Open source and open data for automotive – threats or opportunities?

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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


OPEN SOURCE EXPANDED

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A Brief History of Free, Open Source Software and Its Communities

Jesus M. Gonzalez-Barahona, Universidad Rey Juan Carlos

Free, open source software (FOSS) has a long history, beginning with the origins of software itself, when the terms free software and open source software were not yet defined. Learning about the milestones of this history may help to understand FOSS today.

computers, with IBM being, by a large margin, the market leader. For all of them, software was just a companion to hardware: as long as you paid for maintenance, you had access to the software catalog of the manufacturer. User groups, such as SHARE (IBM) and the DECUS [Digital Equipment Corp. (DEC)] favored software sharing. To some

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

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Open source in mobile devices – 2011

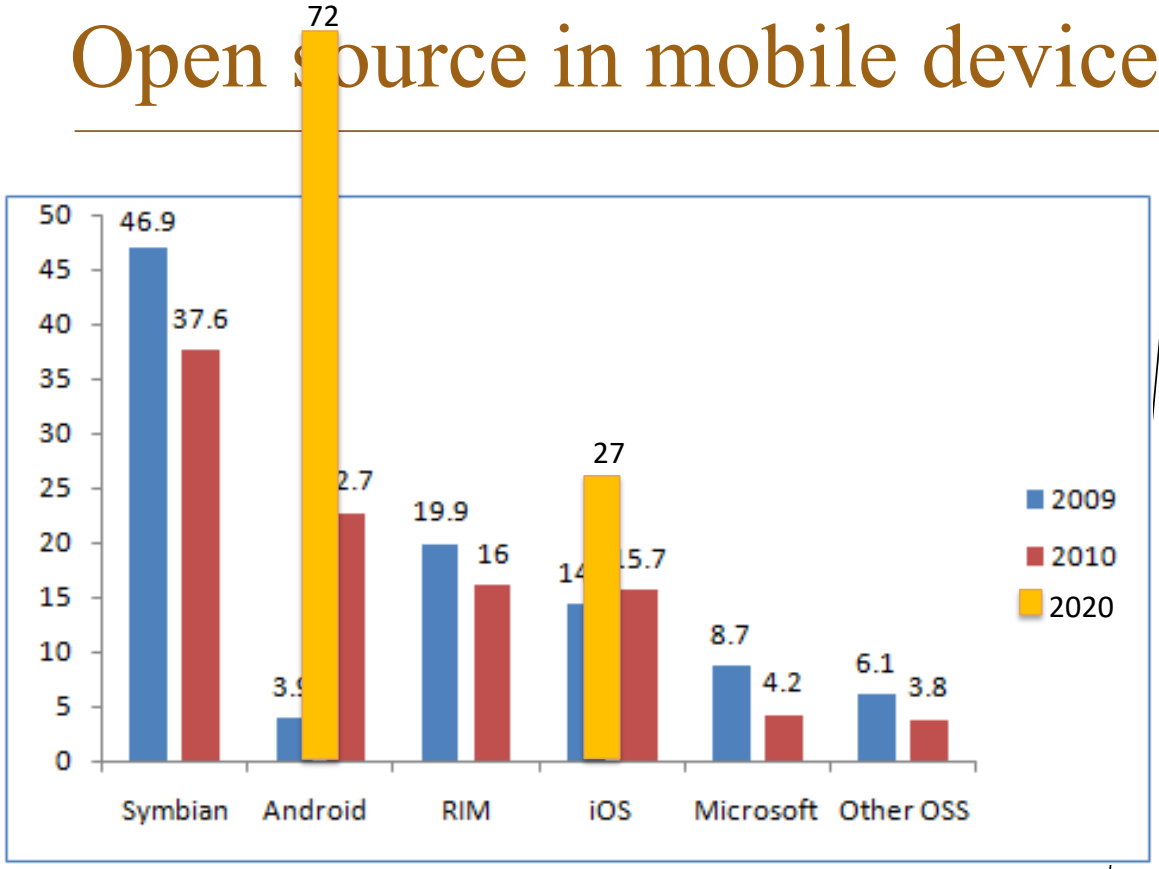

Fig. 1. Worldwide smart-phone Market shares (%) by platform in 2009/2010 (Gartner, 2011)

Open-Source Software Implications in the Competiti
Mobile Platforms Market

Salman Qayyum Mian[1], Jose Teixeira[2], and Eija Koskivaara[3]

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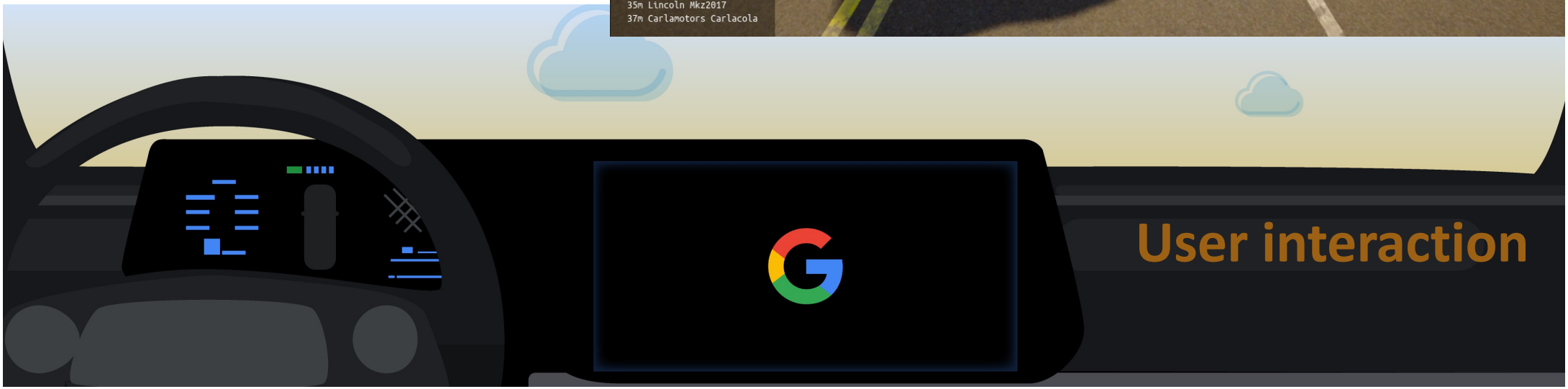
Abstract. The era of the PC platform left a legacy of competitive strategies for the future technologies to follow. However, this notion became more complicated, once the future grew out to be a present with huge bundle of innovative technologies, Internet capabilities, communication possibilities, and ease in life. A major step of moving from a product phone to a smart phone, eventually to a mobile device has created a new industry with humongous potential for further developments. The current mobile platform market is witnessing a platforms-war with big players such as Apple, Google, Microsoft in a major role. An im

Open source in automotive

Core

AUTOMOTIVE GRADE LINUX

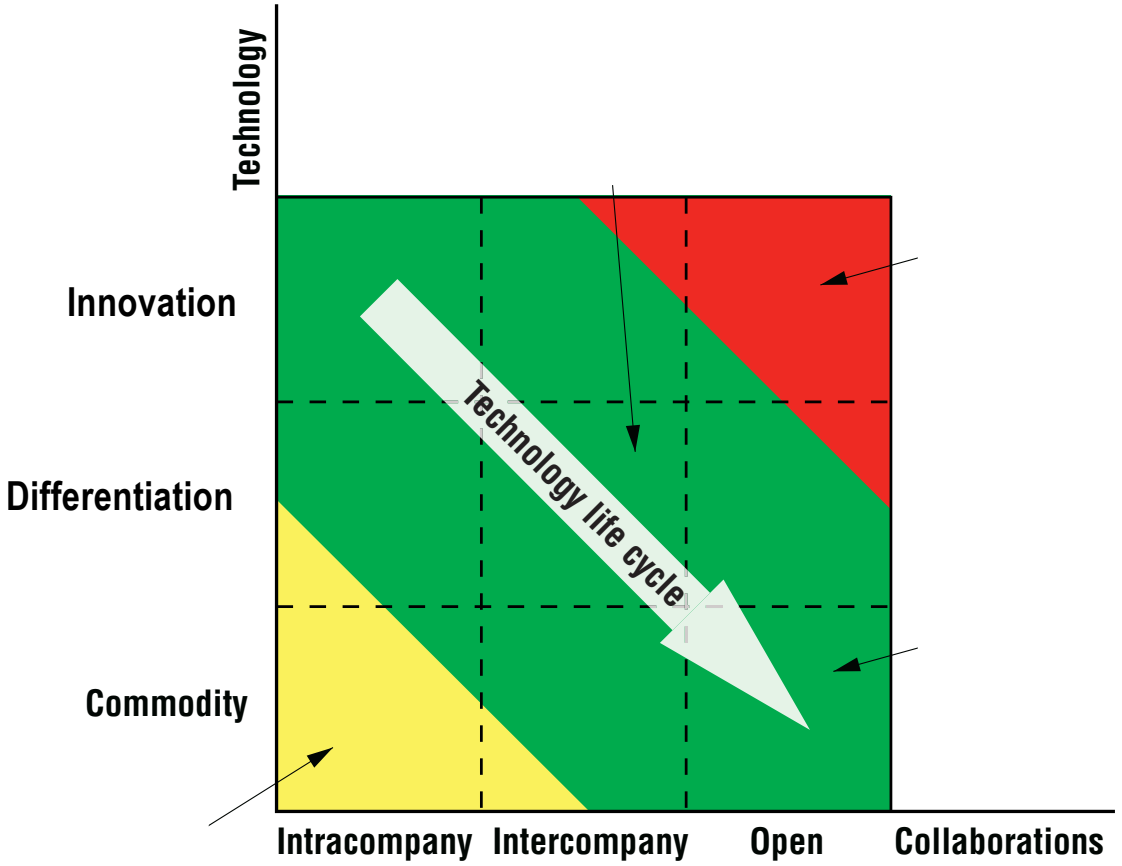
Tools



User interaction

Why Open Source? Commodity vs openess

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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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

Feature Article

How Companies Use OSS Tools Ecosystems for Open Innovation

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Lund University

Per Runeson
Lund University

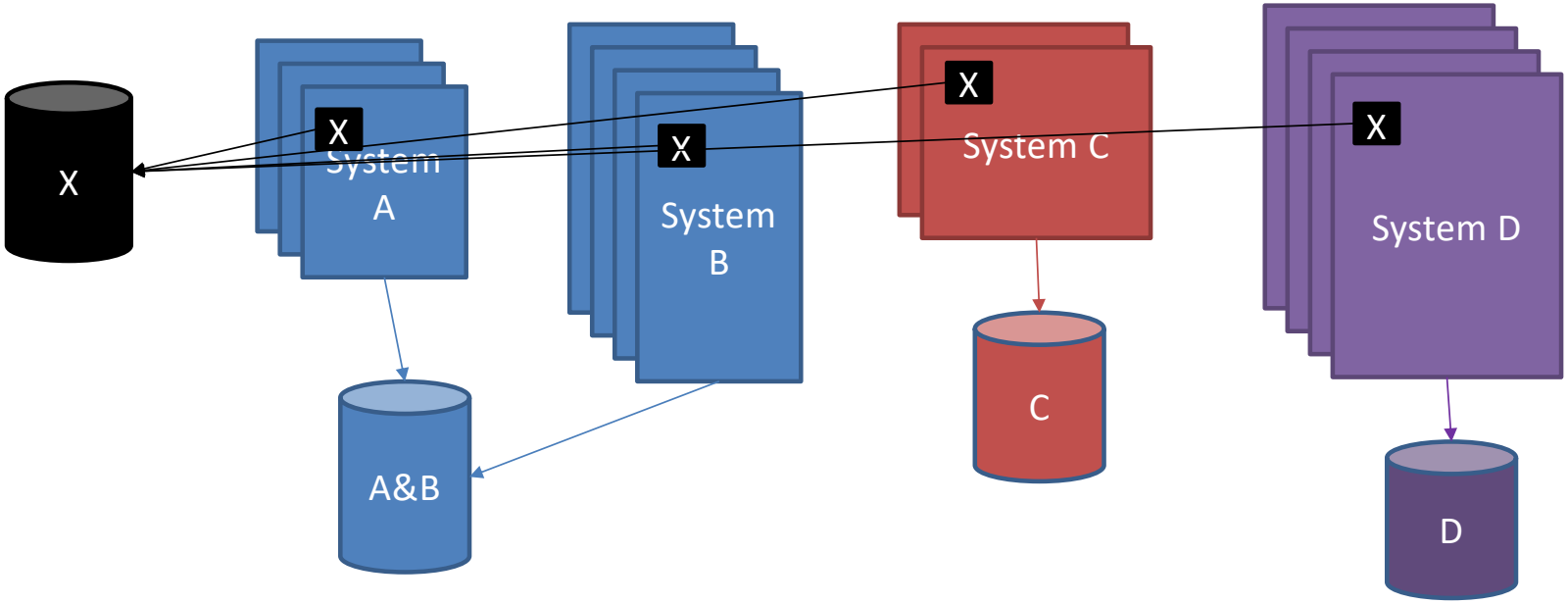
Krzysztof Wnuk
Blekinge Institute of Technology

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

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

Beyond open source software…

AI/ML impact on Open Source: Open Data



Today: X is an **OSS** component
Improved by **programmers**
Governed by **manual** decisions

Tomorrow: X is an (open) **ML** component
Improved by **data and learning**
Governed by **automated** decisions

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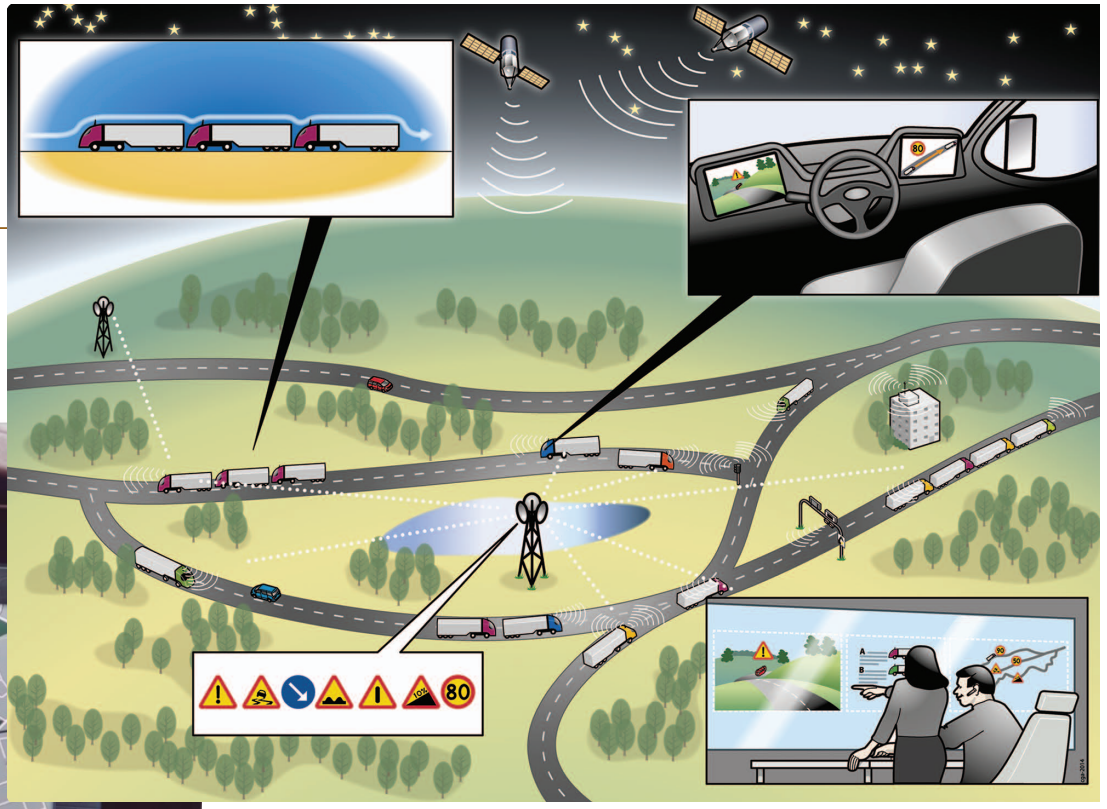
Automotive scenarios

data for road safety

Safety Related Traffic Information Ecosystem: Data for Road Safety
Live Vehicle, Crowd and Infrastructure Data improving road safety across Europe

Current

https://www.dataforroadsafety.eu



Future

https://dx.doi.org/10.1109/MCS.2015.2471046

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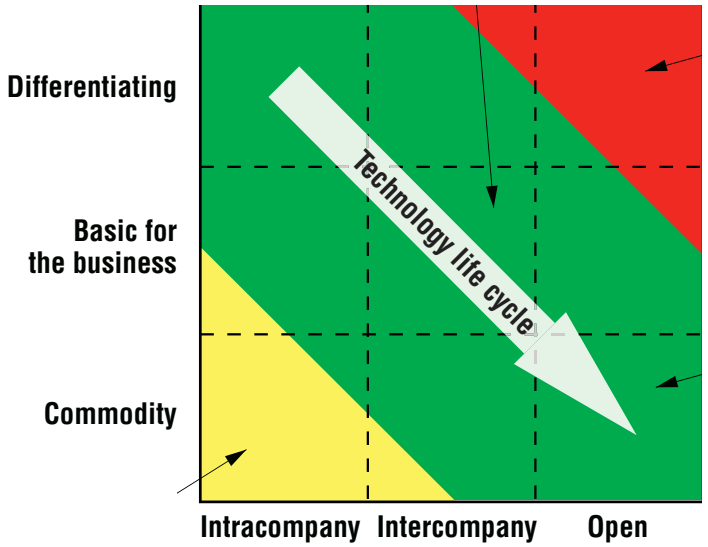
Data challenges and opportunities

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

Open data ecosystems?



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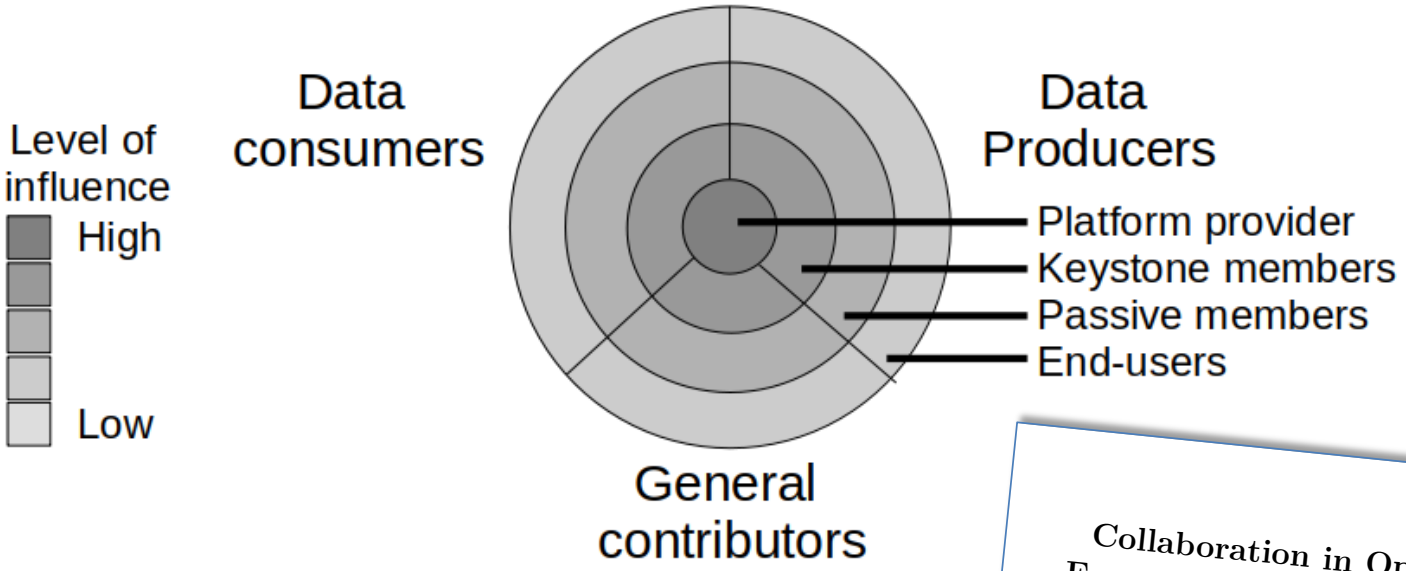
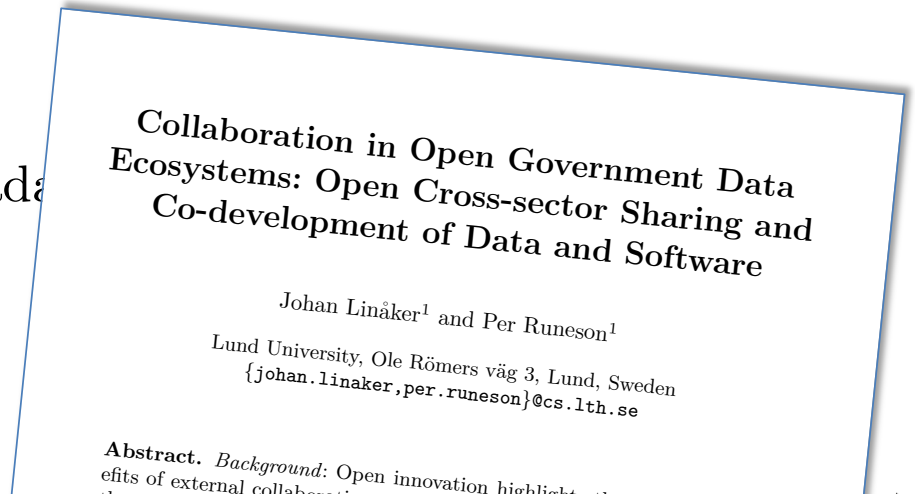
Open Data Ecosystem



Overview of the proposed governance model ada



Collaboration in Open Government Data Ecosystems: Open Cross-sector Sharing and Co-development of Data and Software

Johan Linåker[1] and Per Runeson[1]

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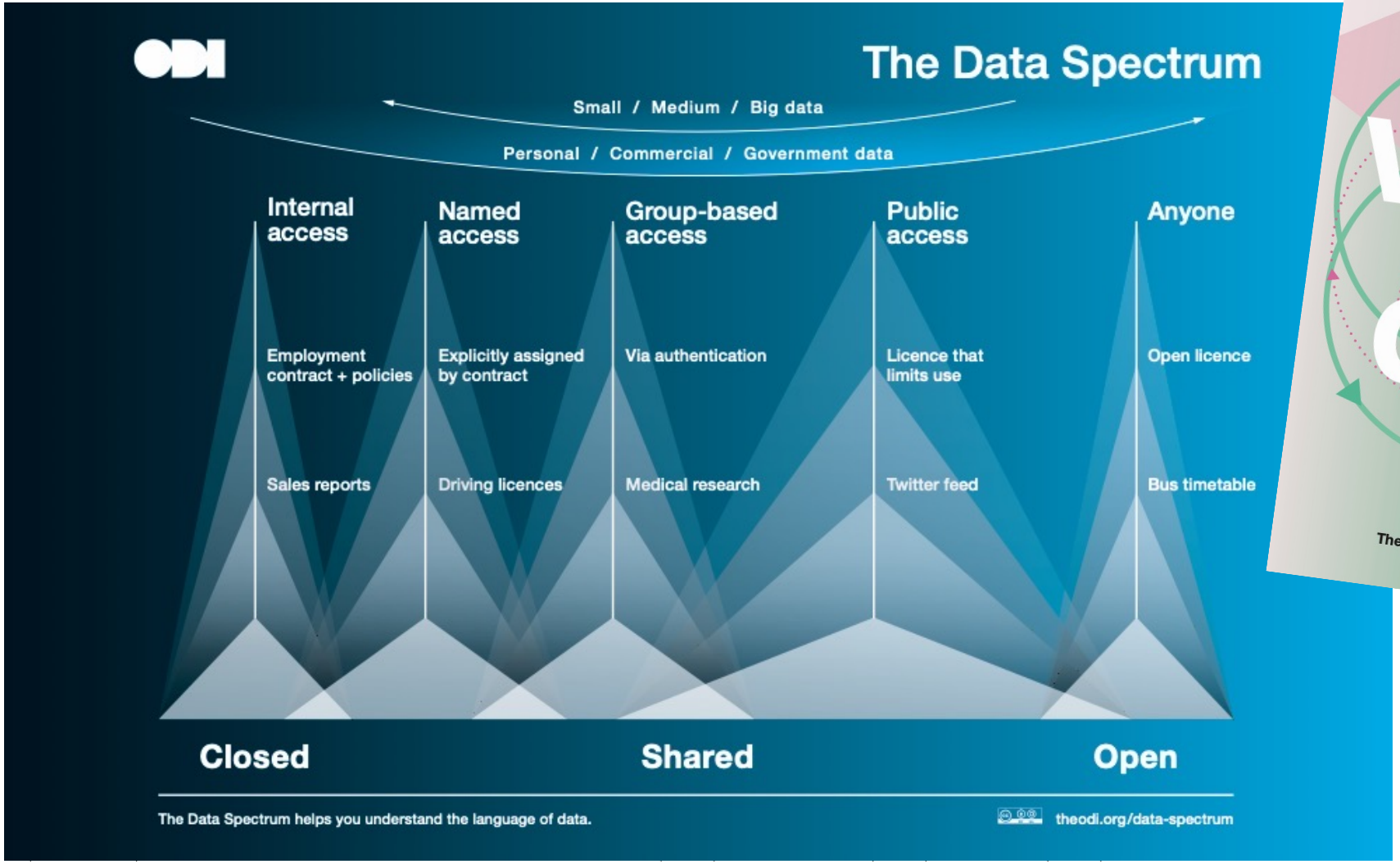
Abstract. *Background*: Open innovation highlight
efits of external collab

How open is open?



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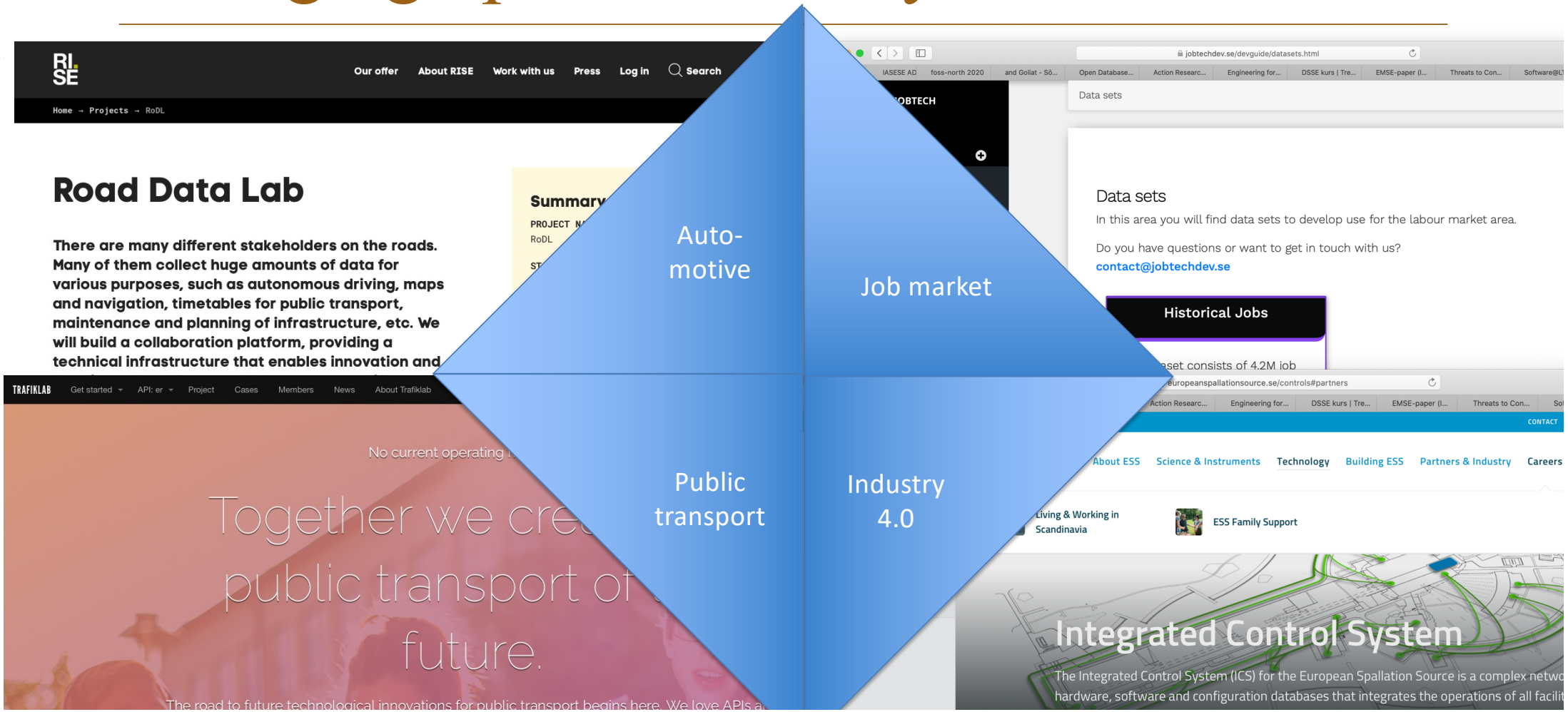
Emerging open data ecosystems



Initial recommendations for data ecosystems

Value

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

Intrinsics

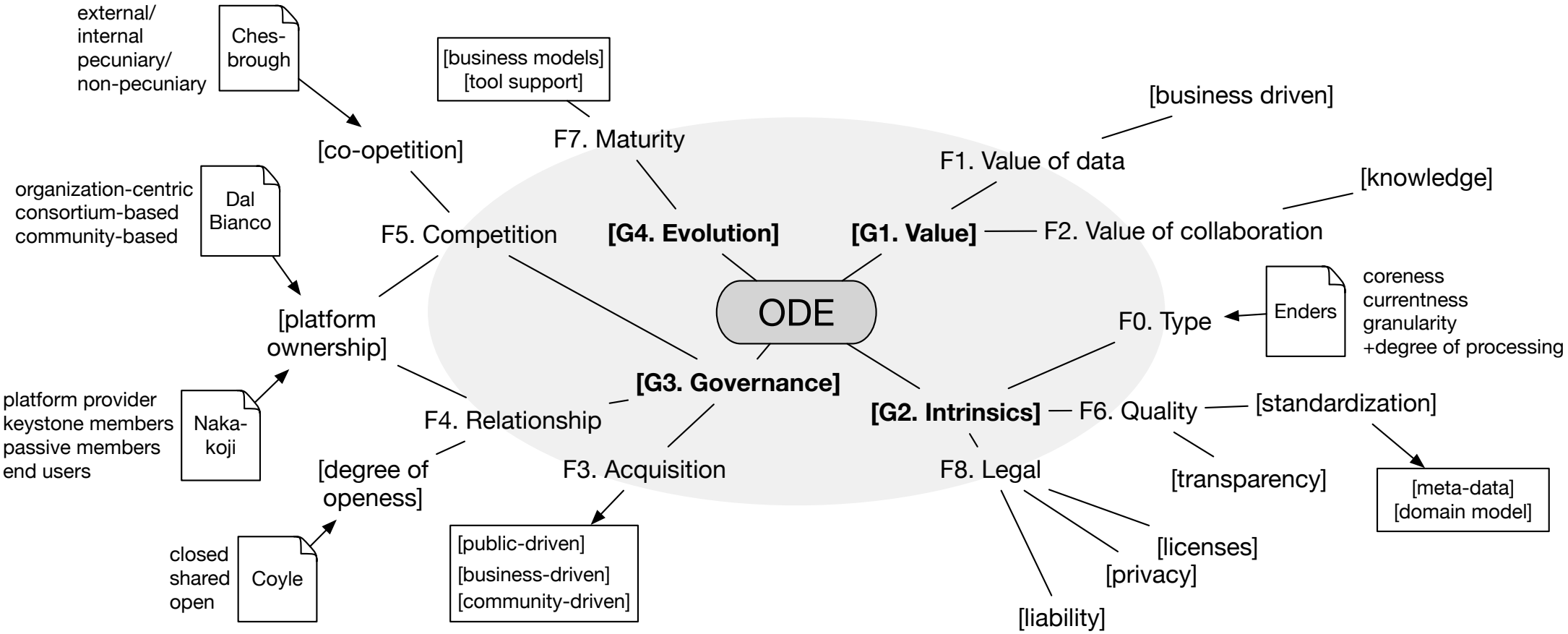
Consider data type, standardize format and establish legal framework

Governance

Define level of openness and platform ownership

Evolution

Advance business models and tool support


external/
internal
pecuniary/
non-pecuniary
Ches-
brough
[business models]
[tool support]
[business driven]
[co-opetition]
F7. Maturity
F1. Value of data
[knowledge]
organization-centric
consortium-based
community-based
Dal
Bianco
F5. Competition
[G4. Evolution]
[G1. Value]
F2. Value of collaboration
ODE
Enders
coreness
currentness
granularity
+degree of processing
[platform
ownership]
F0. Type
[G3. Governance]
platform provider
keystone members
passive members
end users
Naka-
koji
F4. Relationship
[G2. Intrinsics]
F6. Quality
[standardization]
[degree of
openess]
F3. Acquisition
F8. Legal
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[meta-data]
[domain model]
closed
shared
open
Coyle
[public-driven]
[business-driven]
[community-driven]
[licenses]
[privacy]
[liability]

Threats and opportunities for automotive

Threats

- Other actors (big five) dominate
- Data costs increase
- Leaking innovation

Opportunities

- Take lead for mobility data
- Sharing commodity data costs
- Speeding up innovation

Is this engineering?

- No – it is business, law, management, policy…
- Yes – it enables data-driven engineering

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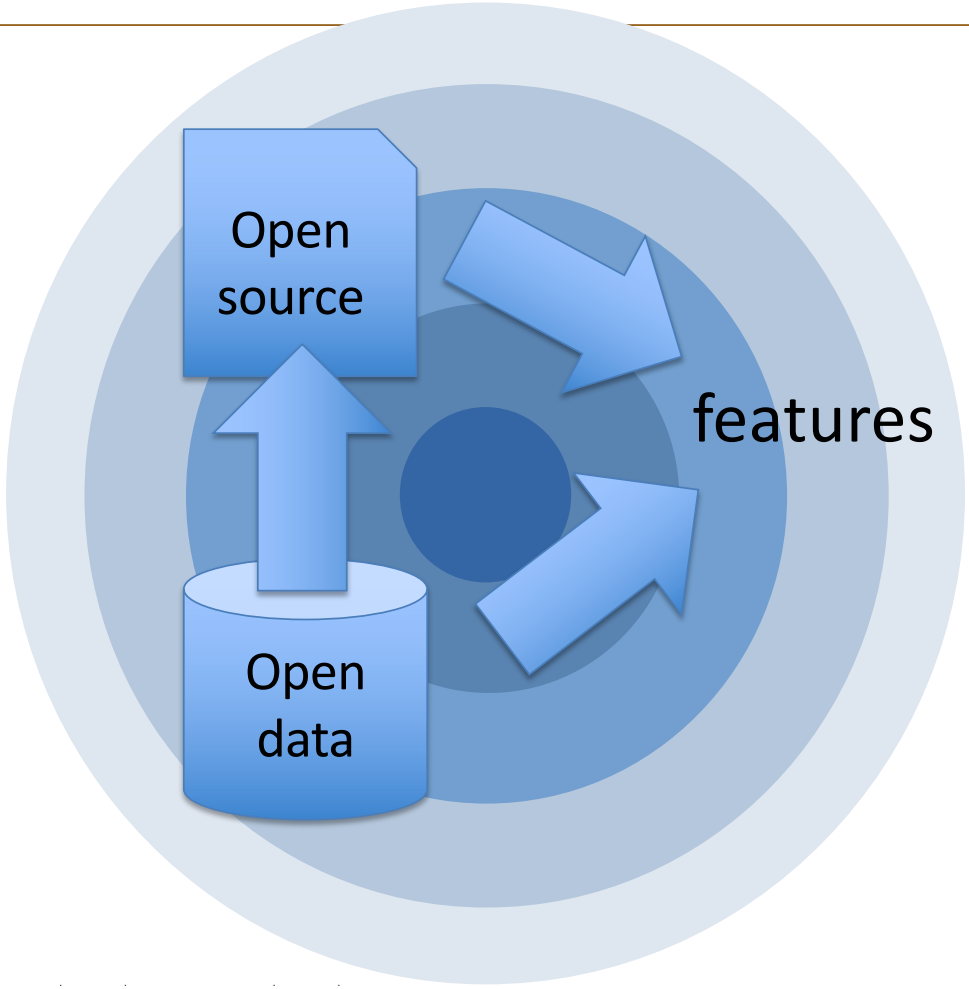
Summary of open source and data

- Data more influencial for features (Machine learning, autonomy)
- Open source platform collects and aggregates data
- Ecosystem of collaboration



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