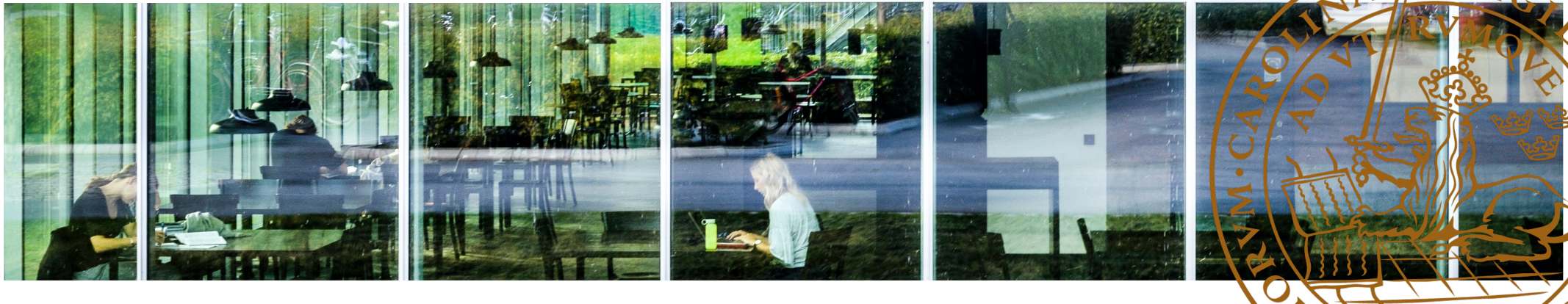




Beyond Open Source

RELEASING THE MIND @ ALFA LAVAL
PROFESSOR PER RUNESON, LTH



Background – Open Source Software

- 1960/70's – software into the bargain
- 1980's – political movement
- 1990's – commercial (Linux)
- 2000's – databases (MySQL), Android
- 2010's – everywhere

<https://dx.doi.org/10.1109/MC.2020.3041887>



OSS is more than the code

...the **maturity** of the community.
...if here is a "**backing organization**"
taking a long-term responsibility.
...what type of **participants** in the
community that are active.
The **roadmap** of the open source
project...

Höst *et al*, 2011

https://dx.doi.org/10.1007/978-3-642-21843-9_13

Usage of Open Source in Commercial Software Product Development – Findings from a Focus Group Meeting

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Abstract. Open source components can be used as one type of software component in development of commercial software. In development using this type of component, potential open source components must first be identified, then specific components must be selected, and after that selected components should maybe be adapted before they are included in the developed product. A company using open source components must also decide how they should participate in open source project from which they use software. These steps have been investigated in a focus group meeting with representatives from industry. Findings, in the form of recommendations to engineers in the field are summarized for all the mentioned phases. The findings have been compared to published literature, and no major differences or conflicting facts have been found.

Keywords: open source, industrial, off-the-shelf components

1 Introduction

Open source software denotes software that is available with source code free of charge, according to an open source license [1]. Depending on the license type, there are possibilities to include open source components in products in the same way as other components are included. That is, in a large software development projects, open source software can be used as one type of component as an alternative to components developed in-house or components obtained from external companies.

There are companies that have experience from using well known open source projects. Munga et al. [2], for example, investigate business models for companies involved in open source development in two cases. They conclude that "the key to successful open source development is to have a clear business model and to have a strong community around the project".

Open source – products and tools

- OSS in products
 - Linux
 - MySQL
 - ROS
- OSS tools
 - Git
 - Gerrit
 - Jenkins
 - TensorFlow
 - R



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Strategies for open tools

Strategy

Proactive

Lucrativeness
(Think tank)

Leaders

(Growth through ecosystems)

Reactive

Laggards
(Business as usual)

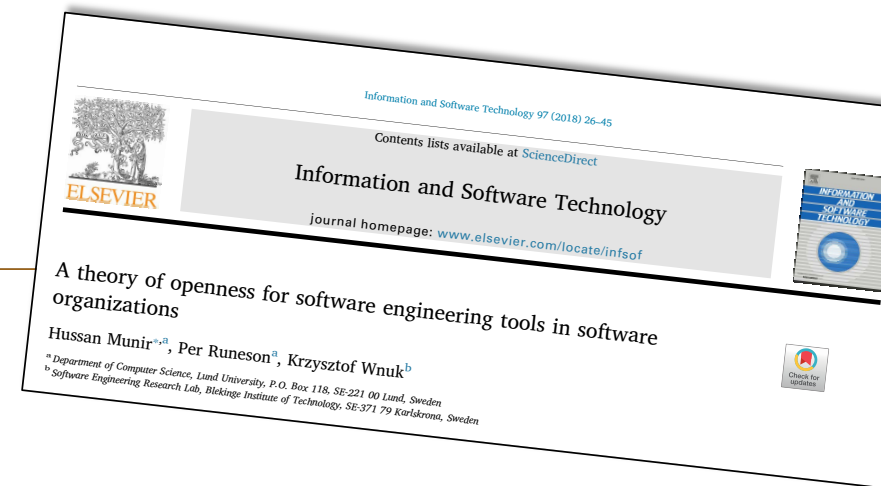
Leverage

(Resource optimization)

Cost saving

Inspirational

Why



<https://doi.org/10.1016/j.infsof.2017.12.008>

Triggers of Openness – why engage?

- Access to skilled workforce
- Faster development speed
- Low license costs and switching costs
- Flexibility in tool usage and adaptations
- Shared cost with the ecosystem
- Governing ecosystem

<https://doi.org/10.1109/MITP.2019.2893134>

Feature Article

How Companies Use OSS Tools Ecosystems for Open Innovation

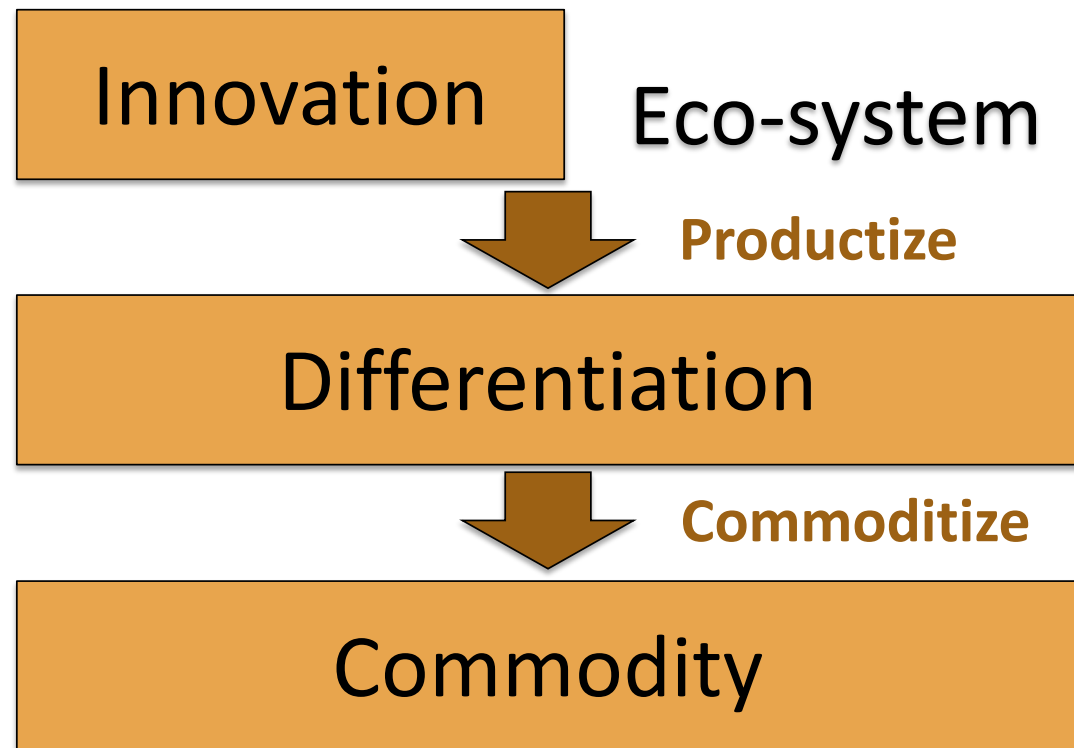
Hussan Munir
Lund University

Per Runeson
Lund University

Krzysztof Wnuk
Blekinge Institute of Technology

Abstract—Moving toward the open innovation (OI) model requires multifaceted transformations within companies. It often involves giving away the tools for product development or sharing future product directions with open tools ecosystems. Moving from the traditional closed innovation model toward an OI model for software development tools shows the potential to increase software development competitiveness and efficiency of organizations. We report a case study in software-intensive companies developing embedded devices (e.g., smartphones) followed by a survey in OSS communities such as Gerrit, Git, and Jenkins. The studied branch focuses on developing Android phones. This paper presents contribution strategies and triggers for open innovation. These strategies include avoid forking OSS tools, empower the ecosystem, steer ecosystem, and differentiation.

Open products



Novelty focus

Value focus

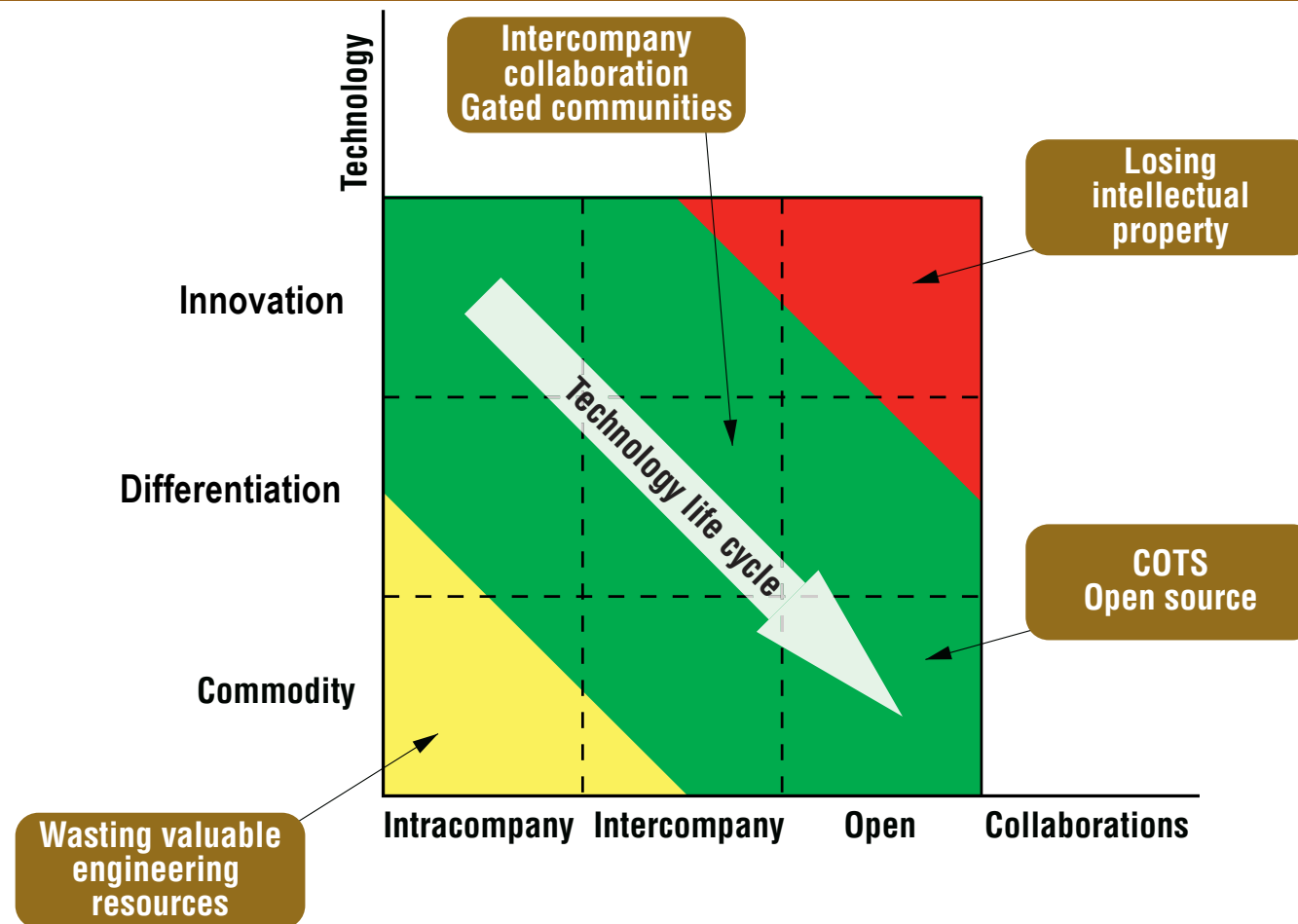
Cost focus



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Commodity vs openness

Lundell *et al.* Commodification of Industrial Software: A Case for Open Source, *IEEE Software*, 26(04):77-83, 2009. doi: 10.1109/MS.2009.88



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Recommended strategies – for open software

1. Establish legal framework and contribution processes
2. Set contributions strategy – look beyond the code
3. Share now or later

<https://doi.org/10.1016/j.jss.2017.09.032>

<https://itea3.org/news/new-book-by-itea-project-scalare-principles-for-industrial-open-source.html>



Recommended practices – how to engage?

- Avoid forking open tools
- Empower developers to participate
- Steer ecosystems through contributions
- Create business through differentiation
- Create new ecosystems

<https://doi.org/10.1109/MITP.2019.2893134>



Summary of our findings – on OSS tools



TinyToCS @TinyToCS · 11 mars 2016



Sharing software tools enables open innovation, brings faster upgrades and frees up resources, but demands investments in the open community

🌐 Översätt tweet



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Beyond open source software...



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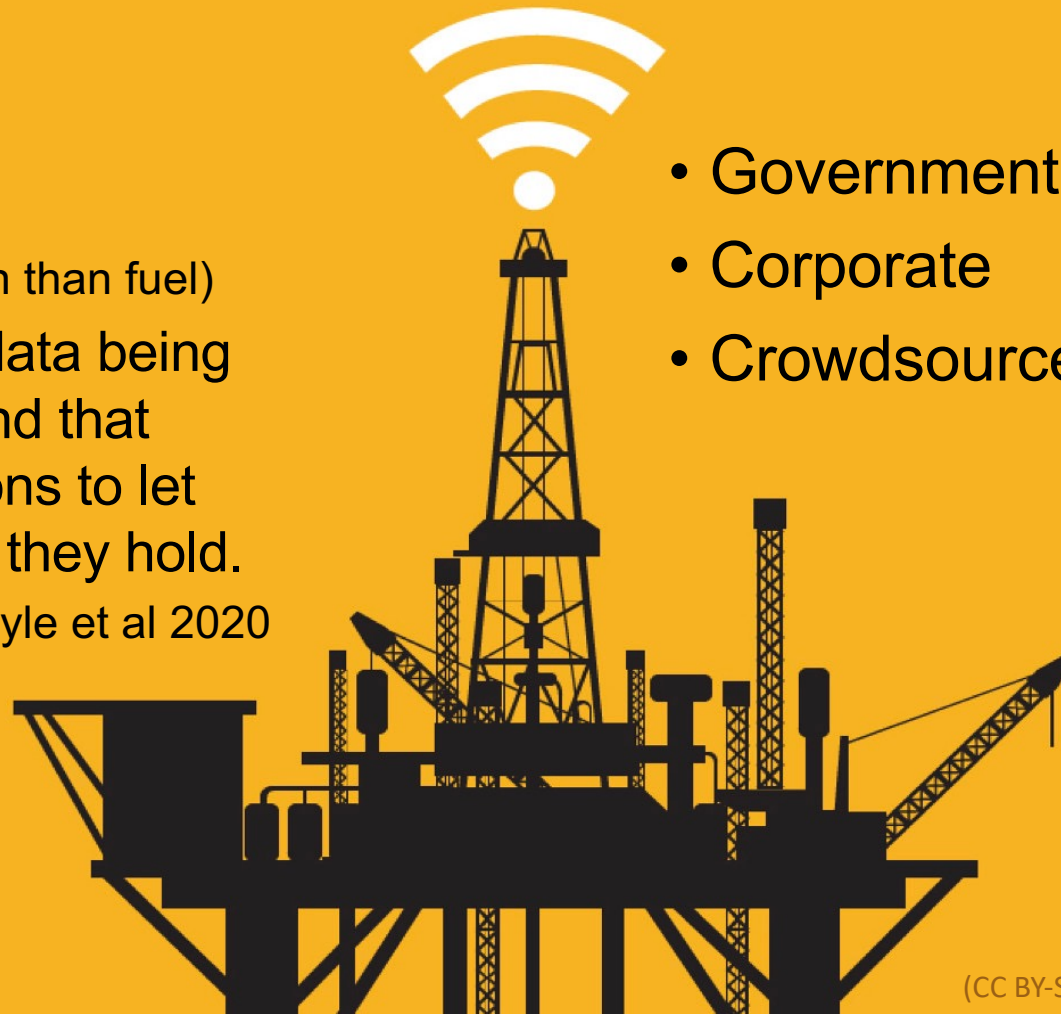
...is Open Data

of different kinds

- Data is the new oil
Clive Humby, 2006
(maybe more lubrication than fuel)
- Value comes from data being brought together, and that requires organisations to let others use the data they hold.

Doyle et al 2020

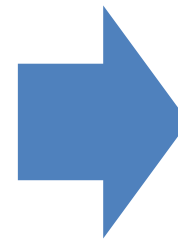
- Governmental
- Corporate
- Crowdsourced



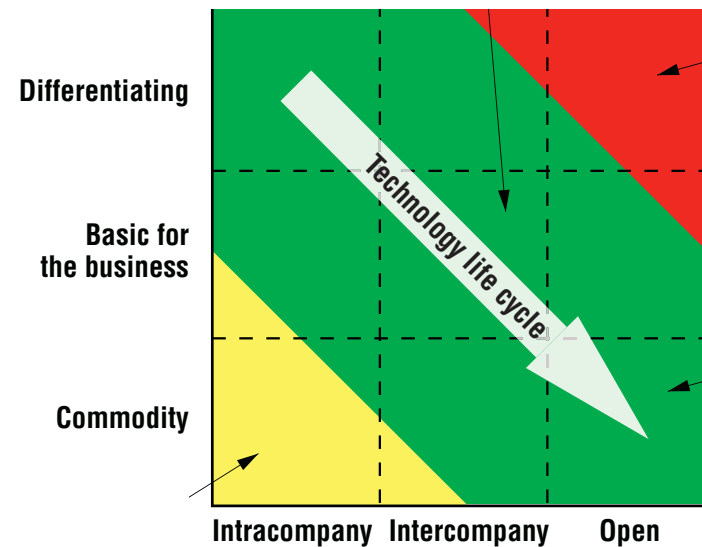
(CC BY-SA 2.0) Gerd Leonhard

Data challenges and opportunities

- Costs for *data maintenance*, *quality assurance* and *annotation* is an upcoming challenge
- Data will gradually become *commodity* for some functionality



Open data ecosystems?



Alfa Laval, 1999

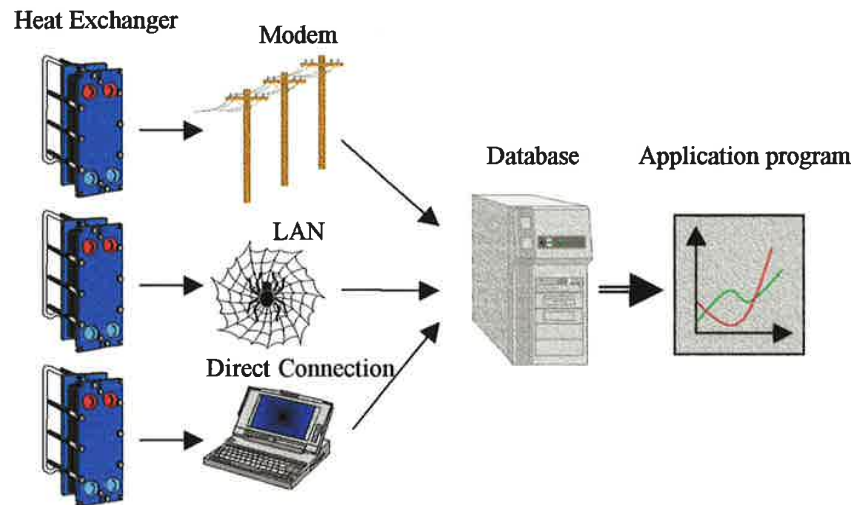


Figure 4.5. Possible ways of accessing Heat Exchanger data

up the OS/2 computer modem. Economically, the OS/2 platform solution is more preferable to Alfa Laval Thermal due to the lower phone bills caused by the H.E. Monitors dialling up the OS/2 computer. System development time is also reduced if choosing this solution because no implementation of the modem transfer protocol is needed. An important aspect is that the ISMAL system is independent of the system,

CODEN: LUTEDX (TETS -5346)/1-62)/(1999) & local 2

Master Thesis:

Process Monitoring -

A study of interfaces involved in a *Process Monitoring System*

January, 1999

by

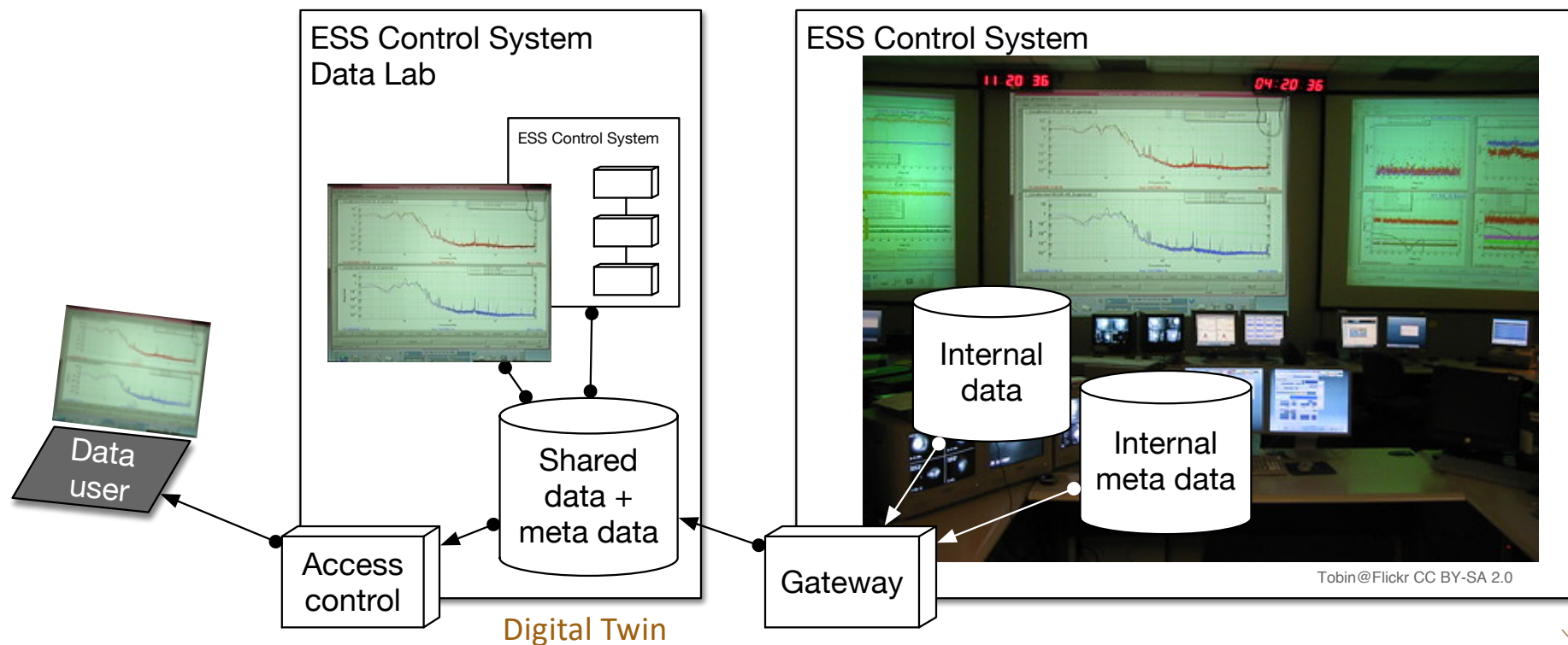
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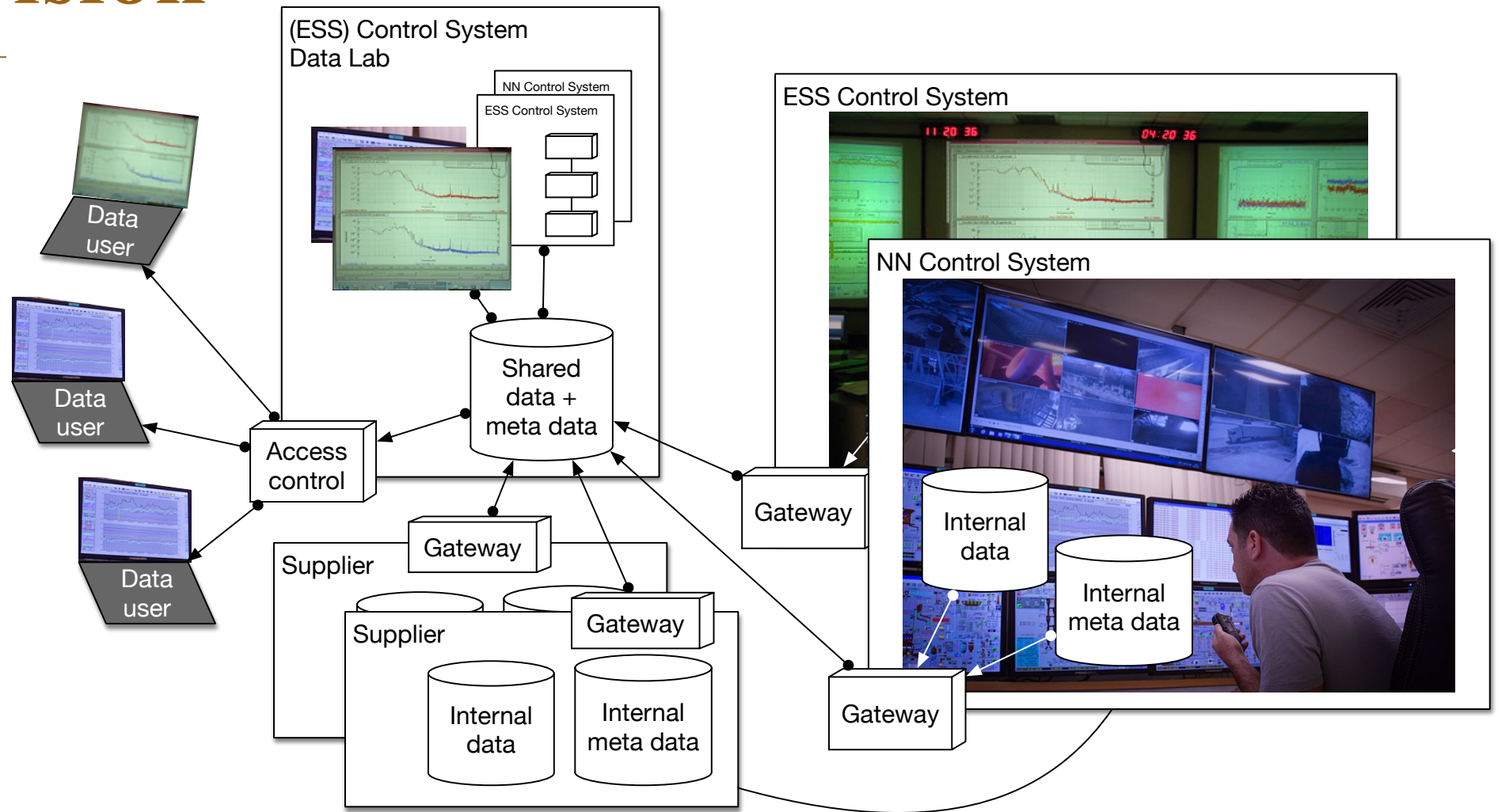


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ESS Control System Data Lab – A proposed architecture for data ecosystem

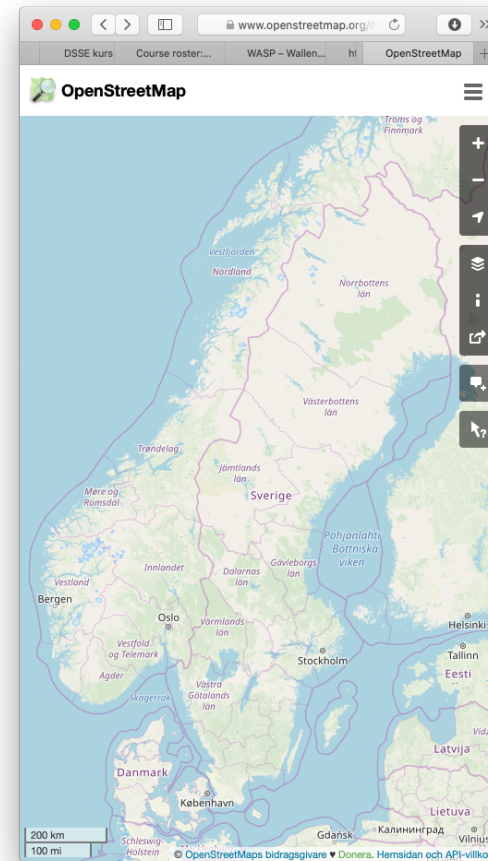


Vision



Differences between **data** and **data**

- Type:
 - Natural/legal persons
 - Natural/designed phenomena
- Currentness:
 - Continuous flow of real-time data
 - Event-based
 - On demand batches of data
- Source
 - Crowdsourcing
 - Public collection



Initial recommendations for data ecosystems

Value

There must be a business value in the data or the collaboration

Intrinsics

Consider data type, standardize format and establish legal framework

Governance

Define level of openness and platform ownership

Evolution

Advance business models and tool support



Future research: B2B Data Sharing for Industry 4.0 Machine Learning

Business models

*Professor Christian Kowalkowski,
industrial marketing, LiU*

- Value creation
- Value capture
- Key resources and processes
- Ecosystem dynamics

Collaboration tools

*Professor Per Runeson,
software engineering, LU*

- Protect data
- Control access
- Support change
- Enhance data

Beyond open source....

- Open source software products and tools
 - established practice
 - define strategy
 - for commodity software
- Open data
 - emerging practice
 - innovation potential

■ Industriföretag, särskilt i processindustrin, att etablera data-delning som praxis för att möjliggöra innovation kring data.

"Industrins data leder till innovationer - om den delas"

DEBATT

Teknikens "big five" (Facebook, Amazon, Apple, Microsoft och Google) bygger sina framgångsrika affärer på data från konsumenterna. De läser in oss användare och våra data och kan därigenom innovera på nya sätt.

För industriföretag som inte samlar konsumentdata är läget ett annat. Data som behövs för att innovera inte av vad ett enskilt företag själv kan samla in, föredra och underhålla.

Därför behöver svensk industri dela data. Det finns några spännande initiativ i det Vinova-finansierade Pää-programmet och AI Sweden, men Finland och Tyskland har gått längre.

I processindustrin delas driftdata från ESS, European Spallation Source, för forskning i maskinlärt i industri 4.0-tillämpningar. Pää, ett av de största förskottsbetalade uppdragen, är ett skript som skapar "data", men tyvärr är företagen inte alltid lika benägna att dela med sig. Vi menar att det finns affärsmöjligheter - på löpande sätt som för öppen källkod

- där tillgången till data effektiviseras genom att fler delar på insamlings-, förädlings- och underhållskonstruktions och nya innovationer kan skapas utanför de organisationer där data samlas in.

Naturligtvis ska vissa data hållas strikt inom företagen, men inte all data har direkt affärsvärde. Däremot kan data skapa affärsvärde i samverkan med andra.

Vi har studerat fyra framväxande ekosystem för data-delning i Sverige:

- I processindustrin delas driftdata från ESS, European Spallation Source, för forskning i maskinlärt i industri 4.0-tillämpningar.
- Vinova, ett i sitt uppdrag att stötta förordningsinstruktioner av särskilt värde för svenskt näringsliv, inkluderar data från driften av ESS och Max IV som innovationskatalysator för processindustrin.
- Myndigheter, i sina digitaliseringsuppdrag, att utveckla öppen källkod och öppna data för att öka transparens och innovationskraft för Sverige, samt minska tilläggseffekter.
- Genom att dela data, och därmed kostnader för insamling, förädlning och underhåll, kan såväl företag som myndigheter bidra till effektivisering.

Data bidrar då till öppen innovation som en motkraft mot att "the big five" tar sig in i nya domäner.

"Data bidrar till öppen innovation som en motkraft till 'the big five'."

Per Rönneron, professor, Lunds universitet.

Karin Rönneron, forskningschef, European Spallation Source.

Erik Thomas Chassagnon, teknisk direktör, Pää - Research Institute of Sweden.

Ny Teknik 8/2021, 29 april



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WASP Research Program

Wallenberg AI, Autonomous Systems and Software Program at Lund University



Swedish website:
Robotics week, learn to code, programming contest...



A photograph of a multi-story brick building with a grid of windows. The windows are white-framed and some have light blue curtains. The brick is a reddish-brown color. The text "WE ARE OPEN" is overlaid in the center in a large, white, sans-serif font.

WE ARE OPEN

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<http://www.lth.se/digitalth>

