, vagueness and imprecision, PytlikZillig and Kimbrough (2016) suggest reducing ambiguity by defining more precisely the elements and dimensions of trust. For example, e-commerce has focused on how trust can support connections with customers when digital platforms and customer service are major differentiation elements for businesses, placing trust as an enabler of competitive advantage (Vaclavik et al., 2020). Therefore, this study focuses its efforts in the relationships between customers and the supplying firm.

Service-based business models

The increase in interest of firms to expand their offerings through services, has emerged due to the high level of competition in many markets, the constant pressure for companies to be responsive, faster communication, and decreased product margins, among many other motives. This has led companies to transition from a product-centred to a service-centred business model (Gebauer et al., 2005).

However, since Vandermerwe and Rada (1988) first introduced servitization, they also acknowledged that it creates challenges for top management. Since then, despite different definitions and approaches, challenges in service-based business model have become a central theme in the literature discussion. One of the most general concepts within service-based business models is product-service systems (PSS). In their definition, Annarelli et al. (2016) suggest PSS as a market proposition focused on the final user's needs rather than on the production process, which can allow a need fulfilment system with radically lower impacts and enhanced environmental and social benefits. It must be clarified that PSS is not, by definition, a circular business model, but some studies have suggested that it could help organisations reach sustainability targets (Antikainen et al. 2018).

Method

This paper presents a conceptual research work combining evidence from secondary sources with previously developed concepts and theories (Hirschheim, 2008). The literature study adopted an integrative approach (Snyder, 2019) in three steps to combine different perspectives to create a new conceptual model (Figure 1).

Articles were selected through searches including the keywords "trust", "servitization", "service-based business model", "sustain*" and "fashion". The articles found through the combination of these keywords in Scopus were not extensive, as only 52 articles were identified in the fields of Engineering, Social Sciences and Business and Management. An initial selection of highly cited articles in the literature on trust development was used for snowballing, with additional articles recommended by experts in the field of servitization, which provided a total of 23 articles. Further, trends were identified through an inductive process to connect *trust* with available literature on service-based business models. The analysis results are synthesised into themes to provide an overview of current research and summarise incentives, influencing factors and trust-building mechanisms to support the development of sustainable service-based model.

FIGURE 14. RESEARCH PROCESS FOR INTEGRATIVE REVIEW ADAPTED FROM CRONIN AND GEORGE (2020)

Findings

Trust in relation to service-based business models

The ambiguity around trust and how it can be assessed (Vaclavik et al., 2020) is exemplified in the different types of relationships where trust plays a role. For instance, organizational trust is required in business-to-business environments, where benefits can be seen in supply chain relationships, lower transaction costs, increased value-creation opportunities, and enhanced collaborative learning (Jones et al., 2010). Then, customer of trust is required to improve relationships with customers and the way they perceive products and services (Alhabeeb, 2007) potentially leading to customer loyalty.

Trust is particularly important in service-based business models as traditional market rules do not apply equally and regulations are yet to be generated. Also, research has shown that relationships mediated by contracts alone fail to support business model innovation activities (Charterina, Landeta & Basterretxea, 2018). In such scenarios, organizational trust can promote stronger connections and more transparent processes (Bachmann, 2001).

Developing trust is not simple, as the concept is abstract by nature and trust-building mechanisms vary across industrial sectors and organization types. Dominic, Ahmad and Aziz (2013) proposed for firms to internally develop four elements: reliability, competence, openness and identification. Whereas Chopra and Meindl (2013) suggested four steps that remodel the relationships with others: (1) consider the relationship value, (2) stipulate operational tasks and decision rights, (3) create effective contracts and (4) design effective solutions to conflicts.

Service-based business models require tight connections and careful selection of collaborators across the value chain, such as suppliers. Different levels of abstraction have been proposed to deal with such complexity. In a recent contribution, Arvidsson and Melander (2020) proposed three main levels of trust that can manifest when selecting partners: interpersonal, organizational, inter-organizational and network trust.

The lack of trust across collaborating organizations was recurrently mentioned in literature as a challenge; business owners often feel that cooperation and collaboration can increase vulnerability and can be taken advantage of by other members of a network (Lydeka & Adomavičius, 2007). Thus, businesses are reluctant to put themselves in a weak position or to share information. Failing to overcome these situations harms value chains and intended business collaborations. The extent of such harm, as described in three selected articles, is described in further detail in Table 1.

TABLE 1. CHALLENGES FACED BY ORGANIZATIONS IN THE ABSENCE OF TRUST

Reference	**Challenges and potential negative scenarios**
Oxborrow and Brindley (2012)	• Deteriorated collaborative relationships, limiting their potential for adding value • Restricts information sharing • Constraints long-term potential for success
Chopra and Meindl (2013)	• Restricted information sharing between organizations • Available data is ignored as it is not trusted • Duplication of efforts • Opportunistic behaviour • Business activities are perceived in silos instead of from a holistic perspective • Lack of responsibility from stakeholders to face problems, becoming enemies rather than partners.

Lascaux (2020)	• Firms participating in collaborative networks where there is lack of trust might attempt to 'outlearn' other partners by absorbing novel knowledge rapidly and ceasing cooperative efforts as soon as they reach their learning objectives in a cooperative project

The role of trust in stakeholder collaboration and how it can be developed in service-oriented organizations to overcome the previously presented challenges is summarised in Table 2.

TABLE 2. ROLE AND ENABLERS OF TRUST IN SERVITIZED ENVIRONMENTS

Reference	**Role of trust**	**Enabling practices and activities to develop trust**
Lydeka and Adomavičius (2007)	• Enabler of cooperative ventures	• Start with small projects to evaluate how potential partners react and evaluate compatibility.
Fawcett, Jones and Fawcett (2012)	• Essential element of relational architecture. • Promotes collaborative innovation strategies. • Enables the analysis of value creation potential	• Information sharing through digital technologies • RFI Codes to enable transactional trust • Information sharing across value chains • Perform according to promises and agreements
Oxborrow and Brindley (2012)	• Critical elements to the development of mutually beneficial relationships	• Upstream relationships and trust are supported by geographical proximity rather than culture.
Chopra and Meindl (2013)	• Enabler for supply chain responsiveness at lower cost.	• Information sharing • Changing of incentives • Operational improvements • Stabilization of pricing • Clear identification of roles and decision rights for all parties • Effective contracts • Good conflict resolution mechanisms
Fantazy, Tipu and Kumar (2016)	• Informal mechanism that determines the degree of cooperation between supply chain partners in the absence of formal cooperation strategies.	• Small number of collaborators. • Commitment mechanisms such as risk-reward sharing. • Shift focus from physical goods towards managing knowledge as an intangible asset
Arvidsson and Melander (2020)	• Enabler for contractual agreements in situations of high uncertainty	• Building individual relationships between organization representatives can lead to trust in the whole organizations.

Integrating the findings from the literature together into themes, several incentives, influencing factors and trust-building mechanisms were identified in Figure 2.

First, the trust relationships are presented in two main levels, consumer trust towards a product or service, and trust towards institutions and organizations, which relates to firm's trustworthiness from a customer's perspective. This division is described by Alhabeeb (2007) as consequential of

the trust that consumers have towards products and services, leading to loyalty that further translates into trust towards the organization.

In organizations undergoing a servitization process, the boundaries of the firm have been said to be blurry, most companies require collaboration between stakeholders to build product-service systems. In some cases, the divisions are vertically integrated, and in others the system is integrated through modularity in collaboration with third parties (Huikkola et al., 2020). To exemplify the need for collaboration, Figure 2 located three company units as the object of institutional trust, with the intention of visually distinguishing the need for collaboration and alignment of company's objectives and the consideration of the dynamic interplay of firms' boundaries when moving towards servitization (Huikkola et al., 2020).

Some incentives and motives for customers to place their trust in product-services are summarized and listed as: economic rewards as opposed to different alternatives in the market, perceived sustainability (option considered to be more environmentally-friendly and efficient in terms of energy or promote more sustainable sourcing), enjoyment and fun attached to the product-service consumption or usage, quality and reliability of the product-service and security of the good functioning of the product-service (Vaclavik et al., 2020).

Also, there are influencing factors that influence the willingness to engage in trust-based relationships. The following list synthetizes some of the most recurrent findings: geographical location (Oxborrow & Brindley, 2012), historical relationship with the company or "historical residue" (Fisman & Khanna, 1999), culture compatibility (Liu & Ma, 2017), environment and situational normality of competence benevolence and integrity (McKnight et al., 2002), level of uncertainty in the decision-making process (Mcknight et al., 2011), power as a mechanism to regulate and control the dynamics between social relationships and social actors (Bachmann, 2001).

However, trust can also be developed in cases where it is not the predominant description of the dynamic between actors through activities that increase competences, promote openness and communication, share information (Chopra & Meindl, 2013).

The findings of this section are summarized in Figure 2.

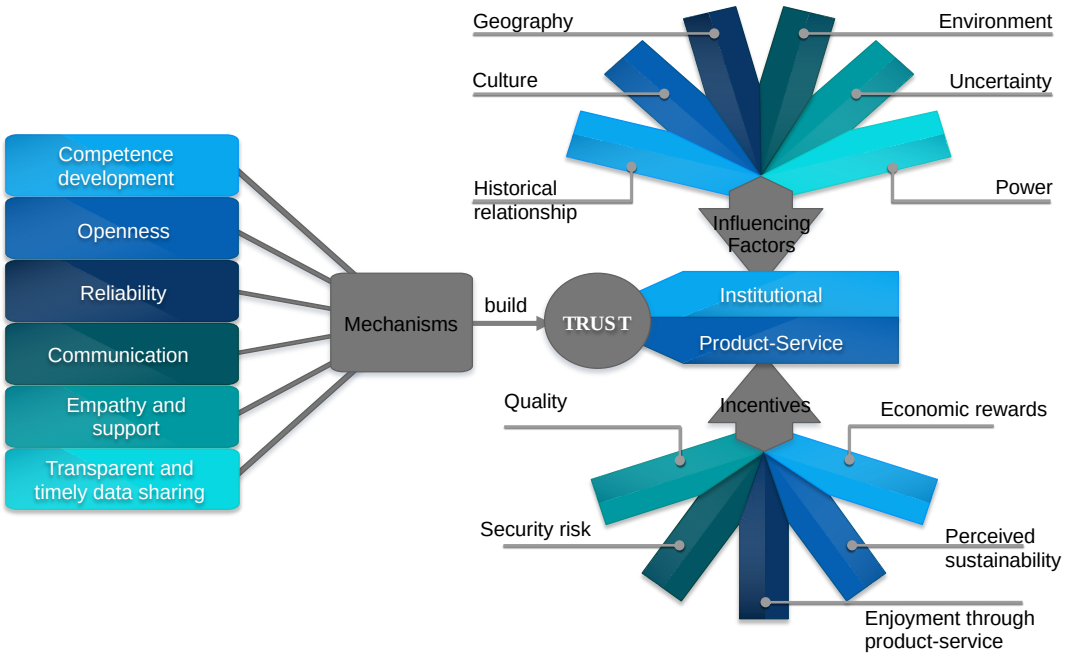

FIGURE 2. THE ROLE OF TRUST IN SERVICE-BASED BUSINESS MODELS

Trust in a service-based fashion industry

The fashion industry needs innovative business models to reduce their environmental footprint, as it notoriously lacks in transparency and the trust this affords (Fashion Revolution, 2020). Business model innovation in the fashion sector is influenced by new supply chain relationships, off-shoring, emerging markets; shared infrastructures, industry training provision, specialist universities, resilient logistics, and sympathetic financial institutions (Oxborrow & Brindley, 2012). In this context, the use of transparency tools such as blockchain can lead to fair and self-regulating systems with multiple points of control and action (Forst et al., 2021). Service-based business models offer many opportunities to impact a product's lifecycle from raw material extraction to care, maintenance and disposal (Armstrong et al., 2015), and could support the sustainability transition of the fashion industry.

Trust in the context of sustainable fashion can be defined as a "consumer's confidence in a firm's reliability and integrity and is related to the willingness to engage with that firm despite the risks involved" (Stathopoulou & Balabanis, 2016). Consumer trust is one of the prerequisites for developing more sustainable offerings in the fashion industry (Forst et al., 2021) and getting consumers to buy product with ethical claims (Liu et al., 2021).

As alternative strategies, some firms have attempted to offer sustainable fashion through loyalty programs. For these strategies to work it is imperative that consumers trust the companies to handle and protect their personal information reliably, in such cases trust comes as a counterpart to the concept of control in future scenarios for designers and developers in the fashion industry (Williams et al., 2021).

Lack of trust in service-based fashion is a major obstacle for the success of transitioning companies. Some identified concerns from customers towards service-based fashion offerings that relate to continuation of the business, durability, size and quality issues, control over final version of garments, and hygiene concerns. Documented case studies such as the one presented (Armstrong

et al., 2015), where the potential of fashion was explored in the context of use-oriented product-service systems, show that lack of trust in the provider is a major contributing factor to the negative perception of such models. Also, other modes of consumption were explored in a study, utility-based non-ownership and redistributed ownership, which aimed to extend previous research work including three key relationship structures, consumer-product, consumer-consumer and consumer-organization (Park & Armstrong, 2017).

Conclusions

The current study explores the role of trust in service-based business models, illustrating it within the case of the fashion industry. The contribution of this study to literature on service-based business models is threefold. First, through a literature review, it highlights the main contributions from different schools of thought to knowledge about trust and summarizes potential challenges that companies can face when there is absence of trust in their operations and they relationships with other stakeholders. Second, this study synthetizes the role of trust according to a range of academical contributions and lists the most recurrent and relevant enabling activities for organizations to develop trust. Third, it provides a framework that illustrates the two main types of trust required in service-based business models, trust towards the product/service and organizational trust, identifying the main motivators for customers to trust both the systems provided and the companies involved. The findings of this work contribute to theory by connecting the literature in the field of trust with that of service-based business models. Further, it can support practitioners by providing clarification on the mechanisms that can support the development trust with their customers when offering service-based business models. However, the exploration of more cases in the fashion industry where the motivators and enabling actions for trust development are tested, remains an important focus in future empirical studies.

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A Fourth-Order Design Playbook For Circular Economy Business Models

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Extended abstract

The circular economy (CE) offers a compelling pathway towards a meaningful sustainable change in business. It presents an innovative approach to address critical environmental challenges that can produce tremendous economic value (Lacy and Rutqvist, 2015; Lacy, Long and Spindler, 2020). In addition to companies, the CE also offers consumers a positive outlook on the future. As Cline (2021, 33) notes: "Circularity promises an exciting world of technological progress where we can have it all – the trendiest jean silhouette, the latest gadgets, single-use plastics – without harming the planet". With such a premise it is not surprising to see the growing interest in CE business models, which are "based on using as little resources for as long as possible, while extracting as much value as possible in the process." (Geissdoerfer *et al.*, 2020, p. 2).

While there is a growing hype around the CE, its implementation has been limited so far (Bocken, Ritala and Huotari, 2017; Circle Economy, 2021). At the same time, from a design perspective, companies have been busy, working to redesign their products, business models, and value chains according to circularity principles. Circular design guides have been produced by companies such as Nike and Ikea, articulating design principles and processes aiming to support ambitious goals. For example, IKEA proposes to only offer circular products by 2030 (Pownall, 2019). For the most part, these design efforts are grounded in a business mindset that still prioritizes growth and profit maximization, touting the concept of decoupling growth of economic activity from the consumption of finite resources as an organizing principle. This approach tends to end up with relatively limited impact, bringing up questions about the ability of CE to deliver on its premise to create sustainable value overall (Corvellec, Stowell and Johansson, 2021).

The challenges of the CE to generate a significant contribution to a sustainable redesign of the production and consumption systems (Hofmann, 2019) echoes the challenges of taking a more radical design approach in a system that is still dominated by a shareholder capitalism mental model, even if a more nuanced one (Godelnik, 2021). We can see examples for this state, defined as sustainability-as-usual (Godelnik, 2021), in the focus of companies on closing material loops rather than on slowing them, especially with strategies involving design for longer-life products. The latter requires companies to radically modify their current business model, which is why companies like Apple and H&M are more invested in improving the recycling of their products than in redesigning them to prolong their life cycle in the first place.

This state of affairs of the CE also represents a failure from a design standpoint. Certainly, there are many examples where design plays an effective role in enabling circular advancements, from upstream innovation of packaging solutions (The Ellen MacArthur Foundation, 2020) to user-centered clothing rental and resale platforms (e.g., Rent the Runway and thredUP respectively). However, these examples reflect a narrower interpretation of design thinking, echoing Buchanan's (2015) first-order of design (invention), which he describes as "the creation of new ideas that depart from what is already established and accepted and that form the beginnings of innovation." (15). What is missing is the type of design thinking that Buchanan (2015) describes as fourth-order design, in which designers provide a broader perspective of integration and evaluation of innovations. The focus of the fourth-order shifts from the design of products to the design of the environments and systems in which these products exist, i.e. "on human systems, the integration of information, physical artifacts, and interactions in environments of living, working, playing, and learning." (Buchanan, 2001, p. 12).

The lack of systemic contextualization in the design approach to CE solutions, in which problems are addressed in a siloed manner, leads to companies spending time, money, and effort to come up with solutions like a recyclable cap for a ketchup bottle (Kraft Heinz, 2021) instead of utilizing these resources into creating far more systemic and sustainable solutions. The question then is how to shift companies from a first-order design thinking approach to a fourth-order approach that could inform CE business models that go beyond sustainability-as-usual?

To do so, the author has been developing a playbook that is informed by the notion of the fourth-order design as an exercise in widening the context of design thinking or the task horizons as Golsby-Smith (1996) puts it. More specifically the playbook takes a strategic design approach, drawing on Hill's (2012) metaphor of "dark matter", which alludes to the criticality of the invisible systemic elements (dark matter) in the creation of products (matter). Similarly, the playbook focuses on the conditions that are critical to creating circular business models (CBMs) with substantial sustainability impact, taking a more systemic approach to change the focal point from the matter (CE practices) to the dark matter, i.e. the structural elements and relationships that shape the CE practices.

Inspired by the Omidyar Group's (2017) systems practice journey map, the initial versions of the playbook presented in this paper have been developed, revised, and experimented with in a "Design of Business" course at Parsons School of Design. The step-by-step playbook, which includes five phases (see Figure 1), offers the integration of numerous design, strategy, and systems tools to help connect the context in which the company operates with the content of developing meaningful CE business model. The phases included in the playbook are as follows:

Phase 0: Getting ready - understanding the moment (e.g., what are the taken-for-granted assumptions that are no longer valid), envisioning a desired future & planning for the journey ahead (Tools: Backcasting, Strategic inflection point, Golden circle).

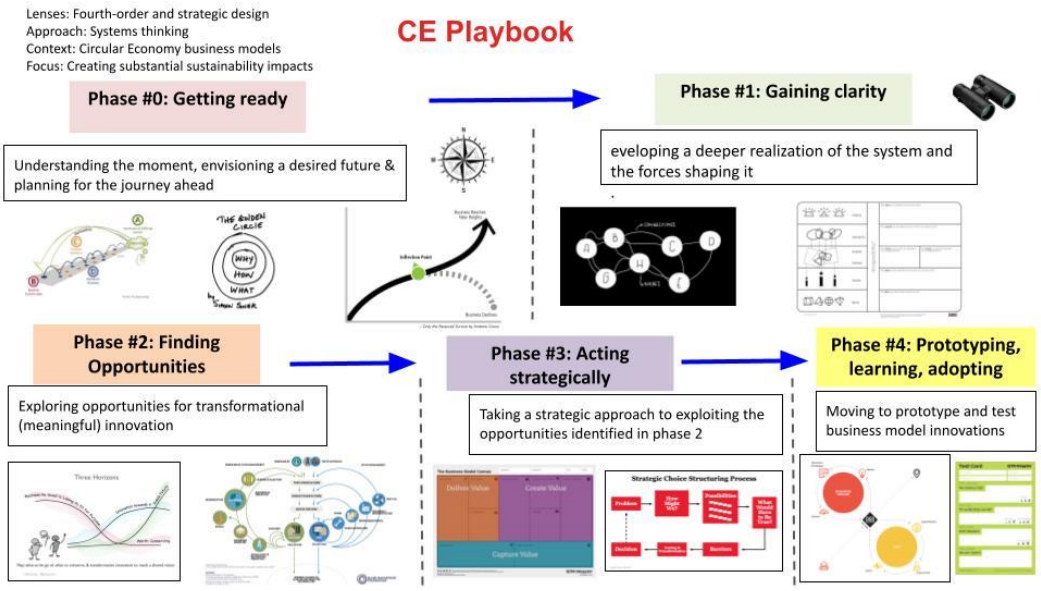
Phase 1: Gaining clarity - developing a deeper realization of the system in which the company operates and the forces shaping it (Tools: System mapping, Concern Canvas).

Phase 2: Finding opportunities - exploring opportunities for transformational (meaningful) innovations (Tools: Three horizons, analysis of material flows).

Phase 3: Acting strategically - taking a strategic approach to exploiting the opportunities identified in phase 2 (tools: Strategic choice structuring process, business model canvas).

Phase 4: Prototyping, learning, adopting – moving to prototype and test innovations (Tools: the iterative process of business concept design, testing cards).

Figure 1. CE Playbook



In addition to presenting the playbook in detail, the paper will present a concrete example of working with it, which is developed this semester in a workshop with design students. Overall, the CE playbook offers a novel perspective to the consideration of the role of design thinking in developing CBMs that could offer a more substantial sustainability impact. It conceptualizes the possibility of moving beyond first-order design to fourth-order design, demonstrating the potential of a broader and more strategic approach to design to help open up the current sustainability-as-usual boundaries of CE.

The paper is contributes to the CBMs and circular business model innovation (CBMI) literature in two main ways: First, it presents a framework supporting the notion that “the creation of CBMs requires a systematic point of view as well as the inclusion of the company's ecosystem, which consists of multiple stakeholders, in the innovation process” (Bocken, Harsch and Weissbrod, 2022, p. 800). Second, it exhibits the potential of strategic design to play a more meaningful part in shaping CBMs. Rather than just using it to consider the factors of desirability, feasibility, and viability (Bocken, Harsch and Weissbrod, 2022), the playbook applies strategic design early at the initial stages of the innovation process where it considers big-picture questions and can create more value (Boyer, 2020).

With the growing hopes that the CE will play a key role in advancing a sustainable post-Covid recovery (Cifuentes-Faura, 2021), the playbook could help provide companies and policymakers with much-needed guidance on how to utilize CE to achieve ambitious goals.

Keywords

Circular economy, design thinking, strategic design, sustainability, business model design.

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Business Model Innovation in Circular Economy contexts: the focus on Systems Thinking, Design, Technology and the hidden role of Collaboration

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Extended abstract

The linear economy, with its 'take, make, waste' model where materials are extracted, consumed, and discarded, is increasingly being questioned (European Commission, 2020). Climate change and ecosystems degradation, together with a growing demand for food and energy, force us to seek new paths of production and consumption (Willett et al., 2019). There is an urgent need for a shift towards new paradigms led by holistic, multidimensional, multidisciplinary and multi-stakeholder approaches. These so-called "grand challenges" by nature cannot be solved by a single actor or organization (Ferraro et al., 2015) and require collaboration, co-creation, dialogue and integration of diverse understandings (George et al., 2016). Globally, this has been acknowledged by the signing of the Paris Agreement and the adoption of the Sustainable Development Goals (SDGs). The circular economy (CE) has been identified as a particularly promising approach to tackling these wicked problems and implementing the debated concept of sustainable development (Ghisellini et al., 2016). By circular economy we normally mean, using its prominent definition, a system that is restorative or regenerative by intention and design, as an alternative to the linear model (Ellen MacArthur Foundation, 2012). CE promotes better management of resources throughout the entire life cycle of products and services, through sharing, maintenance, leasing, reuse, remanufacturing and recycling. The circular economy concept has recently gained momentum in both academia and practice. However, critics claim that it still means too many different things to different people (Kirchherr, Reike, Hekkert, 2017).

Innovation is recognized as the main driver to aligning environmental and economic prosperity and is of paramount importance for the effective implementation of circular strategies (OECD, 2007). Business model innovation (BMI) refers to the exploration of new ways for creating, delivering and capturing value and is considered a critical source of competitive advantage in rapidly changing contexts (Amit & Zott, 2012). Firms are called to play a crucial role in the transition by rethinking

how they structure their business operations, slowing and closing resource loops and encouraging prolonged use of materials and products (Whalen, 2019). Some scholars have started the conversation on how open innovation might be used to promote the circular transition (Bogers, Chesbrough & Strand, 2020). Despite a growing interest in the field, most firms are still questioning how they can practically implement Business Model Innovation (BMI) for a CE (Urbinati, Chiaroni, & Chiesa, 2017).

The purpose of this study is to unveil the key elements and success factors for applying innovative business models toward a circular economy. In order to shed light on the topic and produce a comprehensive state-of-the-art assessment, we selected the systematic literature review (SLR) methodology, suitable to identify, select, critically evaluate and synthesize extant literature in a rigorous, transparent and replicable manner (Vrontis & Christofi, 2019). Three inclusion criteria were chosen, taking inspiration from prior SLR studies (e.g. Khan et al., 2021): i) search boundaries; ii) search strings, and; iii) timeframe. The Title, Abstract and Keyword fields of the Scopus and Web of Science electronic databases were searched. To achieve our objective, we selected the following search formula: '*business model innovation**' AND '*circular economy*' OR '*circular**'. With the initial search, we obtained a total of 239 possibly relevant articles, published until January 2022. Afterwards, we applied the following exclusion criteria. First, we removed duplicates. Second, we focused on articles written in English (Follmer & Jones, 2018). Third, we took into consideration only articles published in peer-reviewed academic journals that had full texts. We continued the review through additional and more thorough rounds. Our rigorous screening process identified 127 papers for inclusion in our final sample. In line with Corsi et al. (2020), the content analysis was done using NVivo, while the technical characteristics of the papers (e.g., publication outlet, type of paper, authors(s) details, citations, etc.) were examined manually.

Our study confirms the increasing trend on the topic of business models for a circular economy, as 82% of the articles examined were published in the years 2019-2022.

Our findings reveal that, in the context of Business Model Innovation for a circular economy, scholars have highlighted three key elements: 1) a systemic approach; 2) the importance of putting the circular design of products and services at the centre; 3) the relevance of leveraging technology. Systems thinking can help organizations innovate by illustrating how different elements are interconnected and interdependent on one another, and how the drivers of direct change are determined and impacted by feedback loops, trade-offs, and non-linear relationships. Organizations that successfully apply systems thinking to reframe their product and service offerings foster the creative redesign of organizational practices which help reconceptualize waste as a resource and support the implementation of circular economy practices (Perey et al., 2018). The role of designers and a design thinking approach emerge as crucial to assist businesses in going circular, because of the ability to anticipate and plan ahead, which is needed to design a product that must evolve and stay relevant, desired and cost-effective over multiple lifecycles (Sumter, Bakker & Balkenende, 2018). A design approach is central to a circular economy, that aims to design out waste and inefficiencies from the very start (Gall et al., 2020). Successful business models should also leverage technological or digital aspects (Urbinati, Chiaroni & Toletti, 2019). Lack of technical and technological know-how can hinder SMEs from transforming their linear business model into a circular one and in some cases developing a technological solution becomes a necessity (Holtström, Bjellerup & Eriksson, 2019). The most recurrent technologies that emerged from the literature are the Internet of Things (Werning & Spinler, 2020) and blockchain (Lähdeaho & Hilmola, 2020).

Interestingly, only a few studies focus on the roles of collaboration and co-creation as key in the redesign of business models for the transition, despite the growing attention of these concepts in the circular economy discourse (Brown, Bocken & Balkenende, 2019). Therefore, we argue that there is an opportunity for further research, particularly in the fields of management and organizational studies, to provide insights to practitioners on how to operationalize effective collaboration and co-creation for a circular economy. A longer-term and more collaborative perspective on business modelling is needed to understand potential system impacts and pursue more radical innovations; the contrary could potentially halt a successful transition toward a circular economy (Brown, Bocken & Balkenende, 2019).

Our study provides contributions to the academic streams on Business Model Innovation and circular economy. The analysis also offers relevant implications for practitioners, as it suggests three key elements to consider when (re)designing a business model for circularity, namely 1) systems thinking; 2) design; 3) technology. Furthermore, our study presents policy implications due to the increasing relevance that policies have assumed to foster the circular economy. Despite providing fresh insights into both theory and practice, as with any other systematic literature review, we are aware of the limitations of our study. Our keyword search formula, for example, and the choice of certain electronic databases may have caused the exclusion of potentially relevant pieces of literature. We suggest future studies to extend the analysis on the key elements of business model innovation for a circular economy. Particularly, the following aspects might deserve attention: a) What are the tools to facilitate collaboration and co-creation for a circular economy?; b) What are the internal and external competencies required to foster collaborative innovation for circularity?; c) How can collaborative circular innovation and co-creation be organised?

Keywords

Circular economy, innovation, collaboration, co-creation, business models

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From Circular Economy to Circular Society: Analyzing the triad of the social, political-economic and organizational system

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Extended abstract

0. Summary

With regards to global mega trends, notably the effects of climate change, organizations across all industries have started to innovate their business models to implement more sustainable approaches of doing business. As an effect, more and more organizations are focusing on a circular economy rather than the predominant economic models based on a take-make-waste approach. But after all, the concept of circular economy can be seen as too short and one-sided, since organizations often focus purely on the economic business models without acknowledging the need for a re-design of social practices, cultural patterns and supporting institutions. In contrast, the concept of circular society represents a more holistic approach which includes all members and key players of society. In our paper we therefore argue that to fully understand this transformation process we must broaden the perspective by including social, institutional and political aspects into this discussion. Consequently, we aim to analyze a triad of relevant systems, divided into the social system, the political-economic system and the organizational system and their individual approaches, needs and attitudes towards a circular society. To fully understand the complexity of this transformation towards a circular society, we are going to identify relevant stakeholders within each system and conduct a qualitative survey, using focus groups to understand the different interests of each stakeholder group. As potential results, we expect to find a deeply interwoven structure between the three systems with respectively different power relations to influence the transformational process towards a circular society.

1. Problem description

In the face of current events and developments, such as extreme weather conditions caused by the climate change, increased resource depletion, loss of biodiversity and other life-threatening and man-made developments, the call for an alternative economic model is

getting louder from political, economic and societal stakeholders. Businesses across all industries have started to explore possibilities to minimize their resource input, to reuse products and components after the use of the product and / or to expand the life cycle of products. Consequently, businesses have started to innovate their business models to implement more sustainable and resource saving approaches of doing business (Ellen MacArthur, 2013).

In this context, the circular economy represents not only an alternative to the current economic model, which is based on a take-make-waste approach, but also a tremendous business opportunity. Studies suggest that the business potential that lies in the circular economy is several trillion US$. From this point of view, the transition towards a circular economy model would not only make sense from a sustainable, but also and especially from an economic point of view (Salvador et al., 2021; Accenture Strategy, 2015). Also, the European Union counts on the effects of the circular economy to reach climate neutrality by 2050 with its long-term strategy The European Green Deal (EU, 2021). Not least because of the high potential in practice, research on the topic of circular economy has been increasing more and more, especially in recent years (Ho et al., 2022; Moreau et al., 2017).

The concept of circular economy challenges linear business models and instead calls for circular flows that reduce the negative impact on the environment by improving the utilization of resources through “reduce, reuse, and recycle strategies” (Moreau et al, 2017, p. 498). But as the circular economy primarily focuses on value creation as well as innovation and consequently on archiving a sustainable competitive advantage over other players on the same market, one might argue that the underpinning logic of a circular economy is not that different from the current economic model. In addition, by focusing purely on business models and (business model) innovation without acknowledging the need for a re-design of social practices, cultural patterns and supporting institutions, this transformation process might be doomed to failure (Jaeger-Erben et al, 2021, Social Design Lab, 2021).

2. Research focus

Since the concept of circular economy is often seen as too short and one-sided (e.g., Friant et al, 2020, Jaeger-Erben et al, 2021, Moreau et al, 2017), a more holistic approach is necessary which includes all members and key players of society. In our paper we therefore argue that to fully understand this transformation process we must broaden the perspective by including social, institutional and political aspects into this discussion and not only focusing on business and economic aspects. What is more we argue that only a turn towards a circular society by including all relevant social and political stakeholders might lead to a true transformation that has a relevant impact also on people and planet and not only the economy.

Therefore, and in line with the concept of a circular society (e.g., described by Jaeger-Erben et al, 2021) the current project will analyze a triad of the following relevant systems and their individual approaches, needs and attitudes towards circularity:

- The organizational system
- The political-economic system
- The social system

Firstly, the **organizational system** consists of economic organizations with their strategic management decisions including sustainable and circular aspects leading to business model innovation within enterprises and organizations. The activities and interests of this system regarding circular economy has already been widely researched, for example in the fields of sustainable business model innovation (e.g., Bocken et al, 2016; Geissdoerfer et al, 2020) or supply chain management (e.g., Geissdoerfer et al, 2018), but as stated above, to gain a more holistic picture, also the following two systems need to be considered.

Secondly, the **political-economic system** includes political institutions, political decision-making setting the legislative framework as well as economic institutions such as chamber of commerce and other special interest groups often influencing decision making processes. Involving this system is of enormous importance, as these institutions play a crucial role in the implementation of laws and rules (Moreau et al. 2017) and must also consider the overall welfare of society and the planet in addition to the economic perspective.

Finally, the **social systems**, including the society with their defining norms and values. These norms and values exist on a societal level but consequently affect the individual behavior and are including the stance on a sustainable and circular behavior. Although society plays a crucial role in the transformation towards a circular society, little is yet known about the share of this system in the change process (Ho et al, 2022; Moreau et al, 2017). While there are already some insights on the role of the civil society (e.g., Ho et al, 2022), which represents "an ecosystem of organized and organic social and cultural relations existing in the space between the state, business, and family" (VanDyck, 2017, p.1), there is still a need for a more comprehensive approach to take a closer look at the individual actors in this system and how they interact.

Thus, we argue that the transformation process towards a circular society will mainly be shaped and influenced by these three systems and their individual interests on this transformation. Especially when more actors with different interests come together, complexity increases (Ho et al, 2022) and may even lead to contradictory actions. Exploring the dynamic interplay of these three systems is therefore of crucial importance and will provide further insights into the transformation towards a circular society.

3. Method

After undertaking a literature review the understand the generic understanding of the circular society concept, we will design a focus group approach. As the concept of the circular society is relatively new, and currently little is known about the interrelatedness between the above identified systems shaping a circular society as well as the interests and motives of each group. Because of this explorative nature, we will adopt a qualitative approach to gain meaningful insights into first the interconnection between these systems and second insights – interests, motivations to participate in this transition, etc. - into each system. Therefore, we will use a focus group design with relevant stakeholders of each system. The aim of the focus group is to gain a broader understanding of the interrelated systems, but also of the interests of each system, which might be supporting or conflicting interests. *{Note from the authors: the focus group will be carried out beginning of May, the results will therefore be presented at the NBM Conference in June this year}*.

Using focus groups in social sciences has become widely accepted within the academic community and there is practical advice on how to design and carry out a focus group as well as on how to evaluate the findings. One of the advantages of a focus group is that it

allows the researchers to observe a large amount of interaction on a specific topic (Smithson, 2008). Furthermore, focus groups give participants the opportunity to engage in a discussion and consequently researchers can use this broad range of information to deliver meaningful insights (Hennink, 2014).

4. Results and conclusion

As potential results of this research approach, we expect to find a deeply interwoven structure between the three systems whereby the goal is to enlighten the power and/or influence of each system within this transformation process. We expect to find a power imbalance towards the social system as the political-economic system and the organizational system are better connected and organized and therefore can influence the transformation process towards their own advantage.

This abstract will contribute to the following theme: Design Thinking, Actor Engagement, and Legitimation in the Context of Circular Business Model Innovation

Keywords

Circular society, circular economy, sustainable business models, system level,

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Leveraging Business Model Innovation for Sustainability

Tentative Principles to Support True Co-Creation Between Students and SMEs

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Extended abstract

Re-thinking in both educational and business practices bears potential as major leverages for a transition towards sustainability. Bringing these together to facilitate learning and joint co-creation towards business model innovation for sustainability (BMIfS) can be a powerful force for action. This requires organizations to embrace a fundamental shift from the “profit-normative” logic (Upward & Jones, 2016) to the logic of sustainability-as-flourishing or “positive-impact companies” (Pavez et al., 2021). This new logic has been described as "[the] possibility that human and other life will flourish on the earth forever” (Ehrenfeld, 2000, p. 36). To achieve this end, organizations must conceptualize and realize new business logics. While startups are well-positioned to create new business logics because they are less burdened by the rigid mindsets and organizational inertia, established organizations such as SMEs face much bigger challenges (Chesbrough, 2010). Change is often met with strong resistance as managers prefer to do what they have always done and been incentivized for (Chesbrough, 2010; Kerr, 1995; Prahalad & Bettis, 1995).

Several authors have iterated the importance of co-creation and collaboration with multiple stakeholders for BMIfS (e.g., Breuer et al., 2018; Brown et al., 2021). Classroom settings provide the ideal setting to collaboratively engage multiple stakeholders (students, teachers, researchers, practitioners, and others) in generating new knowledge and experimenting with ways to improve contemporary “real world” situations (Beynaghi et al., 2016; Holgaard et al., 2016; Holm et al., 2015; Kurucz et al., 2014). However, most higher education remains fundamentally disciplinary and rest in silos, giving students little opportunity to deal with “messy” real-world challenges (Dyllick, 2015). Sustainability challenges are usually wicked and hard to resolve, demanding creative, systemic, and divergent approaches such as problem-based learning (Muff, 2013). There are, however, many organizational and practical challenges to implementing such activities, such as fixed mindsets and timeframes, as add-ons and with no or limited budgets. This limits the opportunities for students

to learn and practice more systems thinking and critical thinking, which is applied to real-life situations (Dyllick, 2015; Guerra, 2017; Muff, 2013; O'Brien & Sarkis, 2014). Furthermore, proactive commitment from SMEs to truly co-create is still weak, inhibiting innovative experiential learning initiatives for BMIfS together with students.

BMIfS have a vital role in achieving a sustainable transition. However, the role of the firms, e.g., their business models entangled in complex ecosystems and how to support sustainability, have achieved little attention (Bidmon & Knab, 2018). In addition, the educational facet in supporting businesses in such transitions appears insufficiently addressed. In particular, the practical implementation of learning activities that aim to strengthen students' and businesses' capabilities for BMIfS (Wyss, Meyer & von Kutzschenbach, 2021). This paper aims to contribute to both by addressing the knowing-doing gap and challenges in true co-creation for BMIfS between students and SMEs and establishing tentative principles to approach it. These principles can support educators in enabling and developing co-creative educational approaches for BMIfS with students and SMEs.

Illustrative Experiences from Two BMIfS Initiatives with Students and SMEs

This research includes observations from two illustrative initiatives and their responses to support the design of educational co-creative BMIfS with students and SMEs. The first initiative, "Think Tank- Business Model Innovation (TT-BMI)", illustrates an action-oriented research project that was launched in 2021 at the University of Applied Sciences and Arts Northwestern Switzerland, FHNW (www.TT-BMI.ch). It aims to gain a deeper understanding of what an appropriate educational initiative should look like to enable collaborative, inter- and transdisciplinary BMIfS with students and SMEs in the Upper Rhine Region. The initiative is in the process of launching several pilot formats ranging from semester-long electives to summer schools and extracurricular, multiple-day workshops. The second initiative, "Uncovering Business Opportunities Opened by a Climate-Neutral Car", illustrates a shorter co-creation challenge for students with a Swedish SME called Polestar. The initiative was integrated as part of the already existing curriculum at University Halmstad with the scope of co-creating a complete business model following different time horizons.

Reflection and Tentative Principles for Designing Co-creative BMIfS Initiatives with Students and SMEs

From the illustrative initiatives, a number of underlying causes for the challenges of true co-creative BMIfS with students and SMEs could be identified. Based on these observations and our experience, we suggest the 7C tentative principles as a means to bridge the knowing-doing gap. These include **C**onfirmation, **C**onfidence, **C**reativity, **C**redibility, **C**ommunication, **C**apability to co-create, and **C**ompetence to address the Systems-Citizenship Gap. For successful BMIfS co-creation initiatives with students and SMEs, these principles need to be mutual, creating value for both students and SMEs as well as the educational institutions. The co-creation initiatives must be flexible, systemic design-based formats organized around a concrete business model innovation relevant challenge to serve as a boundary object. The tentative principles are described as follows:

1. **Confirmation:** Enable opportunities for identity confirmation.
2. **Confidence:** Create arenas and activities to boost confidence in oneself and one's capabilities.

3. **Creativity:** Creatively use resources and ongoing activities to encourage problem-solving and innovation.
4. **Credibility:** Invest time in the relationship between the different parties to create credibility (trust and access).
5. **Communication:** Invest time to communicate with different parties to align objectives, worldviews, and expectations.
6. **Capability to co-create:** Invest time and provide practice opportunities to develop skills and capabilities to have productive conversations.
7. **Competence to address the Systems-Citizenship Gap**: Enable deeper understanding of embeddedness of business activities in socio-ecological systems and resulting interdependencies for BMIfS.

Conclusion

Educating to enable students and SMEs to innovate business models for sustainability and be respons(able) future leaders takes us into unfamiliar territory. It is unfamiliar to everyone. Education for BMIfS is a wicked problem, too. There is no predefined curriculum, any more than there is agreement on the learning process that will be needed. Moreover, it is not a job for educators alone. The inherent resistance to change in social systems (like SMEs or universities) will continue to thwart the transition to sustainability until communities of people from business and educational institutions start working together to create an innovative learning environment for true co-creation for BMIfS with students and SMEs.

Our insights strengthen Giesenbauer and Müller-Christ's (2020) idea of a University 4.0, in which higher education institutions focus on creating collaborations, co-creativity, and inter-organizational networks with stakeholders of all kinds (teachers, researchers, students, industry, and organizations), in the generation of both knowledge and solutions to reduce the complexity as perceived by SMEs and take on the role as change agents for sustainable development.

Building on the tentative principles discussed above, it might be helpful to initiate a systemic design challenge to address the topic of "How might a true co-creative BMIfS initiative with students and SMEs for a flourishing world look like?". As this is not a technical problem and we might only be able to dissolve it (s. Ackoff, 1981), we are also being challenged to experiment with different kinds of research in education for BMIfS, like design-based research. Additionally, longitudinal research is needed to follow up on how SMEs handle the BMIfS ideas and their impact, as Snihur and Bocken (2022) also suggested.

Keywords

Business Model Innovation for Sustainability, Co-Creation, Higher Education, Organizational Learning, Experiential Learning

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Dynamic Capabilities for Enhanced Sustainability Performance: A Multiple-Case Study in the Construction Industry

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Abstract

Businesses in the construction industry need to improve their sustainability performance, considering the sector's large environmental and social footprint. A number of construction organizations have now taken steps to embed sustainability in their strategy and way they do business. Far from sustainability being a cost, these organizations realized new opportunities and gained sources of competitive advantage. Research is increasingly recognizing dynamic capabilities for sustainability as an important aspect in helping organizations with these rapidly changing regulations and customer requirements for sustainability. They can help organizations sense these new sustainability opportunities, adapt their business model and strategy to seize them, and transform their organization to fit with this new way of doing business. Focused on the construction industry, this research does a multiple case study of organizations at an enhanced level of sustainability performance, looking to better understand how they developed their dynamic capabilities for sustainability to achieve their current level.

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All training programs, including PhD, are open to international students. LUMSA has signed more than 160 bilateral agreements worldwide (Europe, the Americas, Asia and Africa). In 2017, LUMSA has 13 currently running projects funded by the EU, including H2020, COST, and Jean Monnet. It has been awarded by the European Commission with two Excellence Labels: ECTS and DS (Diploma Supplement) Label. LUMSA is the owner of its premises and research facilities. LUMSA promotes and supports basic and interdisciplinary research through the University Centre for Research and Internationalization and the Ethics Committee for Scientific Research whose remit is to evaluate and advice on research proposals submitted by scholars working at LUMSA. LUMSA is a member of the Agency for the Promotion of European Research, part of the EURAXESS network- Researchers in Motion - and Eduroam (Education Roaming). LUMSA is member of the Joint Management Committee for the international large scale assessment study on Civic and Citizenship Education promoted by IEA (International Association for the Evaluation of Educational Achievement) ICCS 2022.