



University of St.Gallen

Governance in Data Ecosystems

How much Openness should we afford?

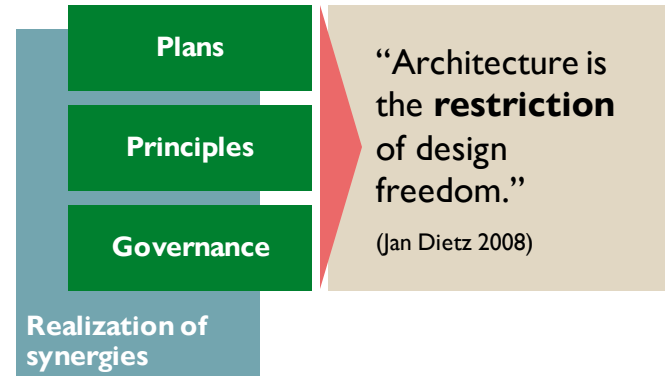
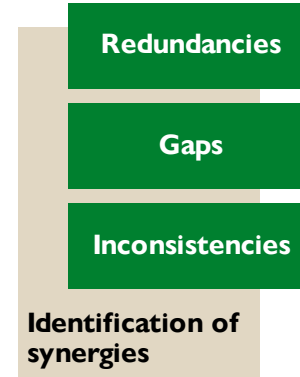
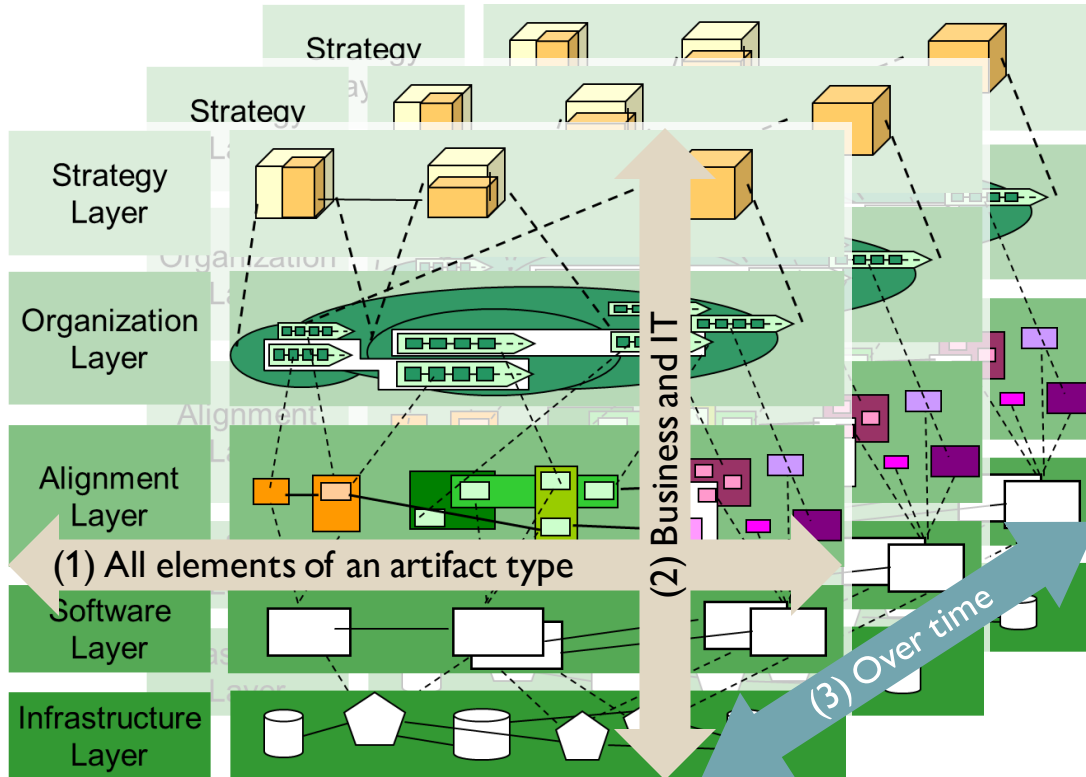
Stephan Aier

From insight to impact.

Agenda

0	Experiences and Hypotheses	2
1	IT and Data Governance	6
2	Governance around (Data) Products in Platforms in Ecosystems	13

Enterprise-level perspective on information systems



Data Management and Analytics Community (DMAC)

Complexity

- Most banking **DWH/BI/Analytics stacks have historically evolved**
- The same is true for their **large number of transactional/source systems**
- This is due to their enormous **business complexity** and results in a challenging **IT complexity**

Governance

- Banks face **extensive regulatory requirements** (e.g., BCBS239 or GDPR)
- **Data management, quality, governance, and platforms** are essential for meeting these requirements
- Requirements for **data privacy and protection** distinguish banks from most other industries

Business Value

- There is **cost pressure** on IT (in banks)
- Banks need to adopt **new technology stacks for advanced analytics/ML**
- Even though banks have a highly digitalized business already, there is the urge to **leverage the data** that is available

Banks face a unique combination of challenges in data management.
Neither consultants nor other industries can help to acquire best practices to address these challenges.

The aim of our community is to share insight on “Eye Level” among partners supported by the University of St. Gallen.

DMAC Partners

COMMERZBANK



Lufthansa

RAIFFEISEN



St. Galler
Kantonalbank



Zürcher
Kantonalbank



Assumptions and hypotheses

Architecture and Architects

- Holistic perspectives are needed and valuable
- Many people don't think about them, or don't want to spend money/resources on them
- If your senior management is in this group ...
- Architects often seem to rely on the inherent value of holistic perspectives – very dangerous

Data

- The most overlooked component in “traditional” EAM
- Has always been there / will always be there – long after applications are gone
- Is valuable, often complex, and rather expensive to make it usable

(Management) Hypes

- (agile, data lakes, cloud transformation, data products, ...)
- Most cannot and should not be ignored
- Complexity persists – there is no free lunch
- However, varying perspectives often create new opportunities

Agenda

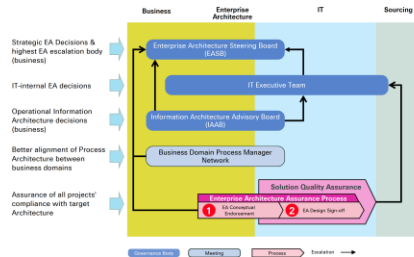
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Governance and Control

(IT) Governance

“specifying the decision rights and accountability framework to encourage desirable behavior in using IT”

Weill, P.; Ross, J.: A Matrixed Approach to Designing IT Governance, in: MIT Sloan Management Review, 46, 2, 2005, pp. 25-34.



Example: Swiss Re: Vivek V Kuruvila, Enterprise Architecture at Swiss Re, St.Galler Anwenderforum 4.6.2012

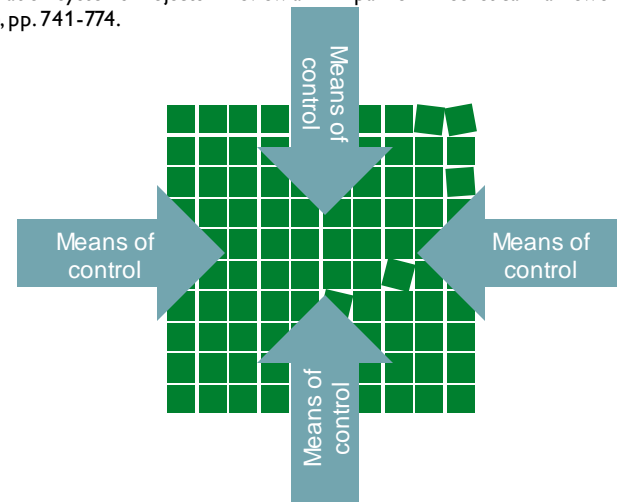
The core principles of governance	
1 Design Governance	Ensure Optimal Design <ul style="list-style-type: none"> Define Target Operating Model design Assure alignment with architectural standards and reduce complexity Identify synergies among initiatives and reuse Assess options and identify optimal delivery approach via interim states
2 Investment Governance	Prioritize Investment Decisions <ul style="list-style-type: none"> Align technology spend to business demand Manage tradeoffs between conflicting resource demands Ensure proper initiative sequencing by balancing schedule vs. demand
3 Execution Governance	Hold Leadership Accountable <ul style="list-style-type: none"> Identify roles and responsibilities Clear communication of commitments Well defined framework for actions and decisions
	Maintain Transparency of Progress and Spending <ul style="list-style-type: none"> Accurate and timely communication of progress against plan Proactive spend management Ensure dependency tracking
	Measured Results and Benefits Realization <ul style="list-style-type: none"> Clearly define business success criteria Collect, monitor, and action on key Business and IT metrics

Example: Alexander Ernst, @ Business Engineering Navigator course at University of St. Gallen, 2013.

(IT) Control

“any attempt to align individual behaviors with organizational objectives”

Wiener, Mähring, Remus, Saunders 2016. “Control Configuration and Control Enactment in Information Systems Projects – Review and Expanded Theoretical Framework” MIS Quarterly (40:3), pp. 741-774.



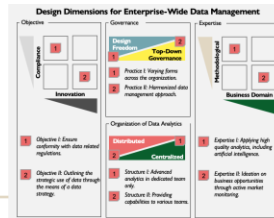
WHAT to decide about and WHO does that?

Management Decisions

- **What** decisions need to be made?
- **Who** has decision and input rights?
- **How** are the decisions formed and enacted?

Governance Trade-Offs

- Enterprise scope vs. LOB scope
- IT involvement vs. business involvement
- Mix of required bodies, roles and processes (e.g. chargeback, service level management)



Schilling, Aier, Winter, Haki, (2020). Design Dimensions for Enterprise-Wide Data Management. A Chief Data Officer's Journey. Proc. 53rd Hawaii International Conference on System Sciences (HICSS 2020), Grand Hyatt, HI.

illustrative

IT Principles	<ul style="list-style-type: none"> ■ How do the business principles translate to IT principles that guide IT decision making? ■ What is the role of IT in the business? ■ What are desirable IT behaviors? ■ How will IT be funded?
IT Architecture	<ul style="list-style-type: none"> ■ What are the core business processes of the enterprise? How are they related? ■ What information drives these core processes? How must this data be integrated? ■ What technical capabilities should be standardized enterprisewide to support IT efficiencies and facilitate process standardization and integration? ■ What activities must be standardized enterprisewide to support data integration? ■ What technology choices will guide the enterprise's approach to IT initiatives?
IT Infrastructure Strategies	<ul style="list-style-type: none"> ■ What infrastructure services are most critical to achieving the enterprise's strategic objectives? ■ What infrastructure services should be implemented enterprisewide and what are the service-level requirements of those services? ■ How should infrastructure services be priced? ■ What is the plan for keeping underlying technologies up-to-date? ■ What infrastructure services should be outsourced?
Business Application Needs	<ul style="list-style-type: none"> ■ What are the market and business process opportunities for new business applications? ■ How are strategic experiments designed to assess success? ■ How can business needs be addressed within architectural standards? When does a business need justify an exception to a standard? ■ Who will own the outcomes of each project and institute organizational changes to ensure the value?
IT Investment and Prioritization	<ul style="list-style-type: none"> ■ What process changes or enhancements are strategically most important to the enterprise? ■ What is the distribution in the current IT portfolio? Is this portfolio consistent with the enterprise's strategic objectives? ■ What is the relative importance of enterprisewide versus business unit investments? Do actual investment practices reflect their relative importance? ■ How is the business value of IT projects determined following their implementation?

Business monarchy: a senior business executive or a group of senior executives, sometimes including the CIO, makes all the IT-related decisions for the enterprise.

IT monarchy: those decisions are made by an individual IT executive or a group of IT executives.

Federal system: C-level executives and business representatives of all the operating groups collaborate with the IT department.

IT duopoly: a two-party decision-making approach involves IT executives and a group of business leaders representing the operating units.

Feudal system: Business unit or process leaders make separate decisions on the basis of the unit or process needs.

Anarchy: in which each individual user or small group pursues his, her or their own IT agenda.

IT governance archetypes and performance orientation

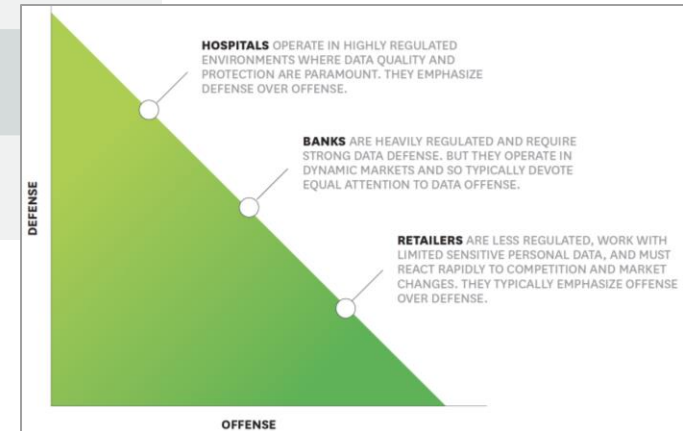
GOVERNANCE ARCHETYPE	DECISION DOMAIN				
	IT Principles	IT Architecture	IT Infrastructure Strategies	Business Application Needs	IT Investment
Business Monarchy	✗				✗
IT Monarchy		✗	✗		
Federal				✗	
IT Duopoly					
Feudal					

	PERFORMANCE		
	PROFIT	ASSET UTILIZATION	GROWTH
Strategic Driver	Profitability via enterprisewide integration and focus on core competencies	Efficient operation by encouraging sharing and reuse	Encourage business unit innovation with few mandated processes
Key Metrics	ROI/ROE and business process costs	ROA and unit IT cost	Revenue growth
Key IT Governance Mechanisms	<ul style="list-style-type: none"> ■ Enterprisewide management mechanisms (e.g., executive committee) ■ Architecture process ■ Capital approval ■ Tracking of business value of IT 	<ul style="list-style-type: none"> ■ Business/IT relationship manager ■ Process teams with IT members ■ SLA and chargeback ■ IT leadership decision-making body 	<ul style="list-style-type: none"> ■ Budget approval and risk management ■ Local accountability ■ Portals or other information/services sources
IT Infrastructure	Layers of centrally mandated shared services	Shared services centrally coordinated	Local customized capability with few required shared services
Key IT Principles	Low business costs through standardized business processes	Low IT unit costs; reuse of standard models or services	Local innovation with communities of practice; optional shared services
Governance	<p>← More centralized</p> <p>E.g., Monarchies and Federal</p>	<p>Blended</p> <p>E.g., Federal and Duopoly</p>	<p>More decentralized →</p> <p>E.g., Feudal arrangements; risk management emphasis</p>

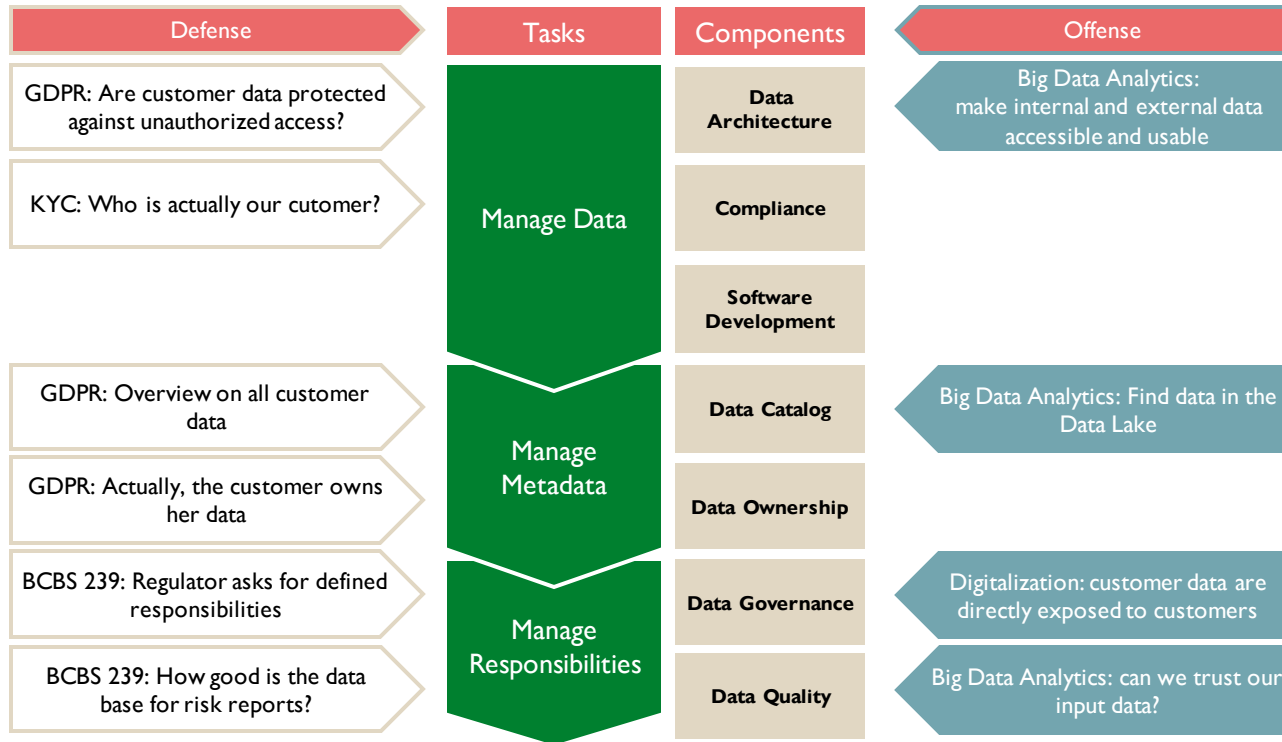
Weill, P.; Ross, J.: A Matrixed Approach to Designing IT Governance, in: MIT Sloan Management Review, 46, 2, 2005, pp. 25-34.

Focus of a data strategy and implications for governance

	DEFENSE	OFFENSE
KEY OBJECTIVES	Ensure data security, privacy, integrity, quality, regulatory compliance, and governance	Improve competitive position and profitability
CORE ACTIVITIES	Optimize data extraction, standardization, storage, and access	Optimize data analytics, modeling, visualization, transformation, and enrichment
DATA-MANAGEMENT ORIENTATION	Control	Flexibility
ENABLING ARCHITECTURE	SSOT (Single source of truth)	MVOTs (Multiple versions of the truth)



Can we have both? Challenges from defense & offense



Kraus, M.: DatenArchitekturManagement, St. Galler Anwenderforum, 2018

But how to “enforce” governance?

Clan Control

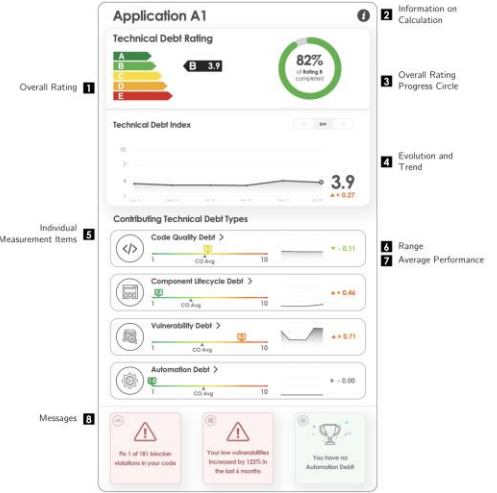
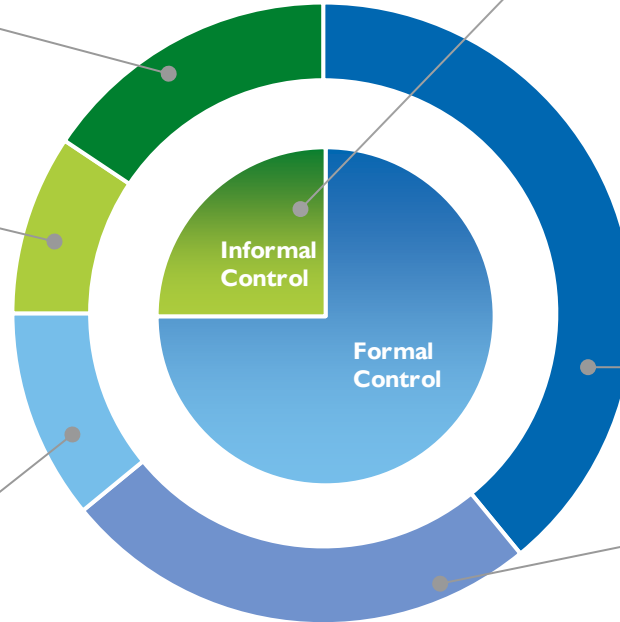
values and norms affecting the behavior of individuals
(Wiener et al. 2016)

Self Control

intrinsic motivation of an individual to set new standards
(Kirsch and Cummings 1996)

Behavior Control

prescribing processes, implementing and monitoring rules, and rewarding compliance
(Wiener et al. 2016)



Input Control

allocation of human, financial, and material resources
(Wiener et al. 2016)

Outcome Control

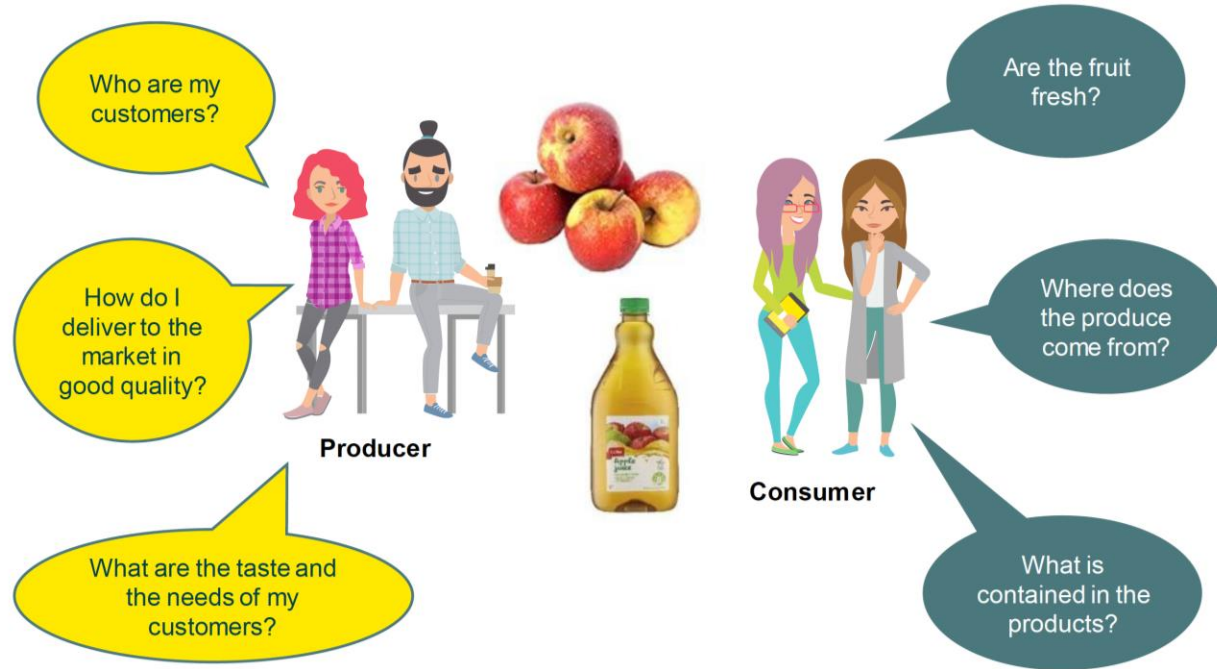
goal definition, performance target definitions, and milestones
(Kirsch 1997)

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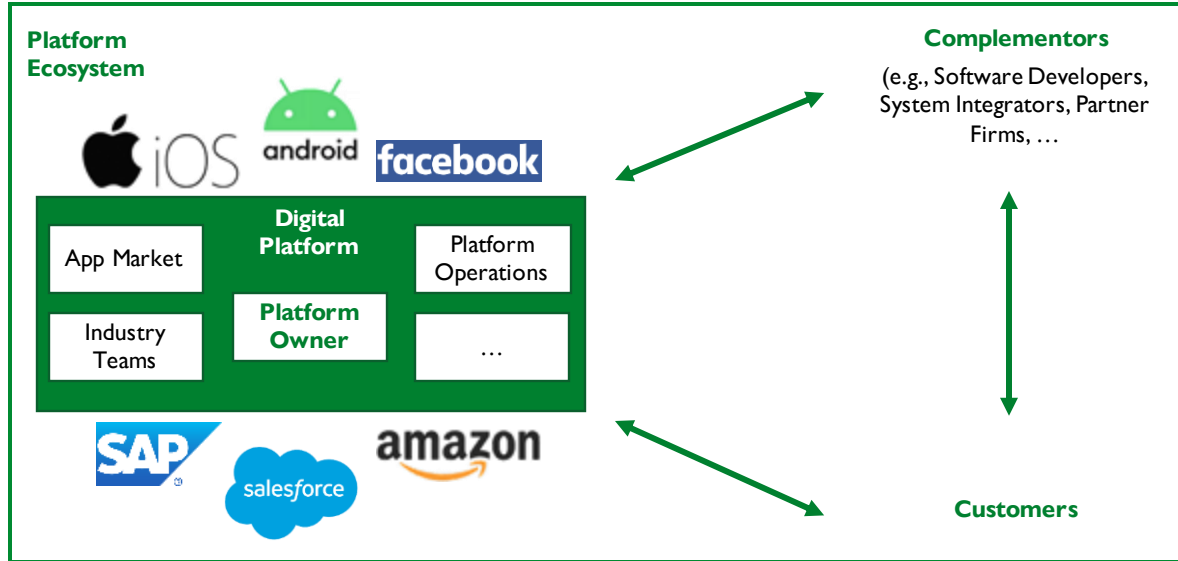
What does it mean to have a data product?

What if data were fruits?



Source: Kraus, M.: Data Governance, EMBA BIT HSG, 2023

Digital platforms and platform ecosystems



Complementors

Third-party individuals or organizations that extend the digital platform with complementary add-ons (e.g., applications, services).

Platform owner

The provider or sponsor of the platform core that aims to align the interests of the different actors involved in the platform ecosystem.

Customers

Individuals or organizations that derive value from the products and services provided by the platform owner and the complementors.

Leverage

Leverage

- mechanism to **achieve greater outputs from the same level of inputs**, other things being equal.
- is achieved through developing **shared** assets, designs, and standards that can be **recombined**.



Production Leverage

Economies of scale and scope

→ reduced *resource cost* → *it is easy to produce and share data with high quality*



Transaction Leverage

Economies of transaction and search

→ reduced *search cost* → *it is easy to find and consume data, and provide feedback on the “experience”*

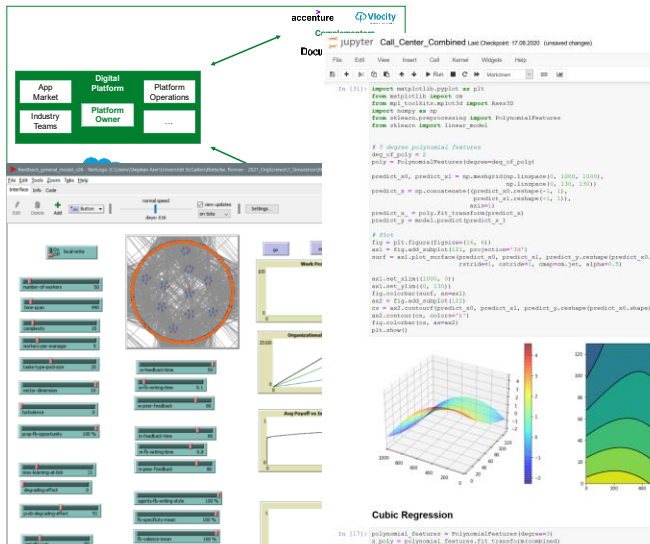


Innovation Leverage

Economies of innovation and complementarity

→ increased *generativity* → *since it is so easy to integrate and consume data it is more likely to test new products and solutions more often*

Do platforms outperform other coordination approaches?



PLATFORM OVER MARKET - WHEN IS JOINING A PLATFORM BENEFICIAL?

Research Paper

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 Haniya Tanriverdi, The University of Texas at Austin, Austin, U.S.A.
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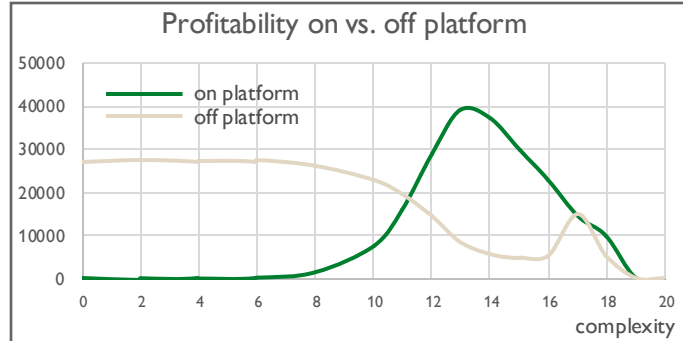
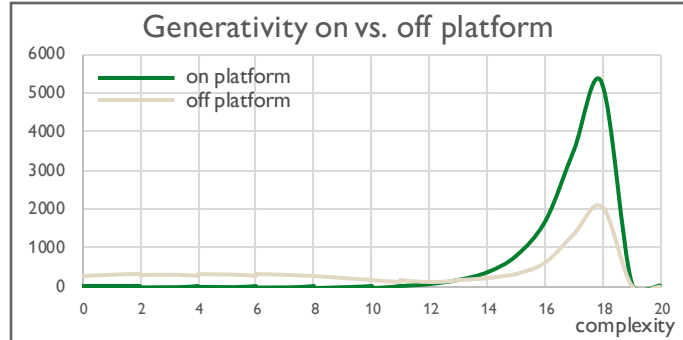
Abstract
 Firms struggle to meet dynamically changing customers' needs. One challenge is to organize a complex search space to find resources needed for innovation that meet customers' needs. Another challenge is to ensure the resources are better than the resource opportunities to meet profitability. Digital platforms promise to address these challenges by reducing the number of promising search results, optimizing real market resource allocation. We analyze whether platform-based resource allocation performance and profitability differs better than the market or assumed. Using open-source modeling and simulation, we find that platform-based resource allocation outperforms the market in terms of its environmental impact, its revenue, and its profitability. This is true for platform-based resource allocation only when the platform is better than the market specifically when the platform never reasonably exists in search results and market opportunities. The study advances our understanding of the environmental conditions under which platform-based resource allocation is better than the market.

Keywords: Platform, market complexity, generativity, profitability, search market, sustainability

1 Introduction
 With the rise of the platform economy (Cusumano and Zrossen, 2016; Parker et al., 2016), we have witnessed an increase in the emergence of more open platforms. However, not all the manifestations of traditional business sets digital platform business (de Haes et al., 2018; Isenhardt et al., 2018). For traditional business attempts to transition into a platform economy, a critical success factor is to offer the platform capabilities that attract partners (i.e., to develop and offer resources on the platform) rather than in the market. For example, the European software corporation SAP has been trying to transition to an open platform and has been struggling on SAP Cloud Platform. The success of the platform hinges on SAP's ability to attract independent software developers (ISVs), convincing them, implementing partners, and existing customers and suppliers to join the platform rather than in the market. In the same way, the platform's resources and capabilities enable such partners to generate revenues that meet SAP's revenue. Additionally, changing search results, platform-based search and have 2 partners choose to invest according to their market conditions, the platform would not exist in the market. In this study, we discuss and test the conditions under which platform-based

14 October 2023, SAP revised the SAP Cloud Platform brand, but its services are included in part of the SAP Business Technology Platform.

Twitter: #WorkshopConf2023 #InformationSystems (ISIS) 2023, #InformationSystems (ISIS) 2023



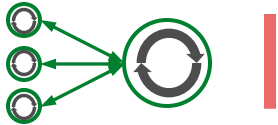
- TACC Stampede 2**
- 18 petaflops of peak performance
 - 1,736 Intel Xeon SKL nodes, each with 48 cores and 192GB of RAM
 - 4,200 Intel KNL nodes, each 68 cores, 96GB of DDR RAM, and 16GB of high speed MCDRAM

Schmid, M., Haki, K., Tanriverdi, H., Aier, S., & Winter, R. (2021). Platform over Market: When is Joining a Platform Beneficial? 29th European Conference on Information Systems. Haki, K., Tanriverdi, H., Safaei, D., Schmid, M., Aier, S., & Winter, R. (forthcoming, 2024). Generativity and Profitability on B2B Innovation Platforms: A Simulation-based Theory Development. *MIS Quarterly*.

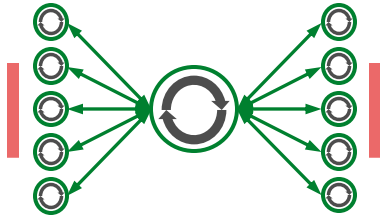
Architectural leverage: openness



Firm internal
No **third-party** involvement



Many-to-one architecture
Supply side of the platform has been opened to external third-party participants



Many-to-many architecture **within the organization (!)**
Both the **supply and demand sides** of the platform have been opened to third-party participants

Platform thinking is to combine differing levels of architectural openness with production, innovation, and transactional leverage

Thomas, L. D. W., Autio, E., and Gann, D. M. 2014. "Architectural Leverage: Putting Platforms in Context," *Academy of Management Perspectives* (28:2), pp. 198-219.

There are limitations, however.

The underlying paradox

Control

of complementors
of the quality of their complements
of value capture

...

to ensure platform integrity and adequate decision-making power as well as the ability to capture a share of the created value

Generativity

of the platform

enough control must be relinquished to empower third-parties to innovate and create

Staub, N. Haki, K.; Aier, S.; Winter, R. 2022. "Governance Mechanisms in Digital Platform Ecosystems: Addressing the Generativity-Control Tension" *Communications of the AIS*, 51, 906 – 939.

Rather than controlling actors directly, platform owners control their environment

		Control	Generativity
Control	Decision rights division of authority and responsibilities	<ul style="list-style-type: none"> – Define the complementors' amount of freedom (e.g., regarding their goals and task types) – ... 	<ul style="list-style-type: none"> – Ensure decision-making autonomy of complementors to increase their innovation output – ...
	Pricing creating incentives for complementors to invest their resources to ensure prosperity of their own offerings and in turn the whole ecosystem	<ul style="list-style-type: none"> – Make actual cost of non-standard solutions (no network effects) visible in pricing – ... 	<ul style="list-style-type: none"> – Subsidize one side of the platform to reach critical mass of complementors and users – ...
	Relational control refers to the degree to which platform owners rely on shared norms and values with complementors to influence their behavior	<ul style="list-style-type: none"> – Facilitate clans to enhance complementor performance and minimize errors – ... 	<ul style="list-style-type: none"> – Facilitate clans to enhance complementor performance and minimize errors – ...
Boundary	Boundary Resources granted by platform owner and used by complementors to support their work, e.g.: <ul style="list-style-type: none"> – Interfaces (e.g., APIs) – Programming resources (e.g., software development kits) – Intellectual property rights – Licensing 	<ul style="list-style-type: none"> – Formalize and standardize complementor activities – Control platform boundaries – Facilitate tight control over development quality through software tools and regulations – Increase control through agreements with different complementor groups – ... 	<ul style="list-style-type: none"> – Increase attractiveness for complementors – Help complementors overcome knowledge boundaries – Support through provision of tools and knowledge – Attract complementors by increasing their profitability – ...
	Gatekeeping degree to which platform owners use predefined acceptance criteria to judge what complementors are allowed into the ecosystem	<ul style="list-style-type: none"> – Restrict access to ensure quality and attractiveness for complementors and users (e.g., levels of access rights) – ... 	<ul style="list-style-type: none"> – Facilitate connection of complementors to the platform – ...
Open			

Staub, N. Haki, K.; Aier, S.; Winter, R. 2022. "Governance Mechanisms in Digital Platform Ecosystems: Addressing the Generativity-Control Tension" *Communications of the AIS*, 51, 906 – 939.

Reviewing assumptions and hypotheses

Architecture and Architects

- Holistic perspectives are needed and valuable → *True*
- Many people don't think about them, or don't want to spend money/resources on them → ?
- If your senior management is in this group ... → *is it?*
- Architects often seem to rely on the inherent value of holistic perspectives – *very dangerous*

Data

- The most overlooked component in “traditional” EAM → *solved, I hope*
- Has always been there / will always be there – long after applications are gone → *is this understood?*
- Is valuable, often complex, and *rather expensive to make it usable*

(Management) Hypes

- (agile, data lakes, cloud transformation, data products, ...)
- Most cannot and should not be ignored → *True*
- Complexity persists – there is no free lunch → *True*
- However, varying perspectives often create new opportunities → *True for me, that is.*

In my humble opinion, these are

Valuable reads

DalleMule, L., & Davenport, T. H. (2017). What's Your Data Strategy? Harvard Business Review, 95(3), 112-121. → [link](#)

Haki, K., Rieder, A., Buchmann, L., & Schneider, A. W. (2023). Digital Nudging for Technical Debt Management at Credit Suisse. European Journal of Information Systems, 32(1), 64-80. → [link](#)

Schmid, M., Haki, K., Tanriverdi, H., Aier, S., & Winter, R. (2021). Platform over Market: When is Joining a Platform Beneficial? 29th European Conference on Information Systems. → [link](#)

Staub, N. Haki, K.; Aier, S.; Winter, R. 2022. "Governance Mechanisms in Digital Platform Ecosystems: Addressing the Generativity-Control Tension" Communications of the AIS, 51, 906 – 939. → [link](#)

Schilling., Aier, Winter, Haki, (2020). Design Dimensions for Enterprise-Wide Data Management: A Chief Data Officer's Journey. Proc. 53rd Hawaii International Conference on System Sciences (HICSS 2020), Grand Weilea, HI. → [link](#)

Weill, P.; Ross, J.: A Matrixed Approach to Designing IT Governance, in: MIT Sloan Management Review, 46, 2, 2005, pp. 25-34. → [link](#) (paywall)



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“From insight to impact” 