



Information Management and Knowledge Management (IMKM)

Lecture 1 **Information & Knowledge Management: Introduction**

TUM

Chair for Information Systems

© Prof. Dr. H. Krcmar

Lecture Schedule

Information Systems Strategy

Business Value of IT

Business IT Alignment

IT-enabled Strategies

Guest Lecture: Digital Leadership and the CIO Role

Digital Platforms

Information Management

IT Controlling and IT Governance

IT Sourcing and IT Off-Shoring

IT Security, Privacy and Risk Management

Guest Lecture: Natural language processing for IM

Knowledge Management

Basics

Tools

Guest Lecture:
Applications



IMKM Lecture 1: Fundamentals

Outline

1. Recap

1. Data
2. Information
3. Knowledge

2. Three parts of IMKM

1. Information systems strategy
2. Information management
3. Knowledge management

3. Why revisit these concepts from a strategy and management perspective?

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What is the difference between

**“information”
 &
 “knowledge”?**

*Please use the Zoom-Chat or open your
 microphone.*

Data

- **Raw facts or figures**
 - with *syntax* (point as point as decimal separator)
 - without *meaning* on their own
 - no *context*
 - not processed into a usable form
- Any alphanumeric characters with a syntax, e.g. text, numbers
- **Directly observable** or verifiable (Dalkir, 2011)

Yes		Yes		No		Yes		No		Yes
42		63		96		74		56		86
111192		111234								
1.17		1.18								

Information

- Data that has been **processed** within a **context** to give it **meaning**

OR

- Data that has been **processed** into a **form** that gives it **meaning**



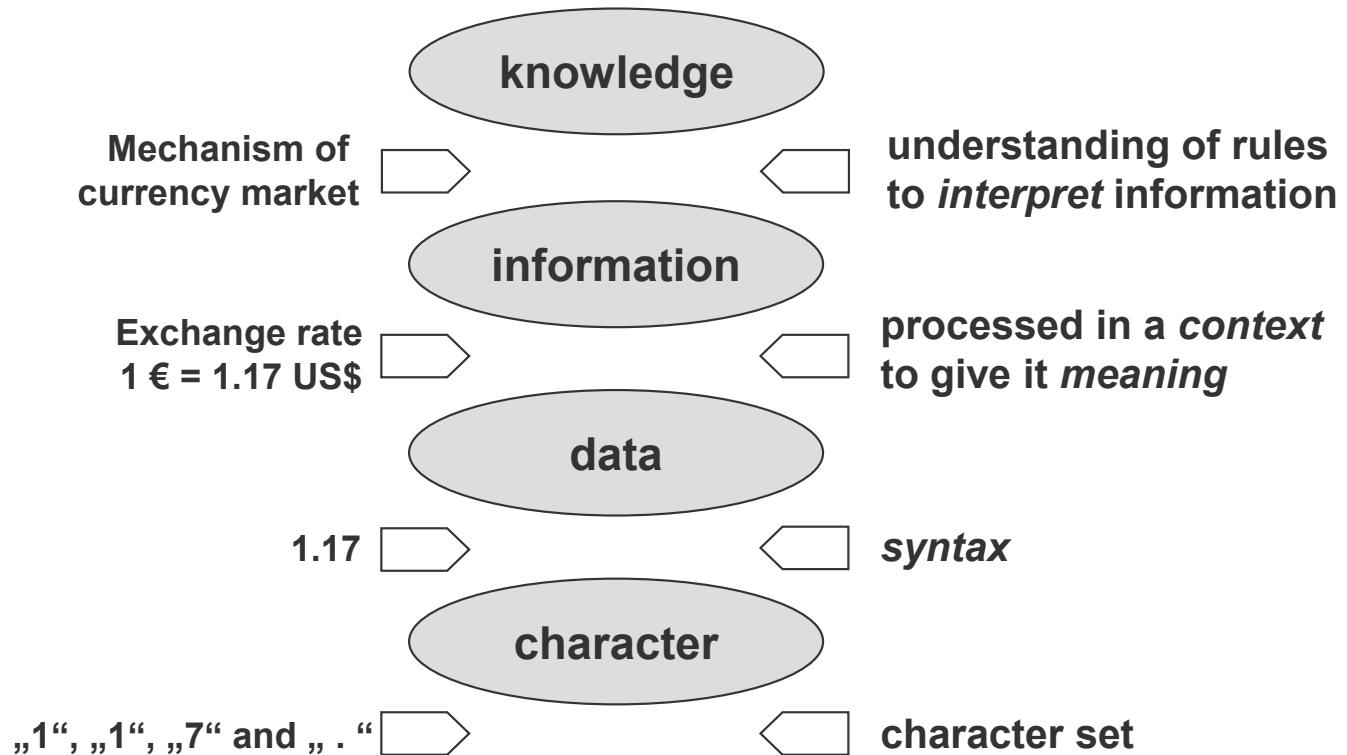
Data vs. Information

- Data: 10.11.20
- Information:
 - 10.11.20 - Date of the next IMKM lecture.
 - 101.120,00 € - Price of a new Tesla Model S.

Knowledge

- Knowledge is the **understanding of rules needed to interpret** information
- Knowledge is the appropriate **collection** of information, such that its intent is to be useful
- Characteristics of knowledge:
 - Using knowledge does not consume it
 - Transferring knowledge does not result in losing it
 - Knowledge is abundant, but the ability to use it is scarce
 - Much of an organization's valuable knowledge walks out of the door at the end of the day.

Character – Data – Information – Knowledge



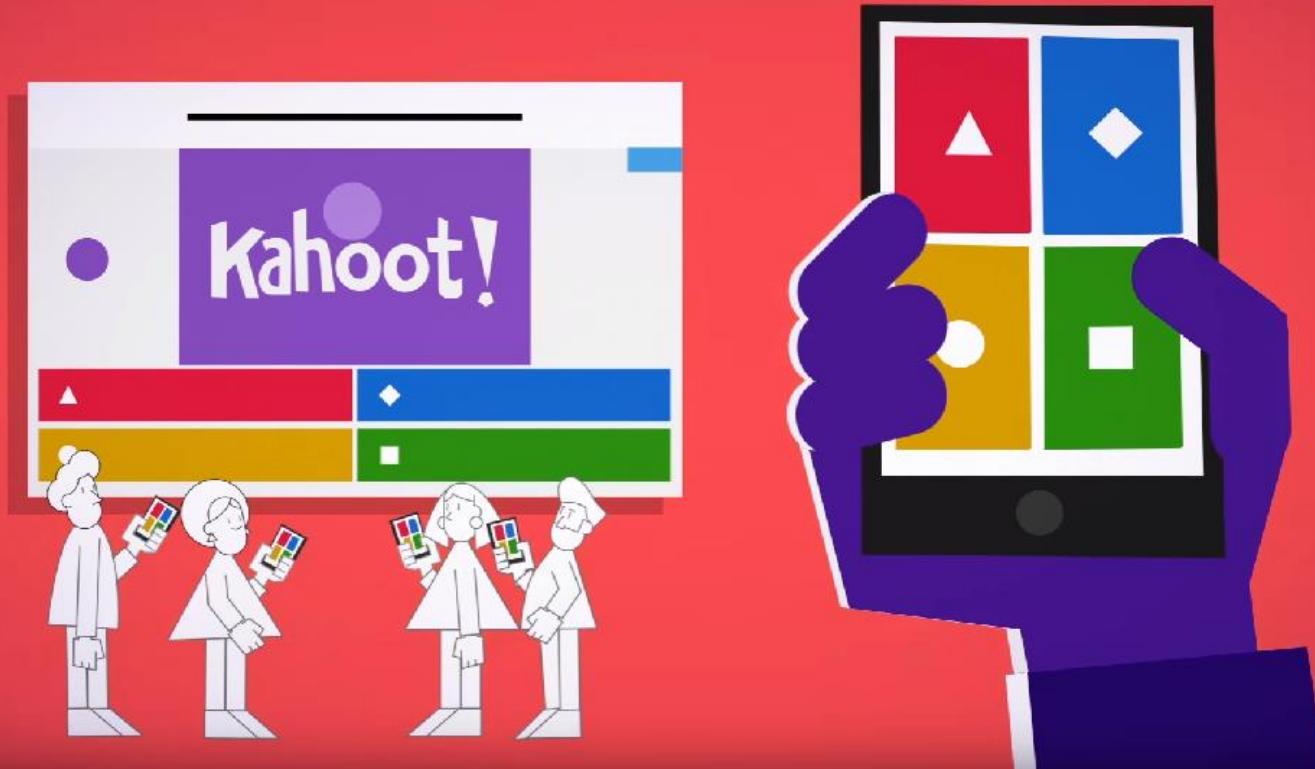
Krcmar, Informationsmanagement (2015), p. 12

Two Types of Knowledge

- Explicit knowledge
 - Objective, rational, technical
 - Policies, goals, strategies, papers, reports
 - Codified
 - Leaky knowledge
- Tacit knowledge
 - Subjective, cognitive, experiential learning
 - Highly personalized
 - Difficult to formalize
 - Sticky knowledge

Quiz Time!

Go to kahoot.it



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Strategy and Strategic Management

Strategy

- Plan of action to achieve a particular goal
- Long-term strategy: typically 3 – 5 years
- Short-term strategy: typically next 6 months

Strategic Management

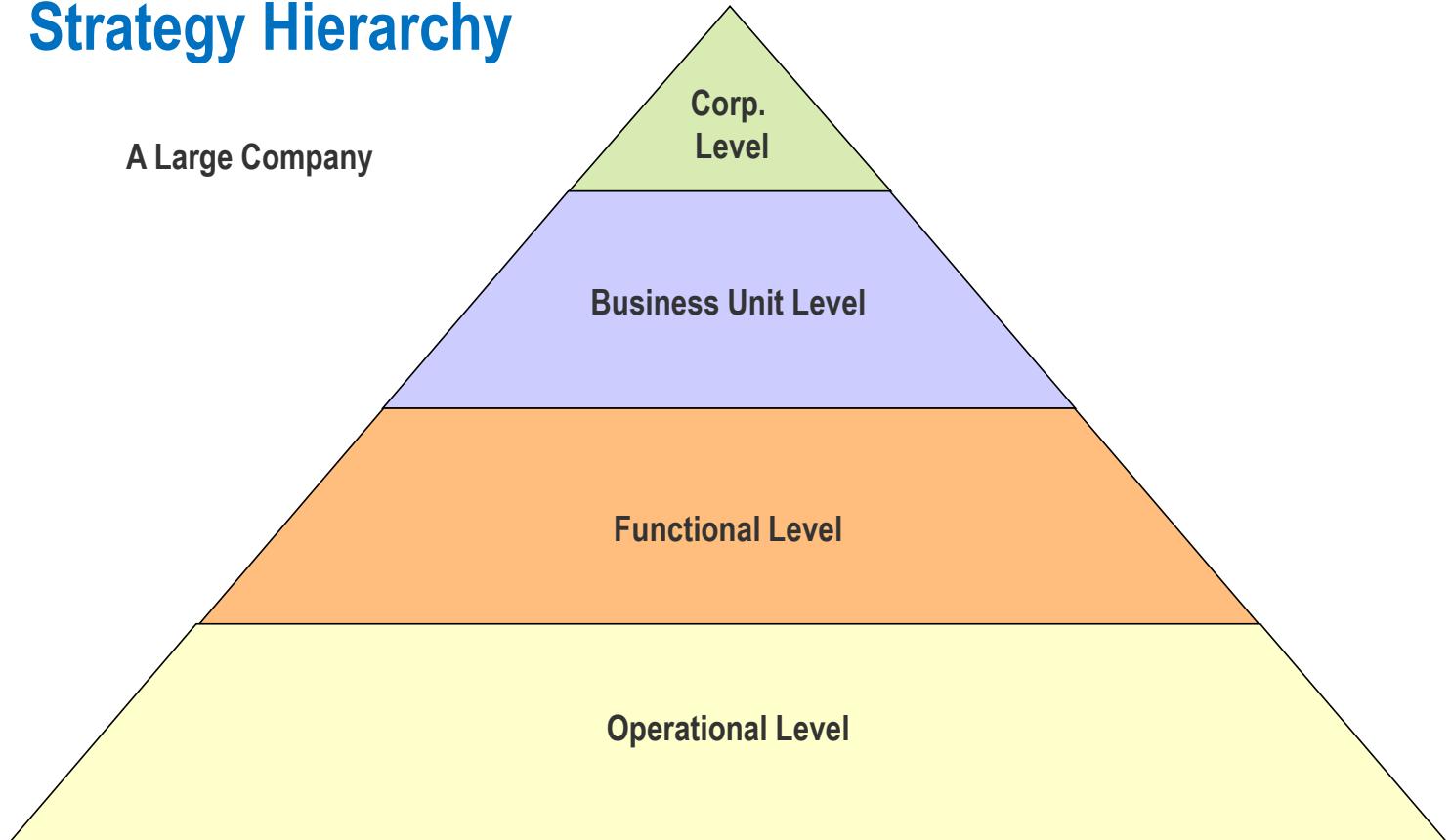
“The process of

- **examining both present and future environments,**
- **formulating the organization's objectives, and**
- **making, implementing, and controlling decisions focused on achieving these objectives in the present and future environments.”**

Smith/ Arnold/ Bizzell (1986, p.4)

Strategy Hierarchy

A Large Company



Strategy Hierarchy

1. Corporate strategy

- Determine type of business (e.g. services, merchandising, manufacturing)
- Form and management of ***overall*** activities
- 1) growth strategy, 2) stability strategy, 3) retrenchment strategy
 - E. g. depending on SWOT analysis

2. Generic or business unit strategy

- Actions and approaches crafted by management to create successful performance in ***one particular line of business***
- 1) cost leadership, 2) differentiation, 3) focus, 4) mixed

3. Functional strategy

- Game plan for running a major ***functional activity or process*** within a business (e. g. research and development unit, marketing unit, financial unit, production unit, HR development unit, etc.)

IS, IT and IM Strategy

- ***Information Systems (IS) Strategy***

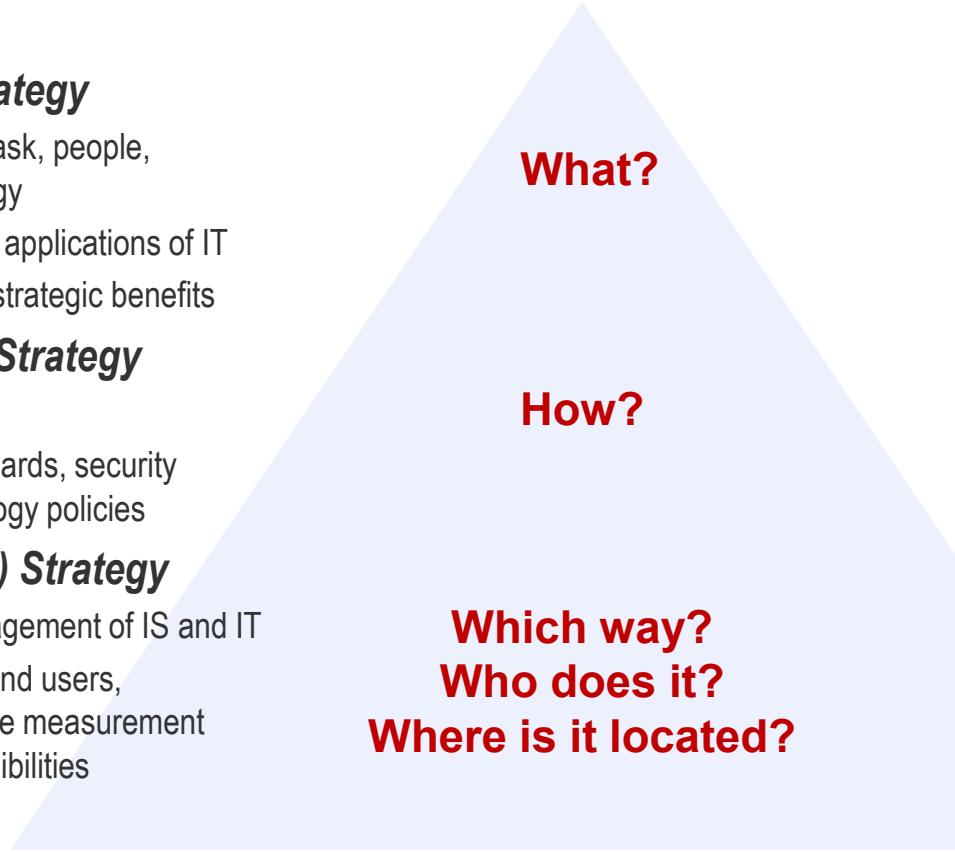
- IS = sociotechnical system with task, people, structure (or roles), and technology
- Focus on the system or business applications of IT
- Business-IT-Alignment to derive strategic benefits

- ***Information Technology (IT) Strategy***

- Aspects of the technology
- E. g. architecture, technical standards, security levels, risk attitudes, and technology policies

- ***Information Management (IM) Strategy***

- Structures and roles for the management of IS and IT
- Relationship between specialist and users, management control, performance measurement processes, management responsibilities



What?

How?

Which way?
Who does it?
Where is it located?

What is Information (Resource) Management (IM)?

- Information = Resource
- Manage this resource effectively and efficiently to achieve the business' objectives
- IT and IS: Tools for generating, storing, managing, analyzing the resource “Information”

Definition and Tasks of Information Management

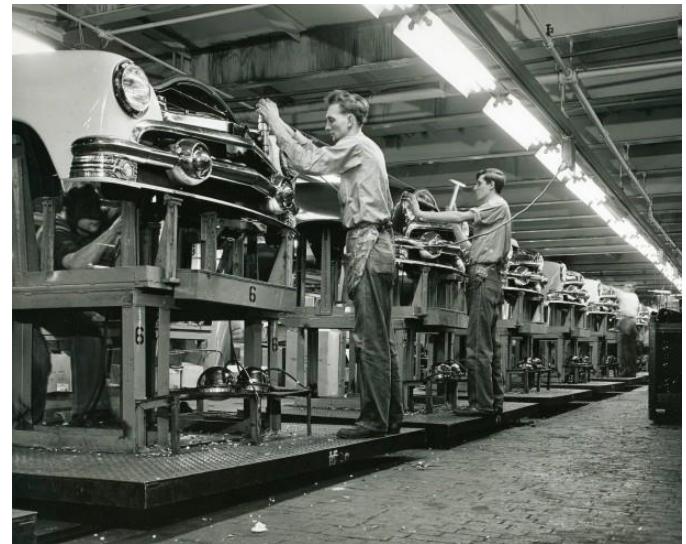
*“IM is part of business management. The function of IM is to ensure **optimal use of the resource information** with regard to business objectives.” (Krcmar, 2015, 1)*

- *“IM helps managers **assess and exploit their information assets for business development.***
- *It draws on the techniques of Information Science (libraries) and Information Systems (IT-related).*
- *It is an important foundation for knowledge management, in that it deals systematically with **explicit knowledge.**” (Dalkir, 2011, 467)*

Krcmar, Informationsmanagement (2015), p. 1

“Classic” Factors of Production

- **Land or natural resource** — naturally-occurring goods (water, air, soil, etc.)
- **Labor** — human effort used in production
- **Capital stock** — human-made goods which are used in the production of other goods (machinery, tools, buildings, etc.)

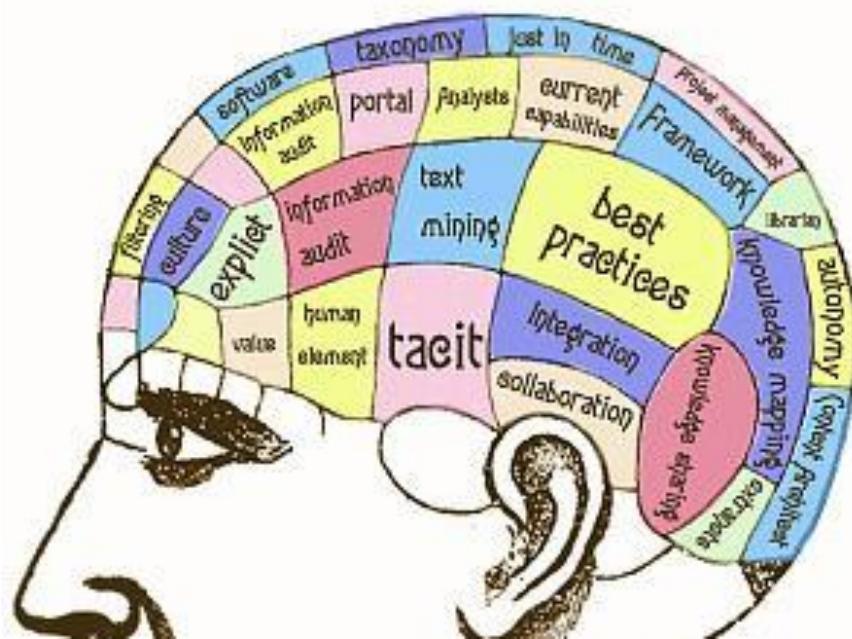


<https://www.faz.net/aktuell/wirtschaft/vor-100-jahren-wie-das-fliessband-die-autoproduktion-revolutioniert-hat-12426514.html>

Information as Factor of Production

- Result is affected by **combination of resources**
 - e.g. a certain combination of resources → improved firm performance
 - Information as differentiating **resource**
 - e.g., processed data from sensors in an assembly line
 - Competition as a discovery **process** for new knowledge and adaptive/ copying learning
 - e.g., learning/ including external information by testing new business models
 - Business ideas result from **linking information**
 - e.g., information on resources and information about customer wishes
 - **Differentiation** based on what companies know!
- **Information is a Production Factor**

Is there a need to differentiate between KM & IM?



Understanding Knowledge Management requires an understanding of knowledge and the knowing process and how that differs from information and Information Management.

What is Knowledge Management?

*“KM is understanding the organization’s information flows and implementing **learning practices** which make explicit the key aspects of its knowledge base” (Broadbent, 1997, 8-9)*

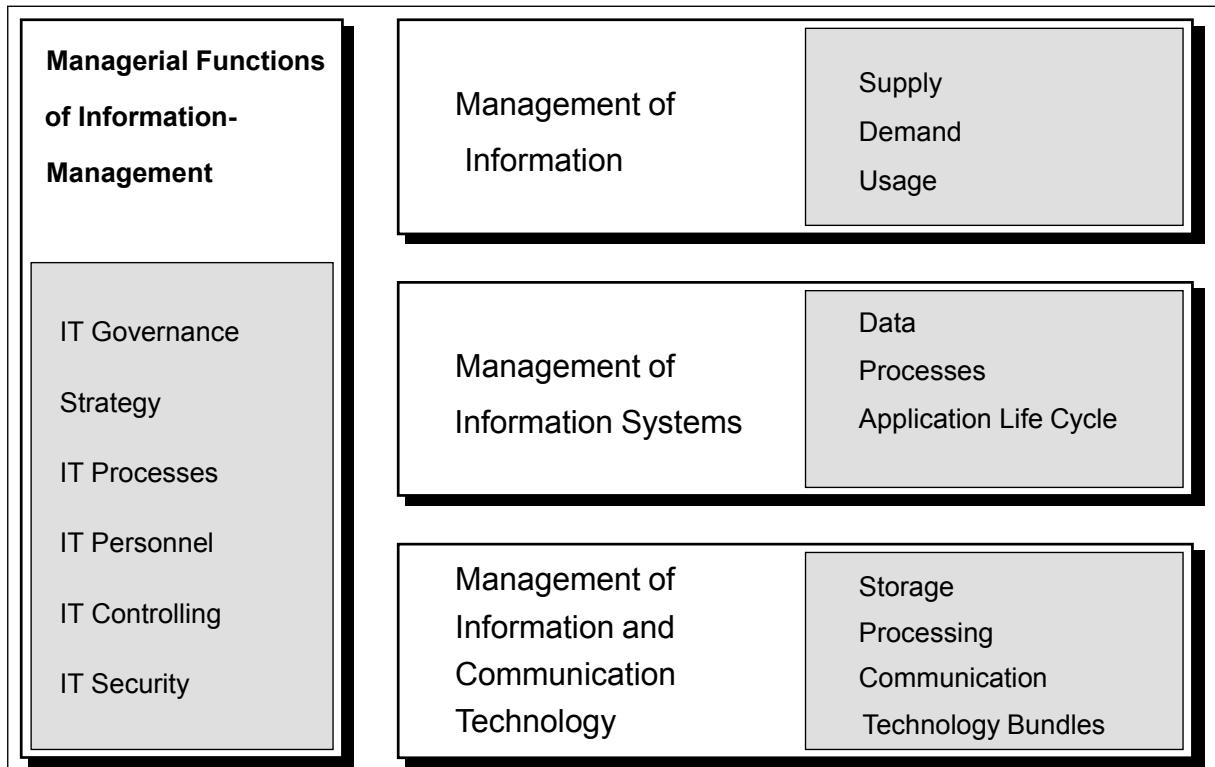
*“KM is a collaborative and integrated approach to the creation, capture, organization, access, and use of an **enterprise’s intellectual assets**” (Brooking, 1999, 154)*

*“KM is the capability to create, enhance, and share **intellectual capital** across the organization”
(Lank, 1997)*

*“KM comprises the development, discussion, and testing of theories, methods, and tools that enable a more systematic approach with **knowledge as a resource**”
(Bellmann, et al. 2002, cited in Krcmar, 2015, 660)*

- **Knowledge Management deals with all kinds of knowledge, information management with some forms of explicit knowledge.**

Recap: IM – An Integrated Framework



Krcmar: Informationsmanagement (2015), p.107

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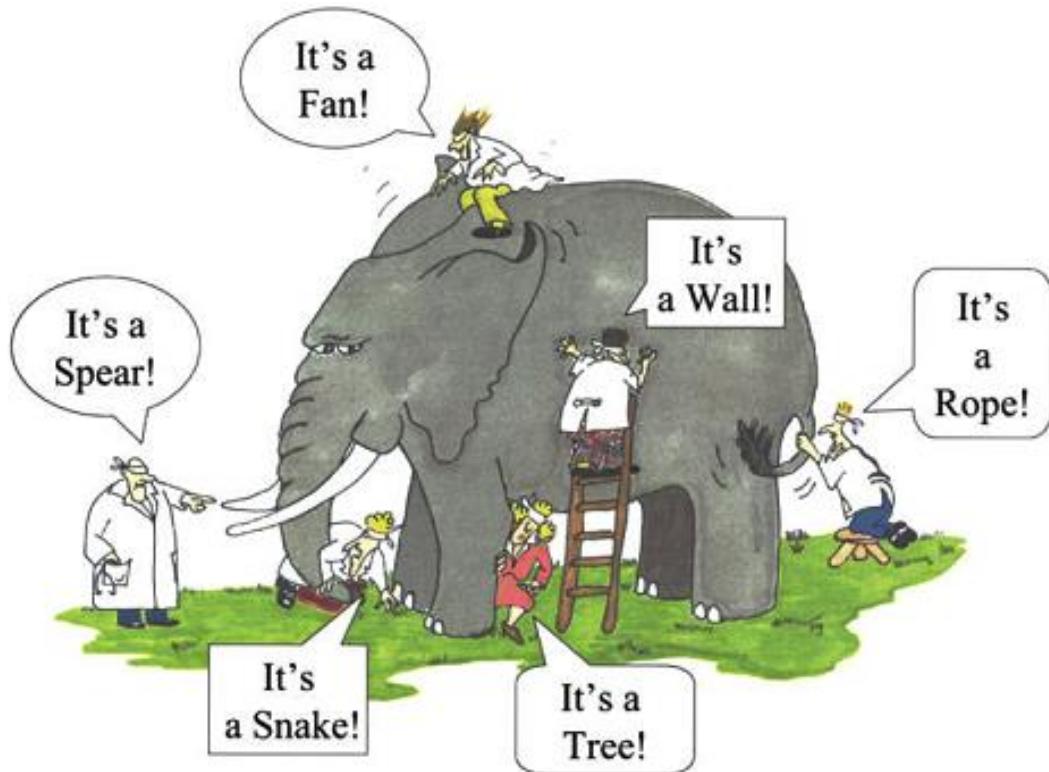
Basics

Tools

Guest Lecture:
Applications

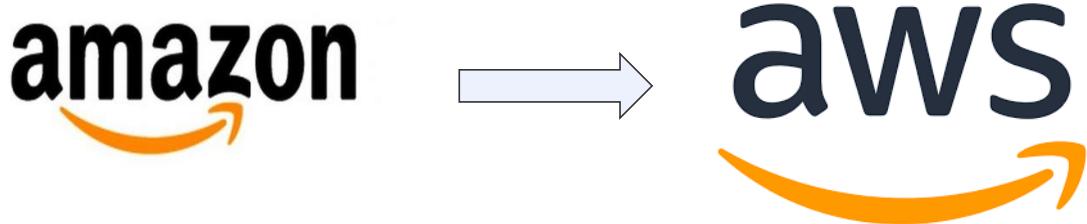


So what's the Big Picture?



<http://www.agilebuddha.com/agile/enterprise-agile-transformation-are-you-able-to-see-big-elephant/>

Example: Amazon Web Services



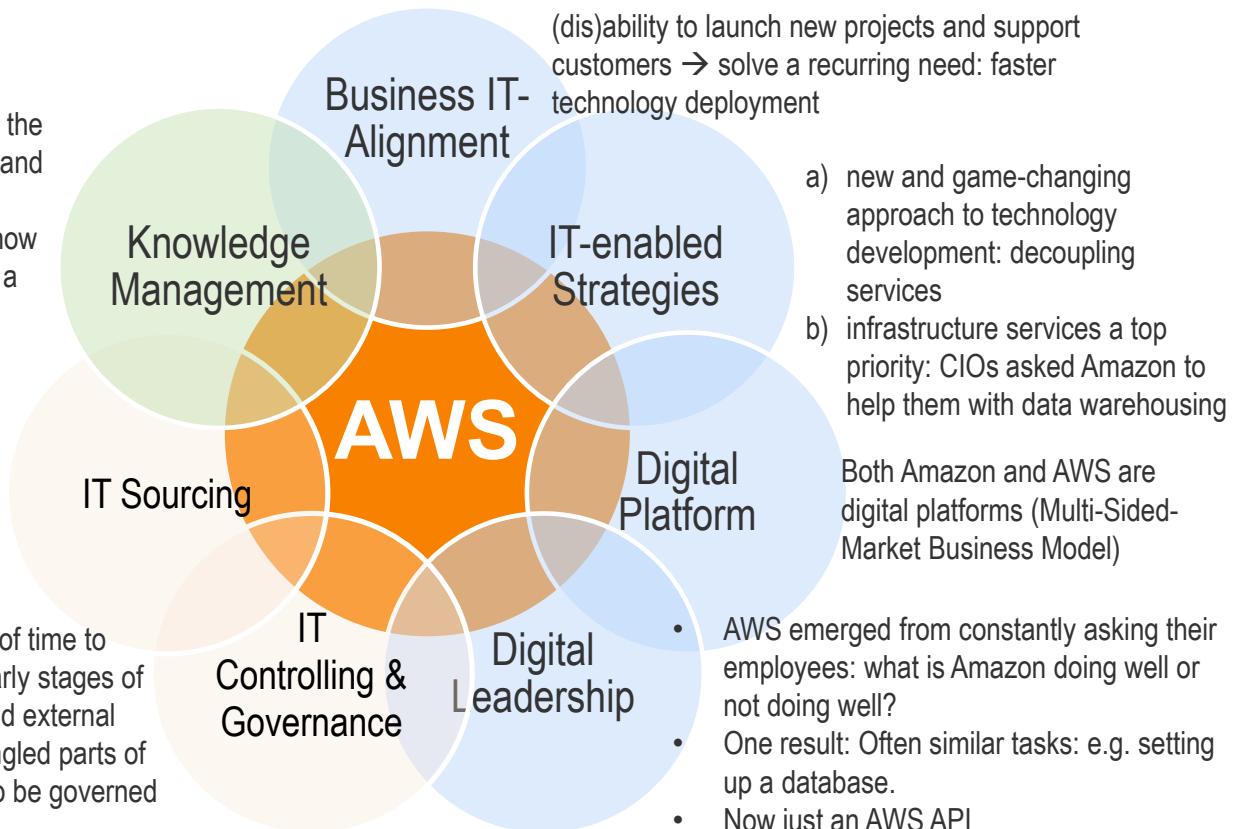
- Launched in 2006
- Provides services for computing, storage, networking, database, analytics, application services, deployment, management, mobile, developer tools, and tools for the Internet of Things.
- 31 % market share for Cloud Services
- 35 billion US\$ revenue (2019) (444% growth since 2015)

Example: How Amazon Web Services (aws) Emerged

e. g:

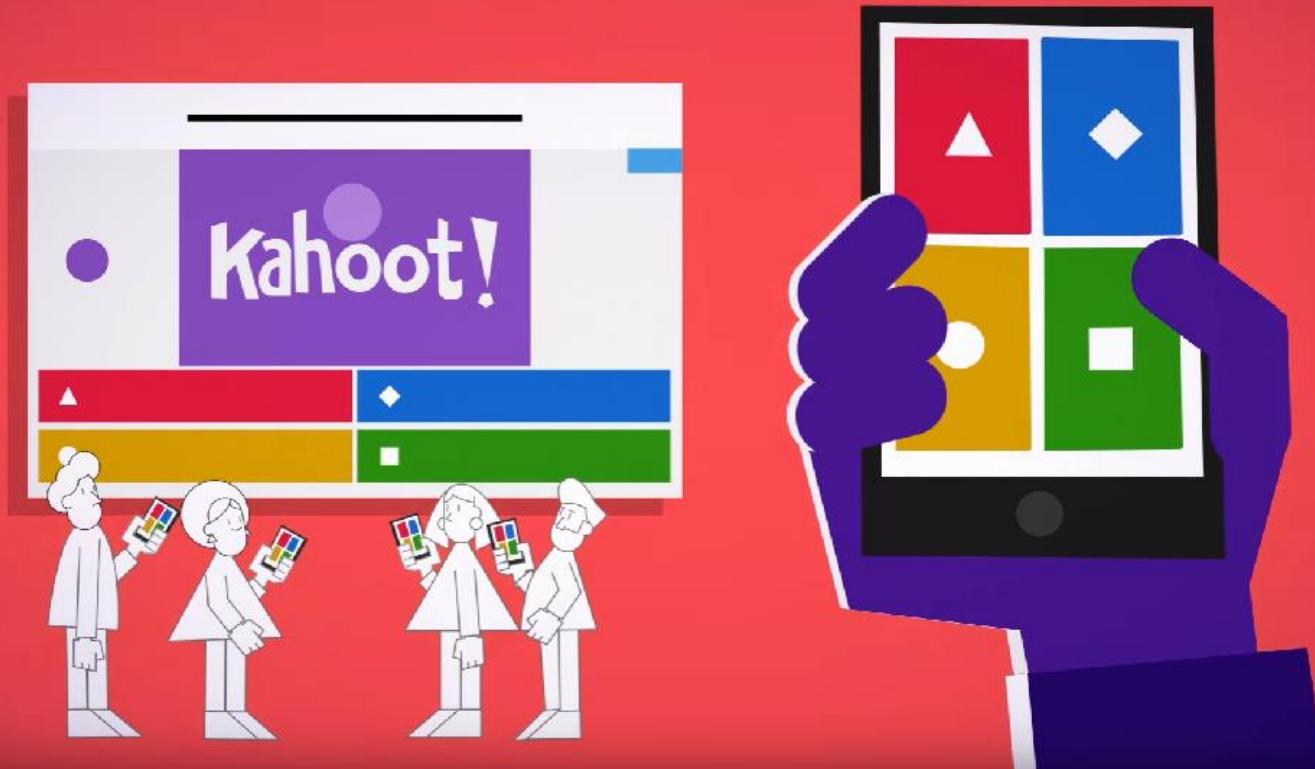
- a) Find the right people in the company to build APIs and services
- b) hire new people that know more about how to run a technology providing business

Customers source parts of their IT from AWS



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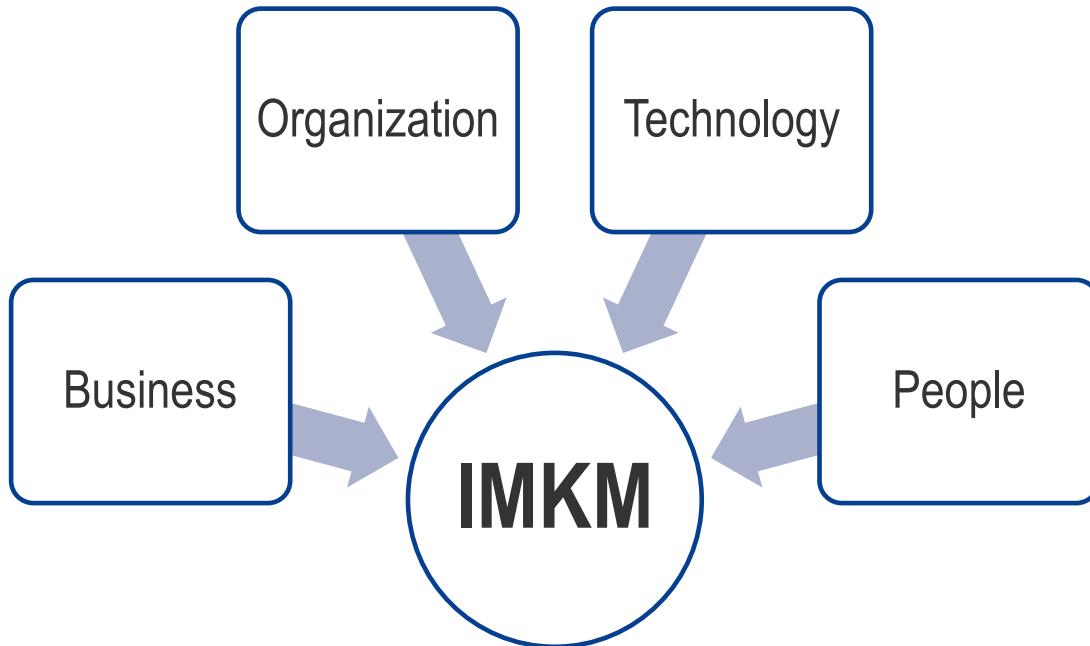
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New Trends and Challenges from different Stakeholders



Business Trends

- Digital Platforms & Digital Ecosystems
 - Value Co-Creation between firms
 - Changing Inter-firm Relations
 - Monopolies and dependencies
- Sustainability & Social Responsibility
- (Digital) Experience-driven value propositions
- Ubiquity / Democratization of Digital Technology
- Data-driven decision-making

Business



IMKM

Uber

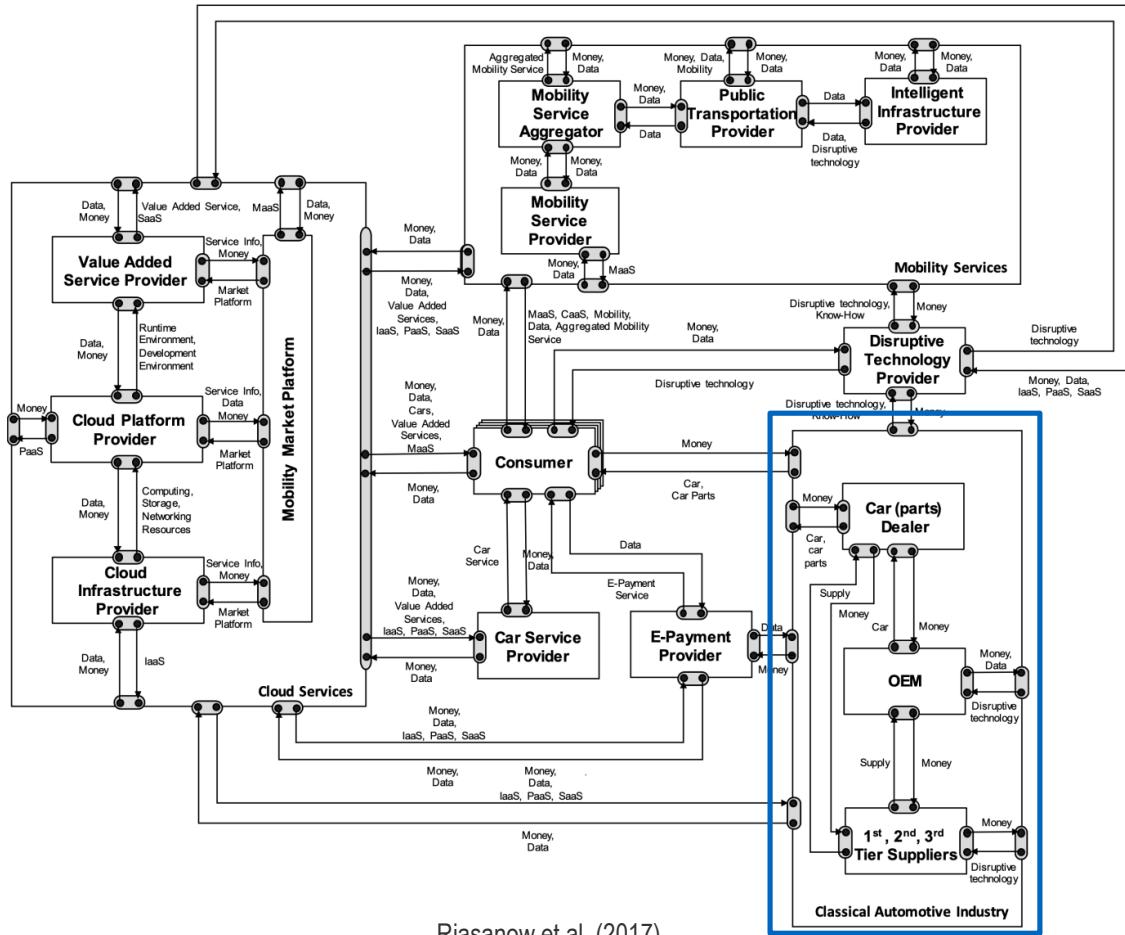
SAP



INTEGREAT
Great Integration.



<https://techwireasia.com/2018/07/the-value-proposition-of-a-digital-agency/>



Riasanow et al. (2017)

Organizing for a Digital World

- Distributed Organizations
 - Distributed Work (e.g. COVID-19)
 - Distributed information systems
 - Cloud, APIs, Serverless, ...
- Digital Maturity of Organizations & People
- Thriving in Digital Complexity
 - Organizing for innovation
 - Strategic agility to respond to unpredictable opportunities and threats
 - Building resilience in uncertain environments



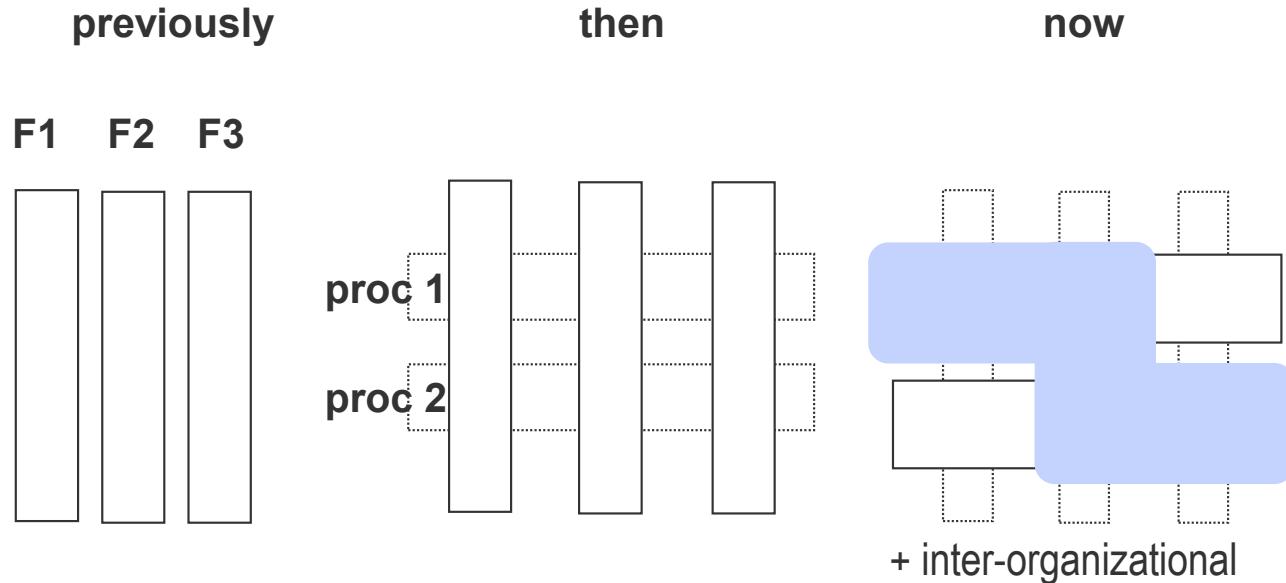
Organization



<https://www.telecom-handel.de/consumer-communications/corona-krise/so-vermeiden-home-office-koller-2519625.html>

Organization

From Functional View To Scaling Agile



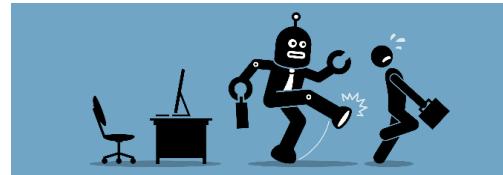
see, understand
and live functions

understand
processes

cross-functions
cross-processes

Never Forget the Human

- Distributed Workplaces
 - Information Distribution
 - Company Culture
 - Team Work
 - Leadership
- Information & Work Overload
- Artificial Intelligence replacing human tasks
- (Data) Privacy
- Lack of qualified employees / Employee turnover

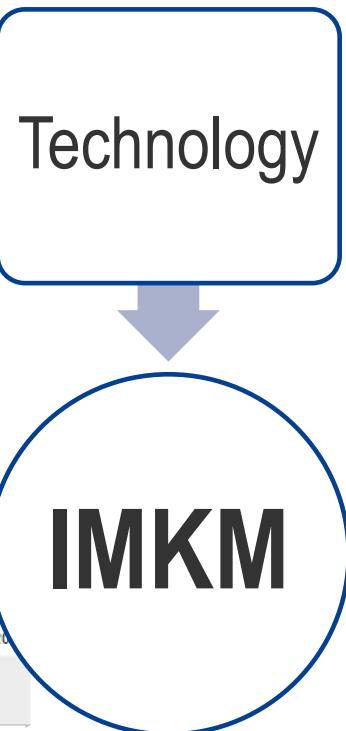
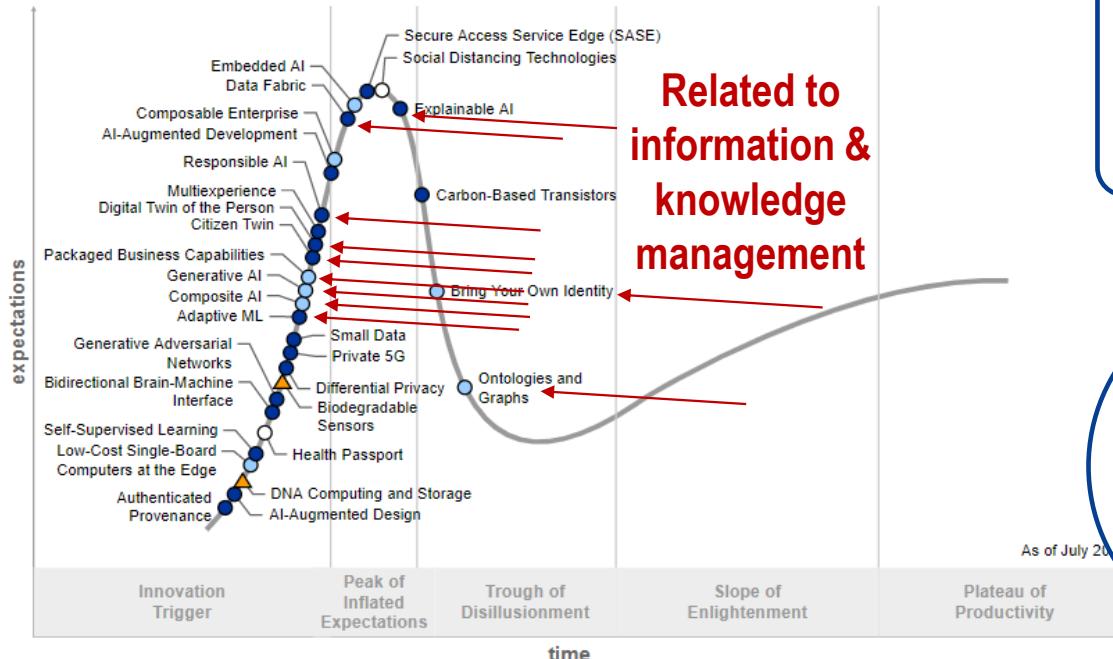


People



<https://becominghuman.ai/ai-robots-do-not-threaten-humans-but-super-humans-do-21c29ea455db?gi=d4d55f3e4053>

Gartner's 2019 Hype Cycle for Emerging Technologies



Plateau will be reached:

- less than 2 years
- 2 to 5 years
- 5 to 10 years
- ▲ more than 10 years
- ✗ obsolete before plateau

Gartner (2020)

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Core Literature: Krcmar, Informationsmanagement (2015)

1. Einleitung (pp.1-8)
2. Begriffe und Definitionen (pp.11-26)
3. Modellierung (pp. 31-78)
4. Aufgabe des Informationsmanagements: Informationsmanagement (pp. 85-109)
5. Aufgabe des Informationsmanagements: Management der Informationswirtschaft (pp. 113-165)
6. Aufgabe des Informationsmanagements: Management der Informationssysteme (pp. 173-302)
7. Aufgabe des Informationsmanagements: Management der Informations- und Kommunikationstechnik (pp. 315-385)
8. Führungsaufgaben des Informationsmanagements (pp. 393-578)
9. Referenzmodelle des Informationsmanagements (pp. 601-630)
10. Einsatzfelder und Herausforderungen des Informationsmanagements (pp. 633-753)
11. Fallstudie „Rockhaus AG“ (pp. 767-783)

Additional Reading

- Accenture (2013). High Performers in IT: Defined by Digital. Insights from Accenture's fourth High Performance IT research.
- Ackoff, R. L. (1989). From data to wisdom. *Journal of applied systems analysis*, 16(1), 3-9.
- Applegate, L. M.; McFarlan, F. W.; McKenney, J. L. (2001): Corporate Information Systems Management. 5. Auflage, McGraw Hill, 2001.
- Dalkir, K. (2013). Knowledge management in theory and practice. Routledge.
- Earl, M. J. (1989). Management strategies for information technology. Prentice-Hall, Inc., Upper Saddle River, NJ, USA.
- Hoberg, P., Krcmar, H., & Welz, B. (2017). Skills for digital transformation. IDT Survey.
- Smith, G. D., Arnold, D. R., & Bizzell, B. G. (1986). Strategy and business policy. Houghton Mifflin School.
- Steinmüller, R. (1993): Informationstechnologie und Gesellschaft, Wissenschaftliche Buchgesellschaft, Darmstadt, p.178.



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Lecture 2 *Business Value of IT*

TUM

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IMKM Lecture 2: Business Value of IT/ IS

Outline

1. Discussion in Research and Basics
2. Measuring Business Value of IT
 1. Frameworks
 2. Methods

Learning Objectives

- You understand the role of information technology (IT) and information systems (IS) for firms.
- You can discuss approaches to identify and evaluate the value of IT/ IS and IT/ IS investments.
- You know different frameworks and methods for measuring the business value of IT/ IS and assessing IT/ IS investments.
- You can apply and discuss measurement methods.

IT Doesn't Matter

by Nicholas G. Carr

As information technology's power and ubiquity have grown, its strategic importance has diminished. The way you approach IT investment and management will need to change dramatically.

In 1968, a young Intel engineer named Ted Hoff found a way to put the circuits necessary for computer processing onto a tiny piece of silicon. His invention of the microprocessor spurred a series of technological breakthroughs—desktop computers, local and wide area networks, enterprise software, and the Internet—that have transformed the business world. Today, no one would dispute that information technology has become the backbone of commerce. It underpins the operations of individual companies, ties together far-flung supply chains, and, increasingly, links businesses to the customers they serve. Hardly a dollar or a euro changes hands anymore without the aid of computer systems.

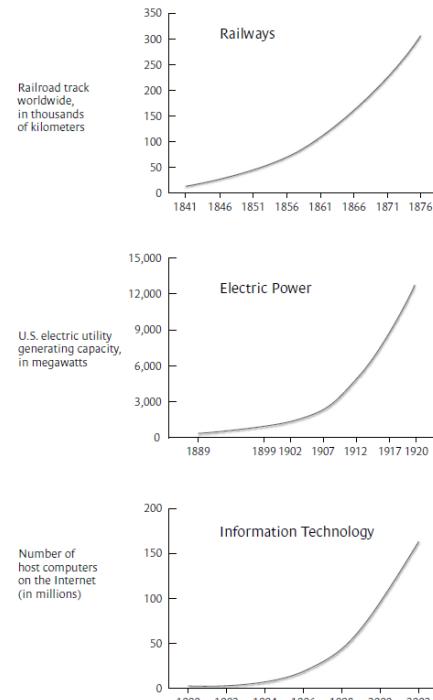
As IT's power and presence have expanded, companies have come to view it as a resource ever more critical to their

success, a fact clearly reflected in their spending habits. In 1965, according to a study by the U.S. Department of Commerce's Bureau of Economic Analysis, less than 5% of the capital expenditures of American companies went to information technology. After the introduction of the personal computer in the early 1980s, that percentage rose to 15%. By the early 1990s, it had reached more than 30%, and by the end of the decade it had hit nearly 50%. Even with the recent sluggishness in technology spending, businesses around the world continue to spend well over \$2 trillion a year on IT.

But the veneration of IT goes much deeper than dollars. It is evident as well in the shifting attitudes of top managers. Twenty years ago, most executives looked down on computers as proletarian tools—glorified typewriters and

The Sprint to Commoditization

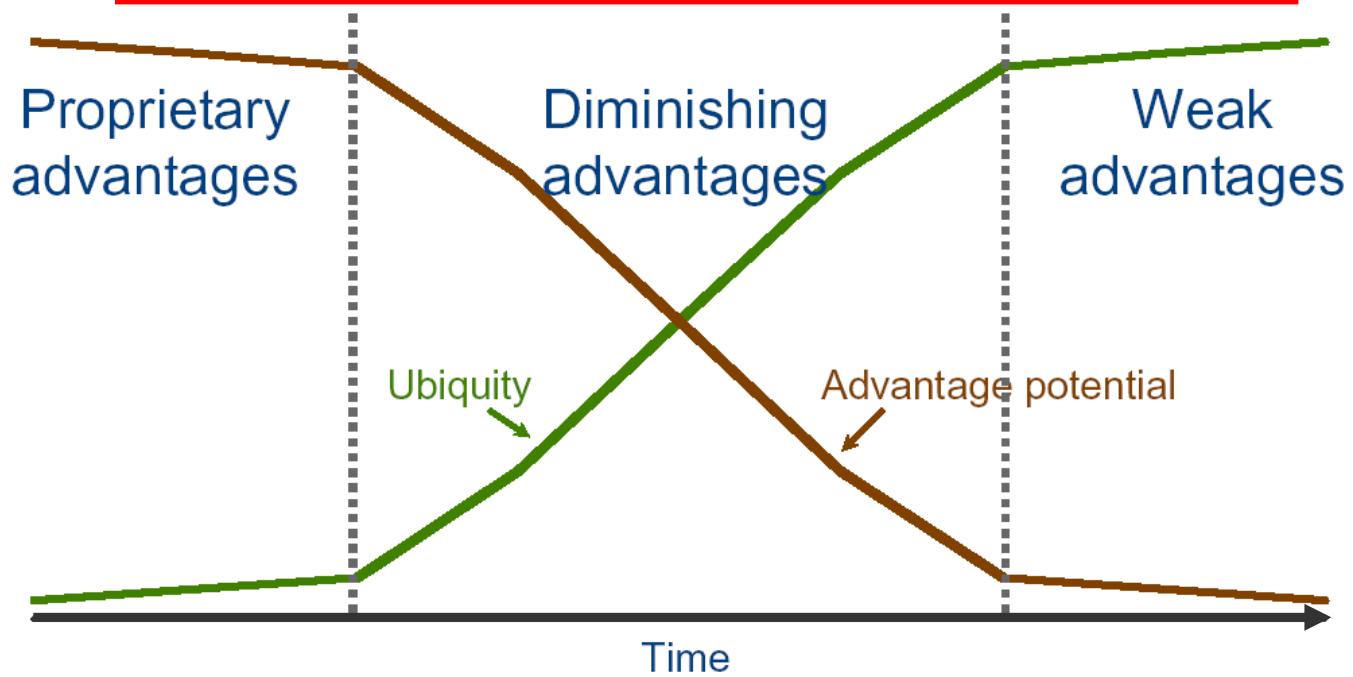
One of the most salient characteristics of infrastructural technologies is the rapidity of their installation. Spurred by massive investment, capacity soon skyrockets, leading to falling prices and, quickly, commoditization.



Sources: railways: Eric Hobsbawm, *The Age of Capital* (Vintage, 1996); electric power: Richard B. DuBoff, *Electric Power in Manufacturing, 1889-1958* (Routledge, 1979); Internet hosts: Robert H. Zakan, *Hobbes' Internet Timeline* (www.zakan.org/robert/internet/timeline/).

Evolution of Technology – Infrastructural vs. Proprietary

IT becomes a simple factor of production!

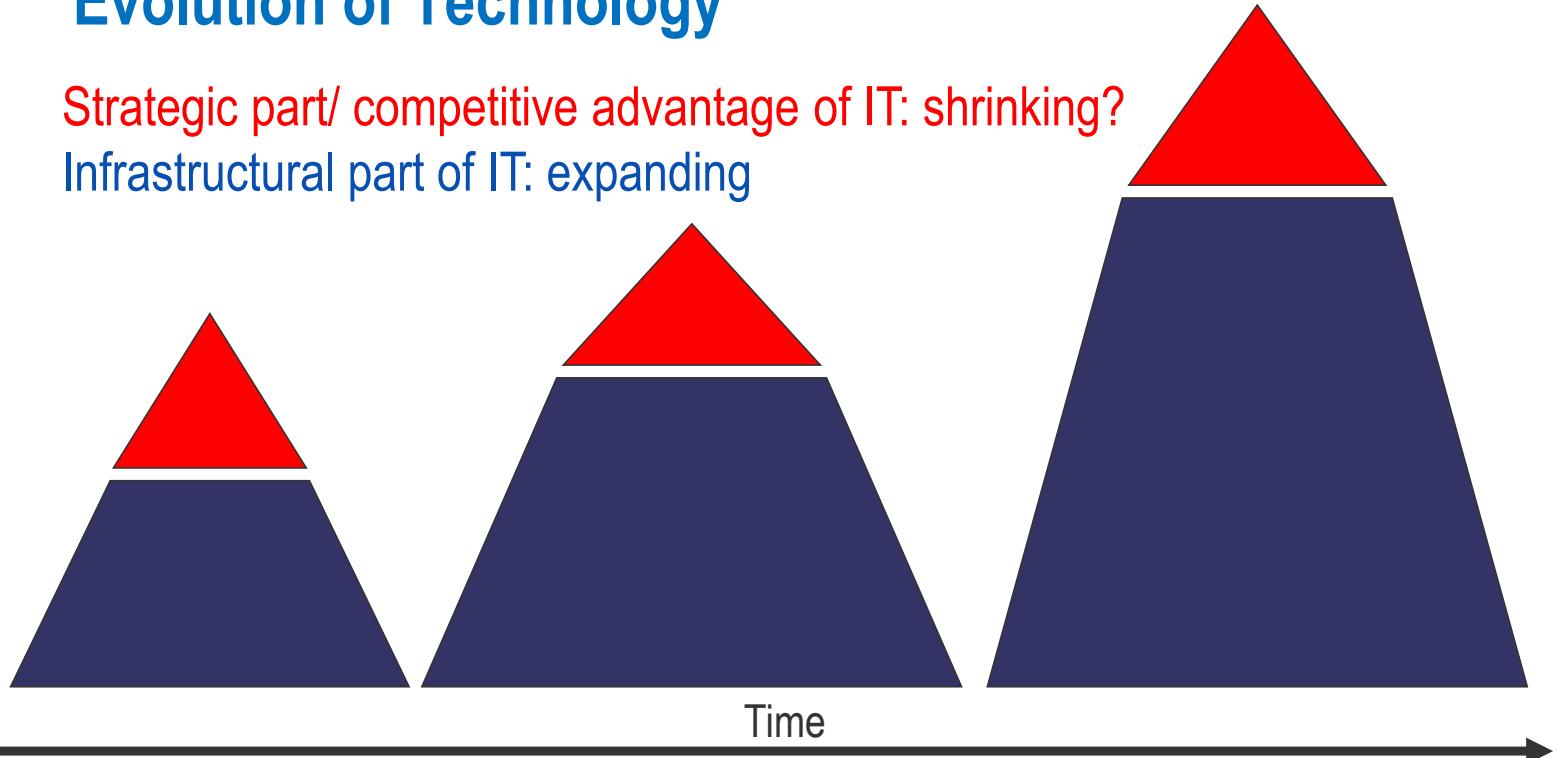


Carr, N. G. (2004).

Evolution of Technology

Strategic part/ competitive advantage of IT: shrinking?

Infrastructural part of IT: expanding



- The software stack continues to be commoditized, yet specialized software remains strategic
- The best business software is invisible; it still needs to be managed

2003

“IT Doesn’t Matter” – Nicholas Carr

2007

“The CIO Dilemma: The Sinking CIO” – Information Week

2009

“The cost of IT is not the value of IT.” – Hunter & Westermann

2011

“IT Spending: No longer the first thing cut” – Information Week

(69% of Companies expected an IT budget increase in 2011)

2014

“CIOs Must Market IT’s Value” – Adam Dennison (cio.com)

2017

“IT as the champion of your Digital Transformation” – William Geller (cio.com)

What we know so far....(based on research findings)

- **IT/ IS does create value**
 - Value can be of different types (financial – ROI, intermediate – process-related, affective – perception-related)
- **IT/ IS creates value under certain conditions**
 - Has to be a part of a business value creating process with other organizational factors operating in a synergistic manner (resource-based view, IT capabilities)
- **IT/ IS-based value manifests itself in many ways**
 - Different ways (productivity, profitability, consumer surplus, and innovativeness)
 - and at different levels (individual, group, process, firm, and industry)

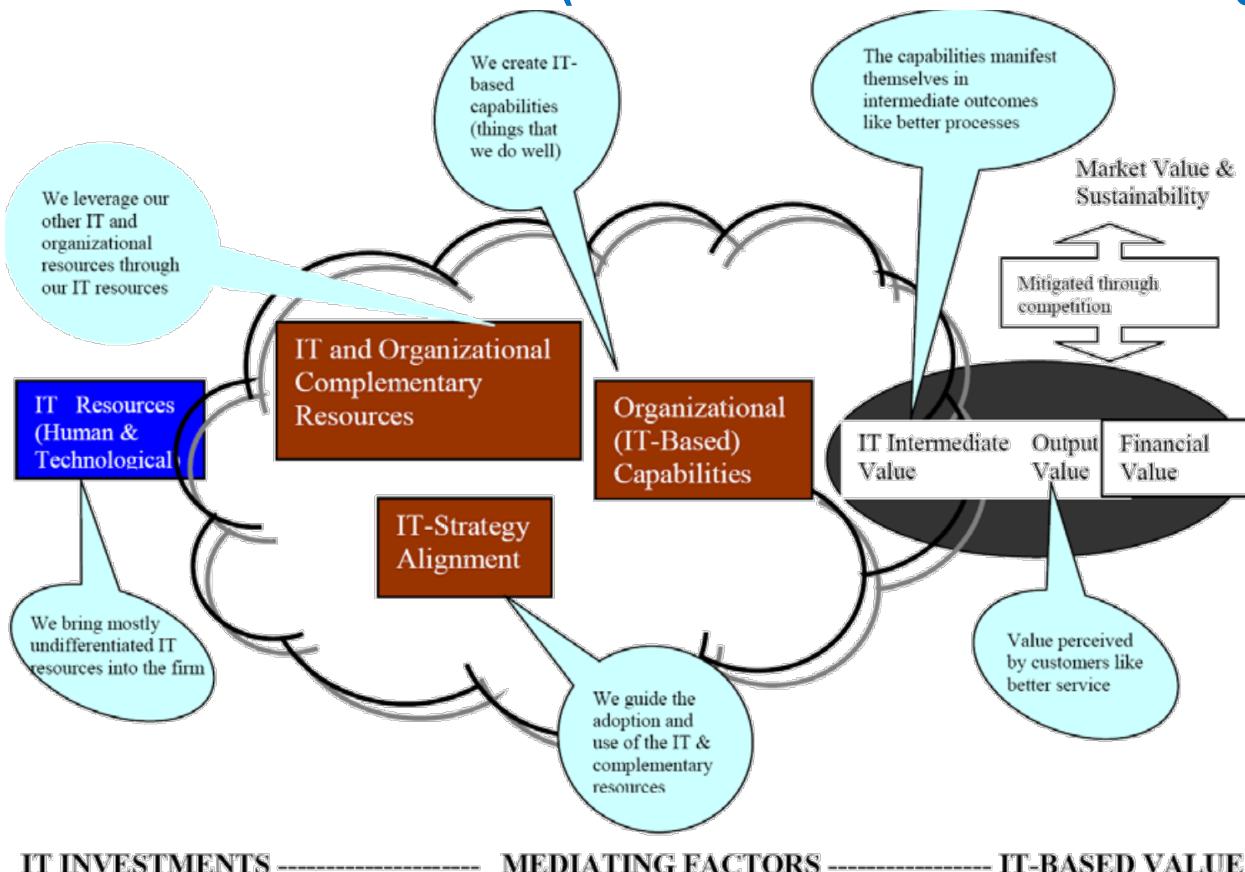
Source: Kohli & Grover (2008, p.27)

What we know so far....(based on research findings)

- **IT/ IS-based value and IS-based competitive advantage are not the same**
 - Competitive advantage stems from creating “differential value”, can be achieved through leveraging IS and complementarities
- **IT/ IS-based value could be latent**
 - IS-based value creation is not immediate, there is a time lag (often in the scale of years)
- **Numerous factors mediate IT/ IS and value**
 - Business-IT/ IS alignment, Business Process Reengineering (BPR)/ Business Process Management (BPM), IT Usage, etc.
- **Causality for IT/ IS value is elusive**
 - It is difficult to fully capture and attribute the value generated by IT/ IS investments

Source: Kohli & Grover (2008, p.27)

What we know so far....(based on research findings)



Source: Kohli & Grover (2008, p.27)

IT/ IS -Potentials and their Organizational Benefit

IT-Potential	Organizational Influence/Benefit
Automate	Reduction of Manual Actions
Informate-up	Providing information to top management.
Informate-down	Providing information to employees across the firm.
Sequential	Natural Order of Activities or Even Paralleling Processes
Precise/targeted	Continuous Process Monitoring
Analytical	Complex Analysis of Existing Information
Integrative	Pooling of Heterogeneous Activities
Knowledge creating	Creation of Knowledge and Expertise
Simplifying	Removing of Intermediaries and Business Process Redesign
Geographical	Overcoming Space
Transform	Redefining the business model, business processes and relationships of the firm

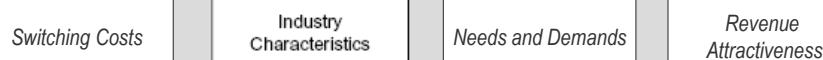
Source: Davenport (1993, p. 51); Vial (2019, p. 132)

Contextual Factors influencing Business Value of IT/IS

III. Macro Environment

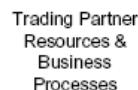
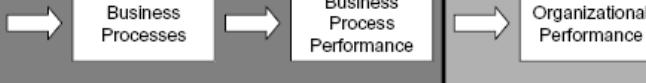


II. Competitive Environment



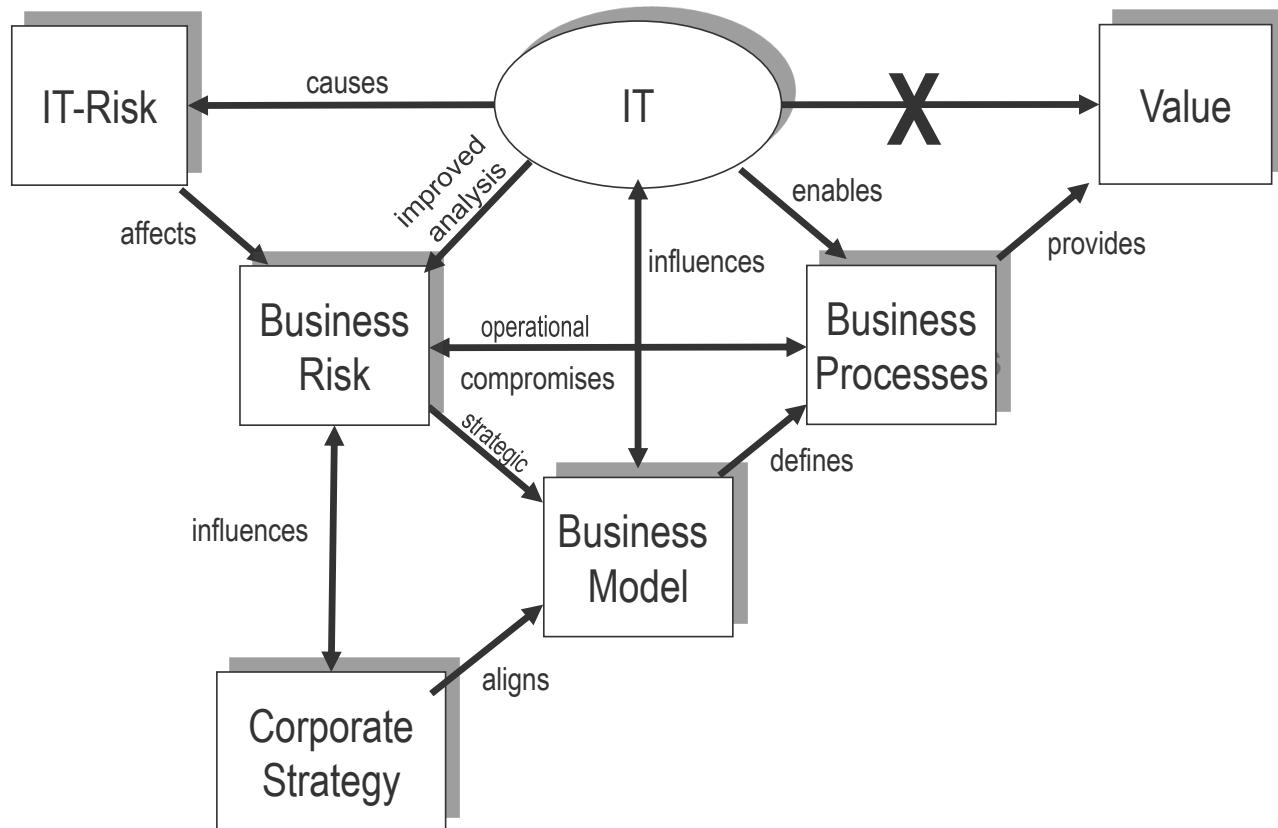
I. Focal Firm

IT Business Value Generation Process



Melville et al. (2004);
Osterwalder, A., & Pigneur, Y. (2010)

IT – Benefit mechanics



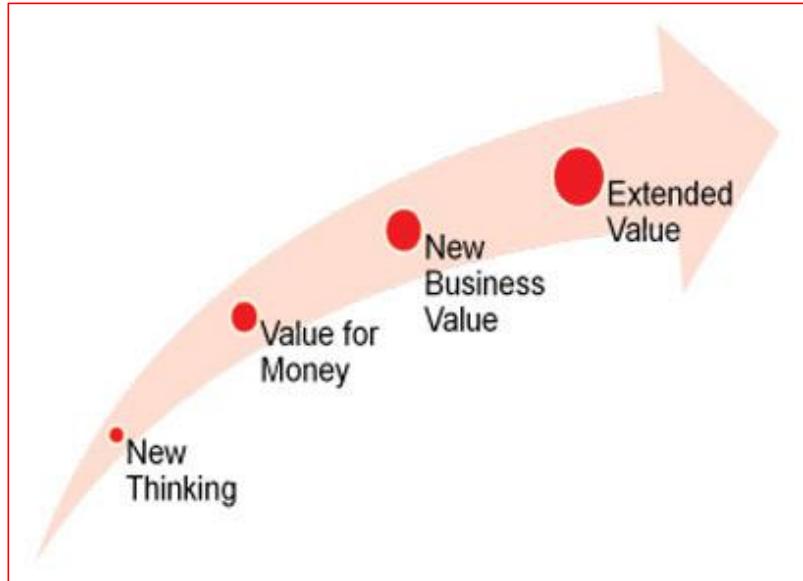
Consequences of IT/ IS Value Ambiguity

- When we can't articulate the value, we tend to focus on the cost!
- To many executives, the cost of IT/ IS appears:
 - substantial; even excessive
 - never-ending
 - not well managed
- Creates IT/ IS direction toward:
 - under-investment
 - down-sizing
 - outsourcing

The Path to Communicating IT/ IS Value for a CIO

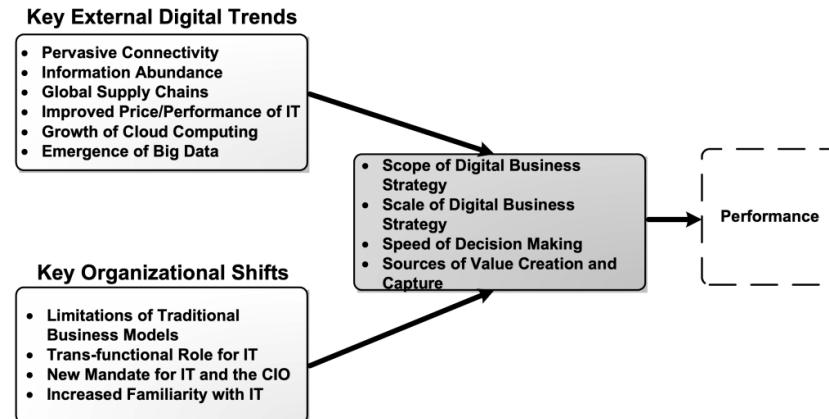
- **Step 1:** Change thinking to avoid the value traps.
- **Step 2:** Show that IT/ IS provides value for money.
- **Step 3:** Show how IT/ IS improves business performance.
- **Step 4:** Show how value is created beyond and behind IT/ IS.

Successful IT/ IS leaders communicate value in a particular way and in a particular order.



Hunter & Westerman (2009, p.7)

More recent Discussion in Research: Digital Business Strategy

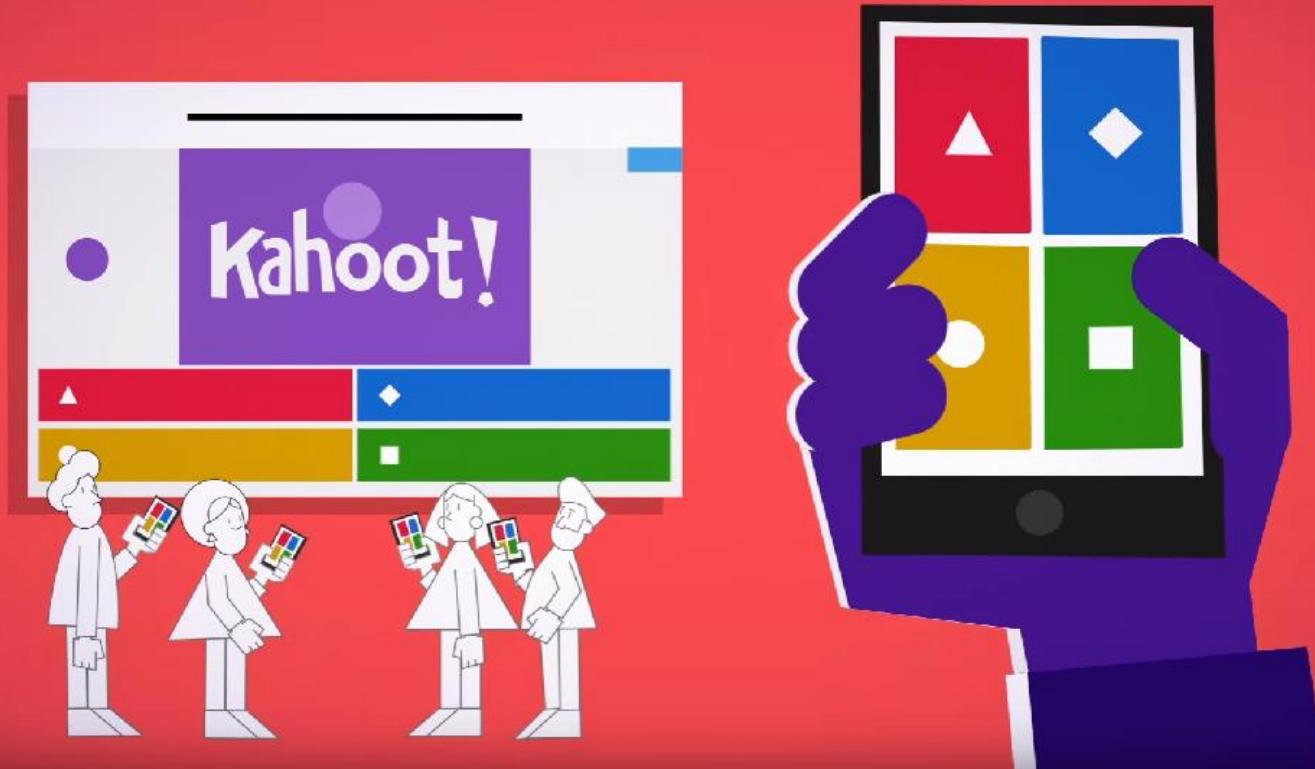


- Adapt business infrastructure to the new digital era
- Traditional business strategy reshaped by digital technology: modular, distributed, cross-functional
 - Embedded technology in products and services
 - Digital platforms
 - IT as a ubiquity
- From business-IT alignment to fusion of business and IT towards a digital business strategy

Bharadwaj et al. (2013)

Quiz Time!

Go to kahoot.it



IMKM Lecture 2: Business Value of IT/ IS

Outline

1. Discussion in Research and Basics
2. **Measuring Business Value of IT**
 1. Frameworks
 2. Methods

Learning Objectives

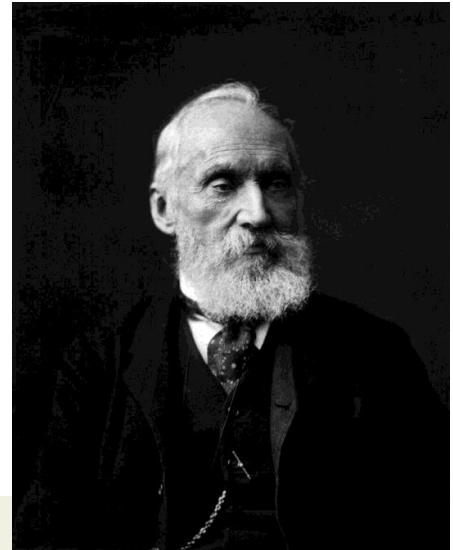
- *You understand the role of information technology (IT) and information systems (IS) for firms.*
- *You can discuss approaches to identify and evaluate the value of IT/ IS and IT/ IS investments.*
- *You know different frameworks and methods for measuring the business value of IT/ IS and assessing IT/ IS investments.*
- *You can apply and discuss measurement methods.*

Business Value of IT is difficult to measure



Measures of IT/ IS Value

- Earnings growth
- Market share
- Customer awareness and satisfaction

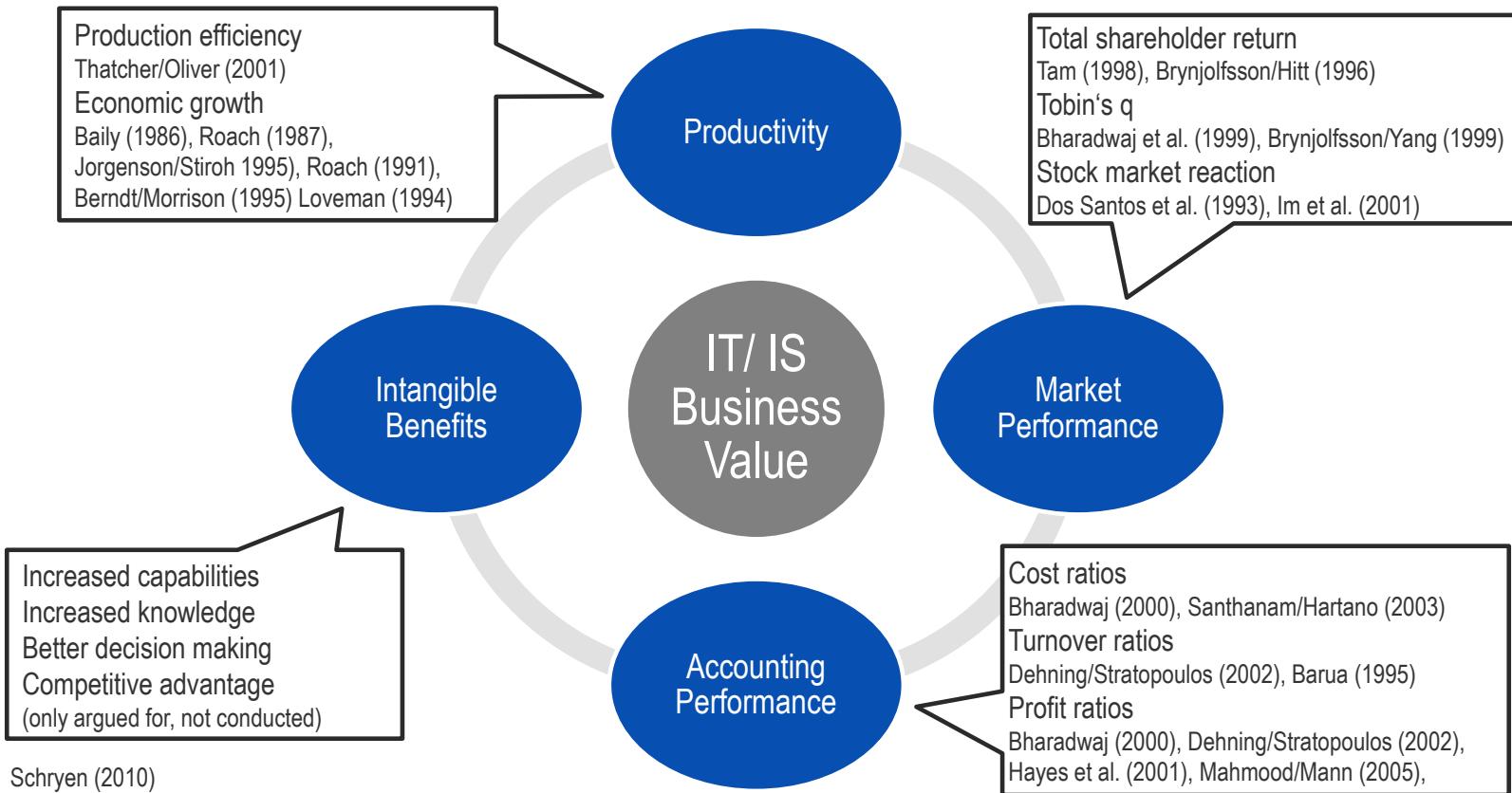


One of my favorite quotes:

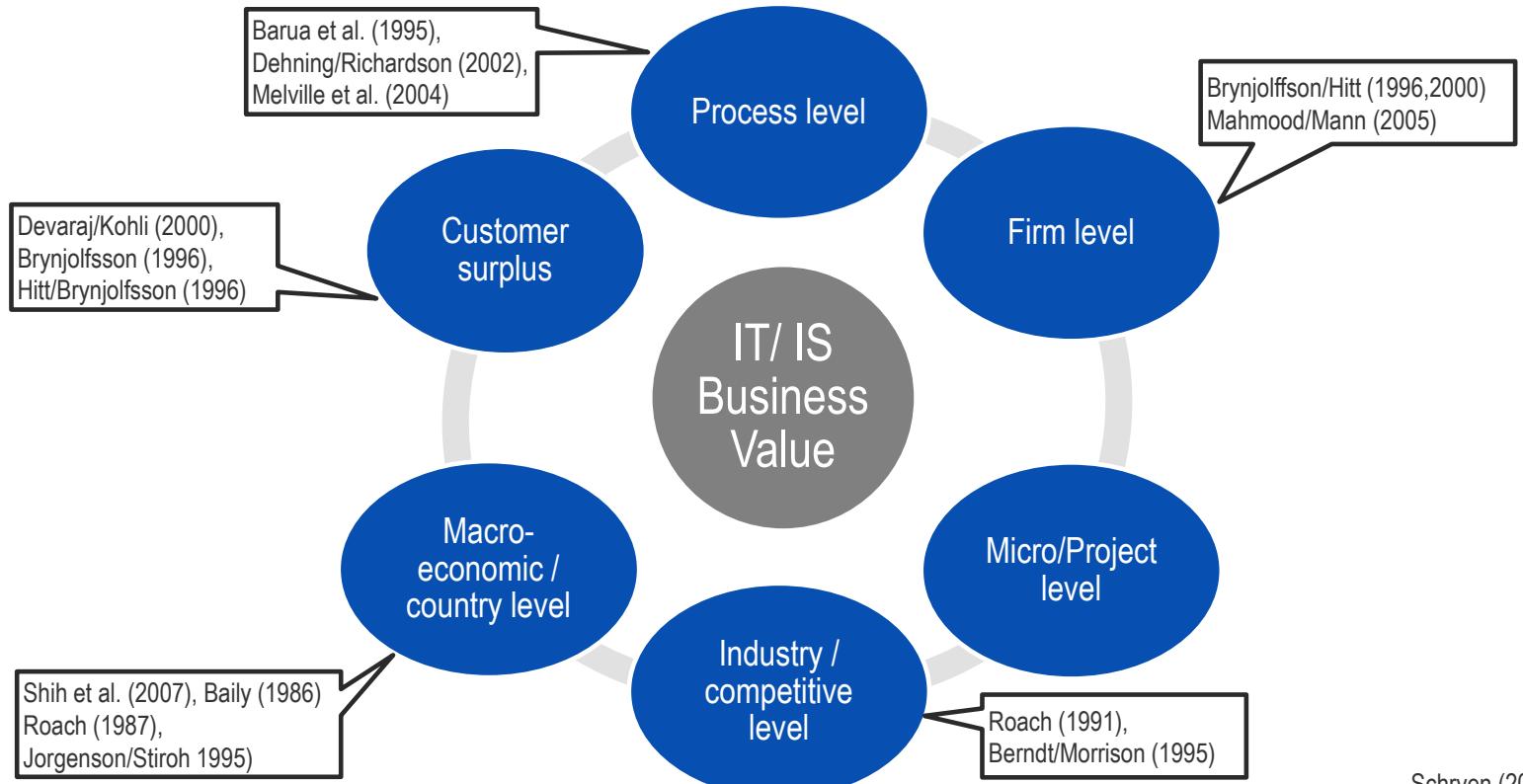
*When you cannot measure, your knowledge is
of a meager and unsatisfactory kind.*

William Thomson, 1. Baron Kelvin

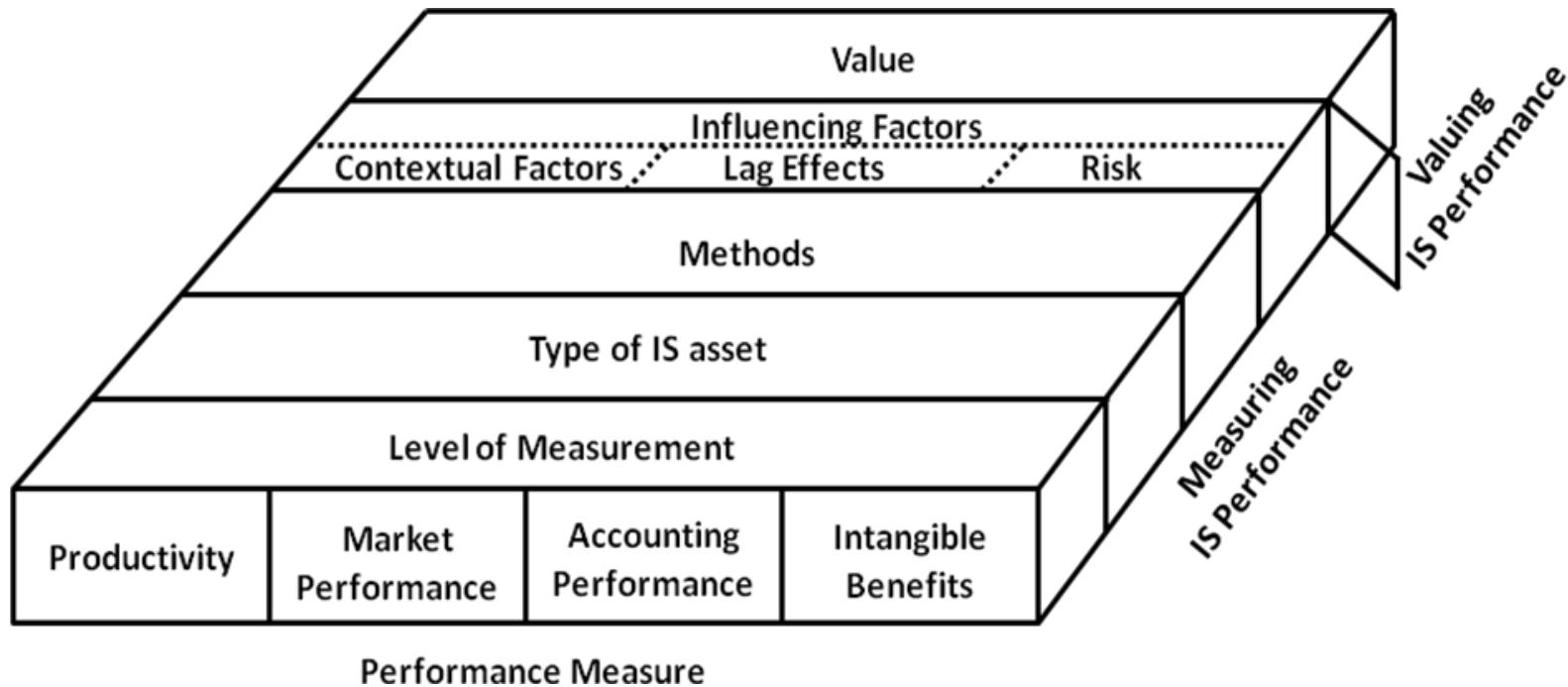
Performance Measures



Level of Measurement



A Taxonomy of IT/ IS Business Value Research



Schryen (2010)

IT/ IS Business Value – Distinction

- **Measuring the business value of IS**

- Assessing the business value of current systems and technologies
 - Post-investment

Is the system resulting in some performance gain? Can this gain be measured? How should we measure it?

- **Evaluating IS investments**

- Assessing the feasibility of making new investments into IT/ IS
 - Pre-investment

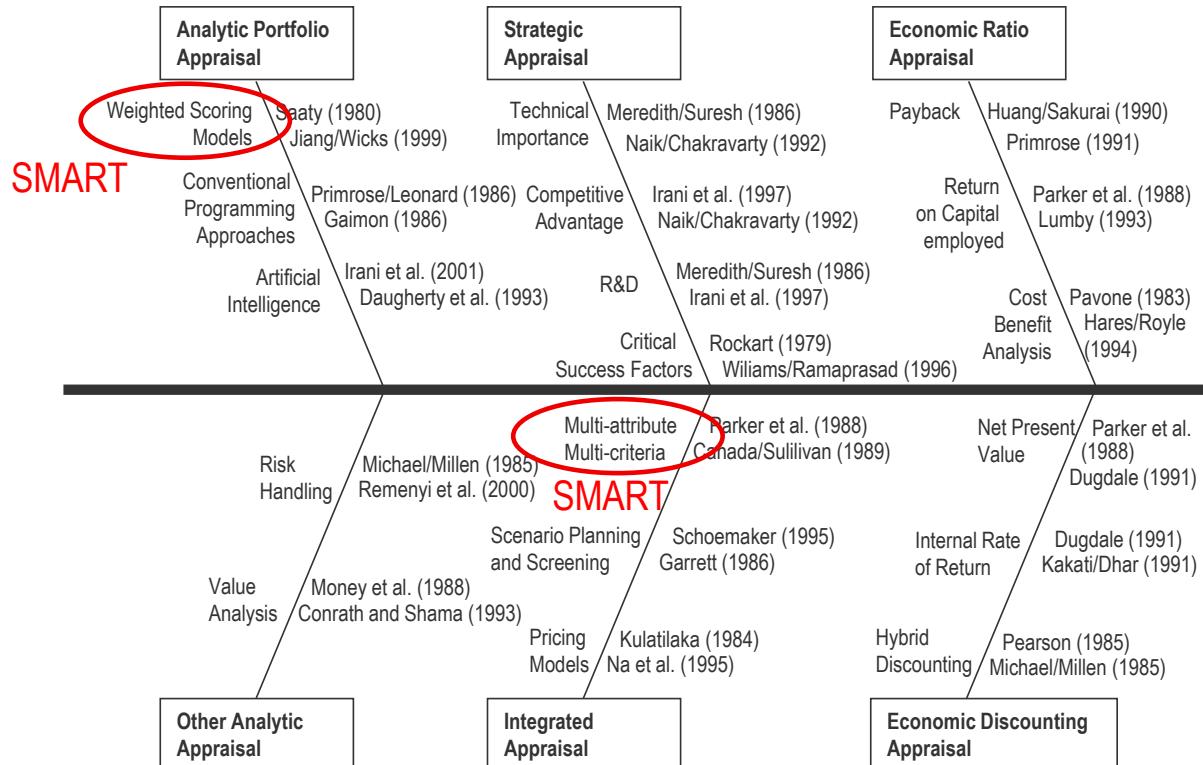
Should we invest in the new system or technology? How much will it cost? What kind of gains can we expect?

The Business Value Process



Source: Sward D. (2006)

Approaches to assess IT/ IS Value and Benefit



Adapted from Irani (2001) in: Krcmar (2015), p. 482

Example method: Simple Multi Attribute Rating Technique (SMART)

- A systematic process for decision making
- Based on an
 - identification of the different **alternatives** and
 - their relevant **attributes**,
 - assignment of **weights** for each attribute and
 - calculation the **weighted arithmetic mean** for each alternative.
- Sensitivity analysis

Example method: Simple Multi Attribute Rating Technique (SMART)

1. Identification of decision maker
2. Identification of alternatives
3. Identification of relevant criteria and their effects
4. Measure the value of benefit for every alternative and for every criteria
5. Assign weights for every criteria
6. Calculate the weighted arithmetic mean using all criteria for every alternative
7. Make a provisional decision
8. Sensitivity analysis

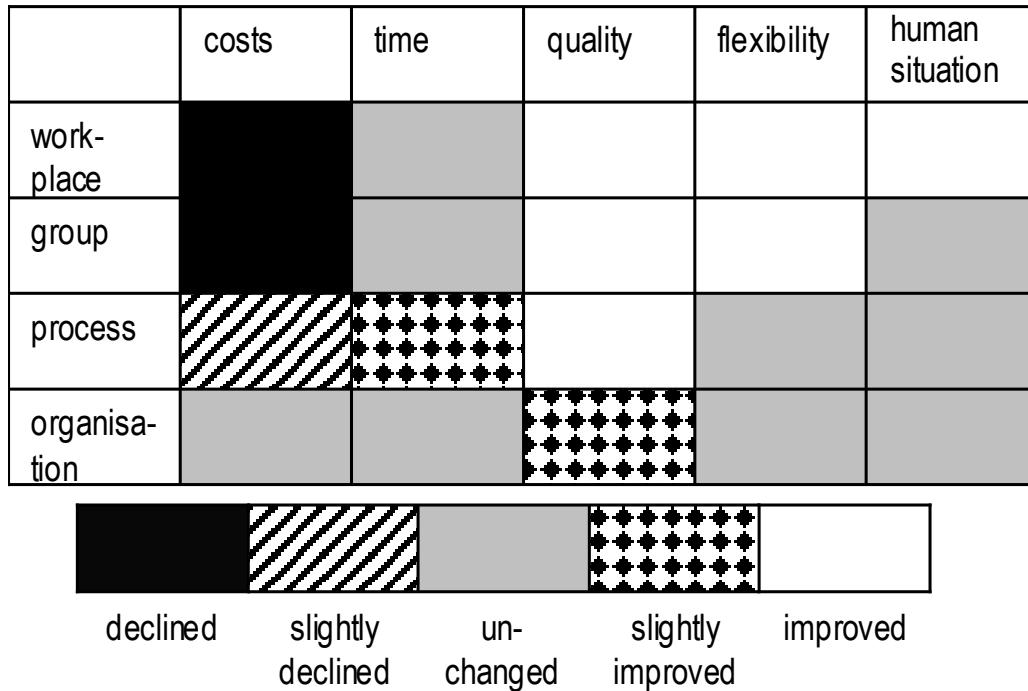
Example method: Simple Multi Attribute Rating Technique (SMART)

	Criterion	Weight	Project			
			1	2	3	4
1	Market share effect	10%	70	70	50	30
2	Competition	5%	30	70	70	70
3	Risk	10%	10	30	50	30
4	Product fit	5%	70	70	50	0
5	Strategic plan alignment	15%	50	50	70	30
6	Customer support	20%	50	50	30	30
7	Payback	10%	70	70	30	10
8	NPV	15%	70	50	30	30
9	ROI	10%	50	50	30	10
	Totals	100%	53	54	43	26.5

TABLE 4-1 WSM Rates

Rating	Score
Poor/not satisfied	0
Below average	10
Average	30
Above average	50
Excellent	70

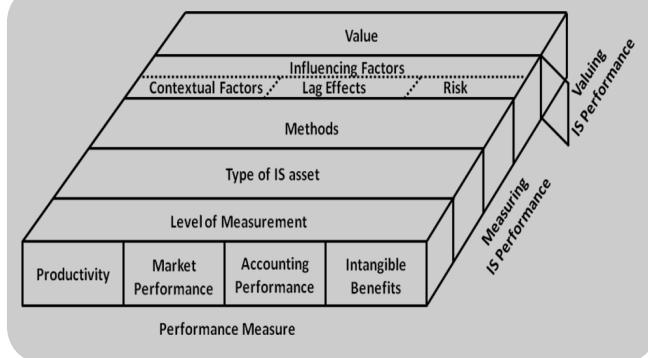
Example criteria for assessing IT/ IS Value



A Model of Layers for Assessing IT/ IS Innovations in Organizations, adopted from Schwabe (1999, p.629) in: Krcmar 2015, p.484

Business Value of IT/ IS

Frameworks

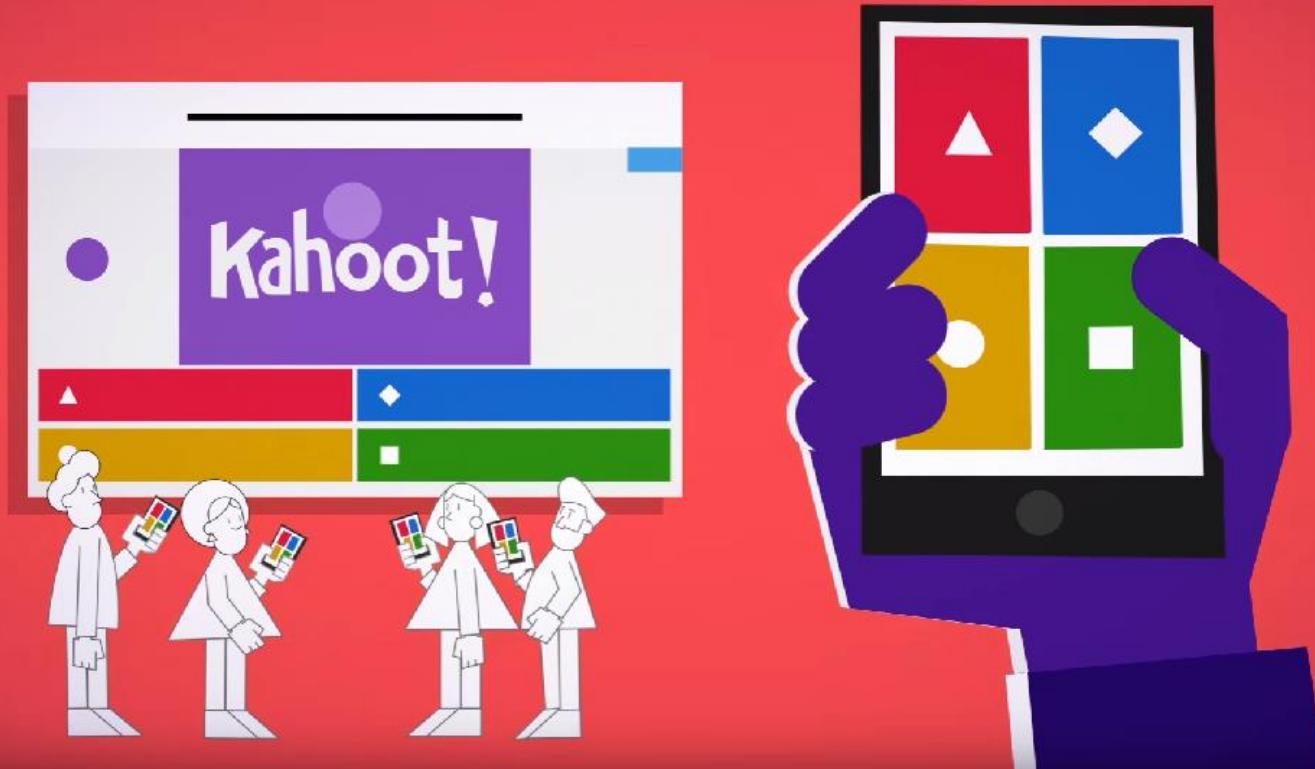


Methods for Measuring

-
- The diagram lists four methods for measuring business value of IT/ IS:
- Discounted Cash Flow
 - Total Cost of Ownership (TCO)
 - Simple Multi Attribute Rating Technique (SMART)
 - Layers for Assessing IT Innovations

Quiz Time!

Go to kahoot.it



Core Literature: Krcmar, Informationsmanagement (2015)

1. Einleitung (pp.1-8)
2. Begriffe und Definitionen (pp.11-26)
3. Modellierung (pp. 31-78)
4. Aufgabe des Informationsmanagements: Informationsmanagement (pp. 85-109)
5. Aufgabe des Informationsmanagements: Management der Informationswirtschaft (pp. 113-165)
6. Aufgabe des Informationsmanagements: Management der Informationssysteme (pp. 173-302)
7. Aufgabe des Informationsmanagements: Management der Informations- und Kommunikationstechnik (pp. 315-385)
8. Führungsaufgaben des Informationsmanagements
 8.3 IT-Controlling (pp. 472-521)
9. Referenzmodelle des Informationsmanagements (pp. 601-630)
10. Einsatzfelder und Herausforderungen des Informationsmanagements (pp. 633-753)
11. Fallstudie „Rockhaus AG“ (pp. 767-783)

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Discounted Cash Flow / Net Present Value (NPV)

- Based on the concept of time value of money
- Future cash flows are estimated and discounted to get their present values
- The sum of future cash flows (incoming and outgoing) is the NPV

$$C_0(i) = -I + \sum_{t=1}^T \frac{Z_t}{(1+i)^t} + \frac{L}{(1+i)^T} = \sum_{t=0}^T (1+i)^{-t} \cdot Z'_t$$

- C_0 : Net present value of point in time $t=0$
- i : interest rate
- Z_t : Cash flow of period of time t , Z'_t : all kinds of payments
- I : investment spending of the point in time $t=0$
- L : remaining value in point of time $t=T$
- T : considered time frame (in time periods)

Total Cost of Ownership (TCO)

- A cost basis for determining the economic value of an investment
- Includes total cost of acquisition and operating costs
- Differentiation between
 - Budgeted costs (direct & planned)
 - Not budgeted costs (indirect & might be not plannable or measurable)
 - Hinders or delays the user, e.g. downtimes, formal learning, causal learning, self-support and peer support
- Popularized by the Gartner group in 1980's



Information Management and Knowledge Management (IMKM)

Lecture 3 *Strategy and Business IT Alignment*

TUM

Chair for Information Systems

© Prof. Dr. H. Krcmar

Lecture Schedule

Information Systems Strategy

Business Value of IT

Business IT Alignment

IT-enabled Strategies

Guest Lecture: Digital Leadership and the CIO Role

Digital Platforms

Information Management

IT Controlling and IT Governance

IT Sourcing and IT Off-Shoring

IT Security, Privacy and Risk Management

Guest Lecture: Natural Language Processing for IM

Knowledge Management

Basics

Tools

Guest Lecture:
Applications



IMKM Lecture 3: Strategy and Business IT Alignment

Outline

1. Strategy
 1. Market-based View
 2. Resource-based View
2. Business-IT Alignment
 1. Corporate Strategy and Information Systems
 2. Strategic Alignment Model
 3. Multi-Business Organizations

Learning Objectives

- You can differentiate different terms related to strategy.
- You understand and can apply the market-based and the resource-based view.
- You understand and can differentiate and discuss two strategic alignment models.

Reminder: Strategy and Strategic Management

Strategy

- Plan of action to achieve a particular goal
- Long-term strategy: typically 3 – 5 years
- Short-term strategy: typically next 6 months

Strategic Management

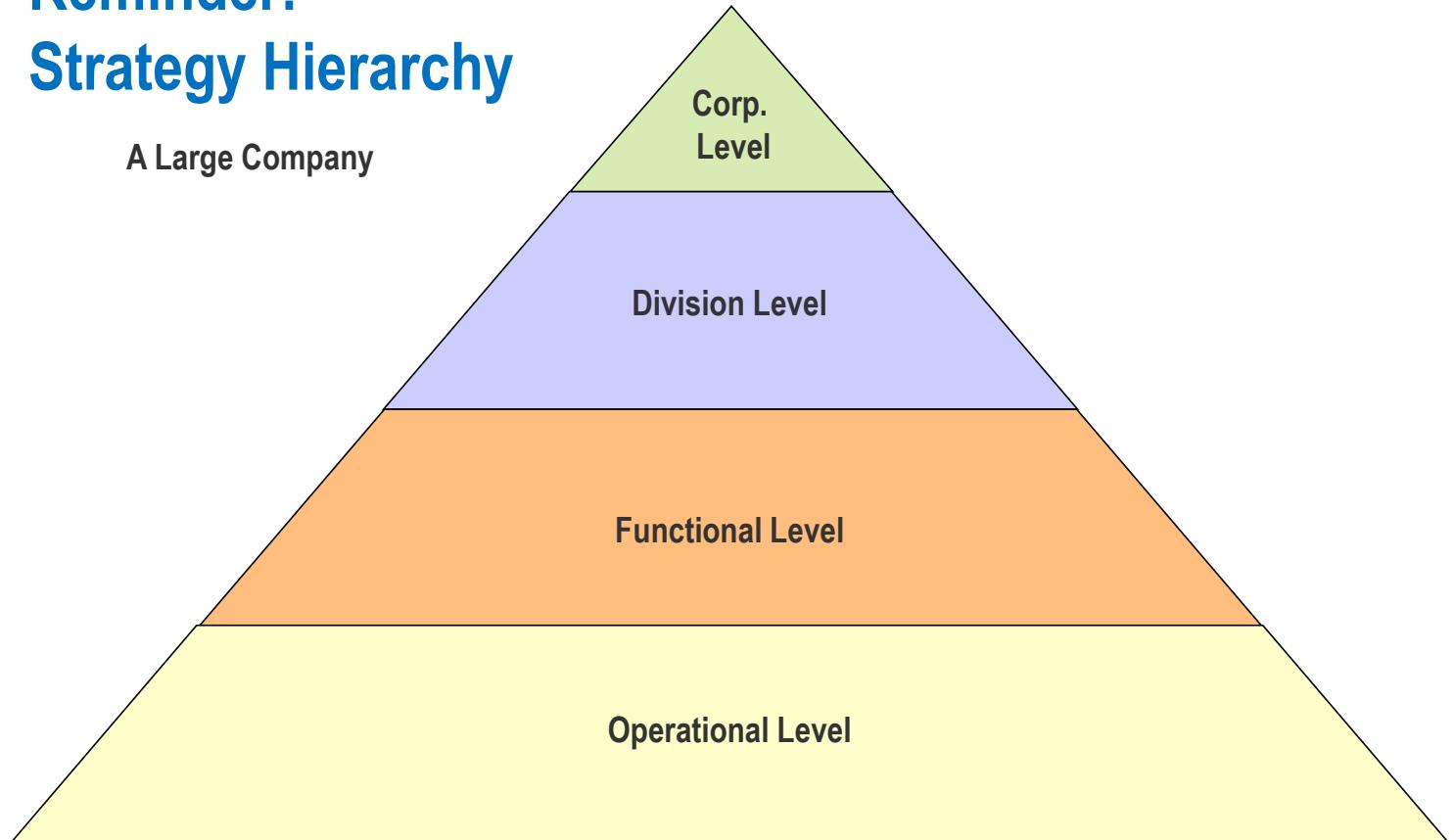
“The process of

- **examining both present and future environments,**
- **formulating the organization's objectives, and**
- **making, implementing, and controlling decisions focused on achieving these objectives in the present and future environments.”**

Smith/ Arnold/ Bizzell (1986, p.4)

Reminder: Strategy Hierarchy

A Large Company



Reminder: Strategy Hierarchy

1. Corporate strategy

- Concerned with deciding what type of business the organization should be in and how the overall group of activities should be formed and managed
- 1) growth strategy, 2) stability strategy, 3) retrenchment strategy
- Depends on SWOT analysis.

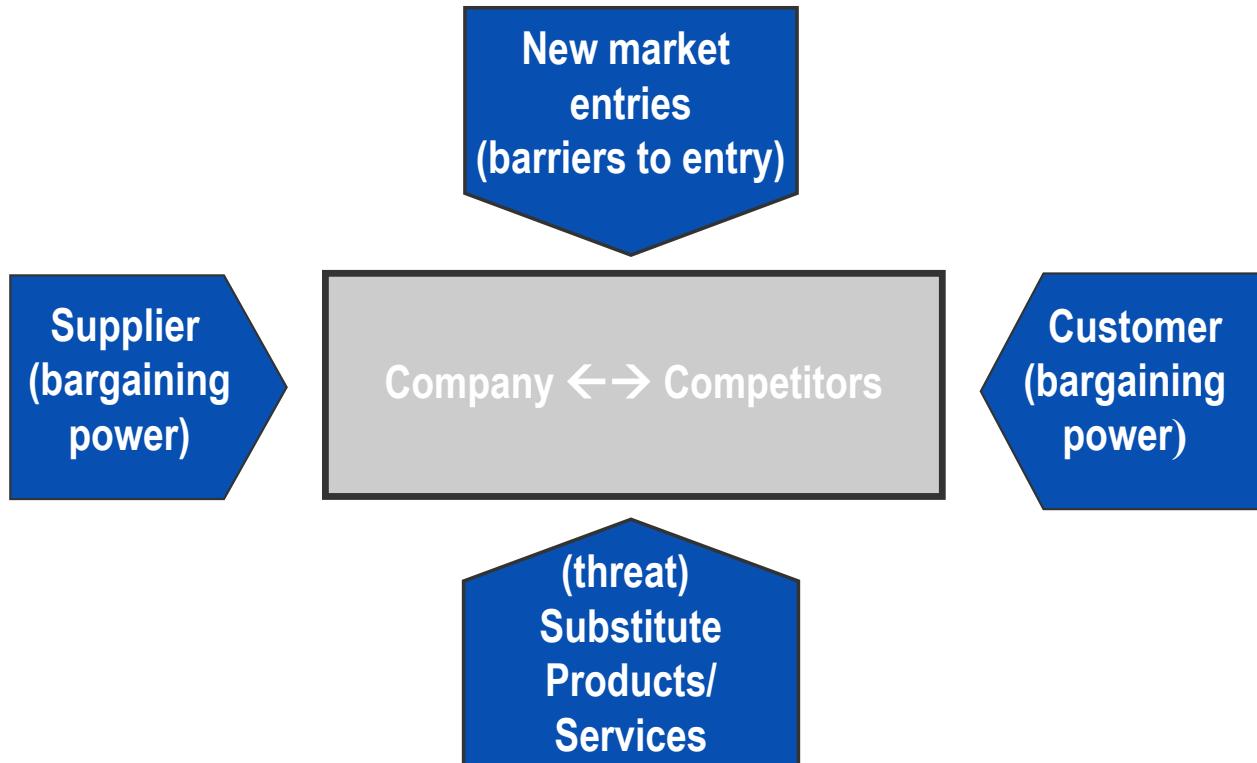
2. Generic or business unit strategy

- Refers to the actions and approaches crafted by management to create successful performance in one particular line of business
- 1) cost leadership, 2) differentiation, 3) focus, 4) mixed

3. Functional strategy

- Concerned with managerial game plan for running a major functional activity or process within a business such as research and development unit, marketing unit, financial unit, production unit, HR development unit, etc.

Porter's Five Forces of the Market-based view (MBV)

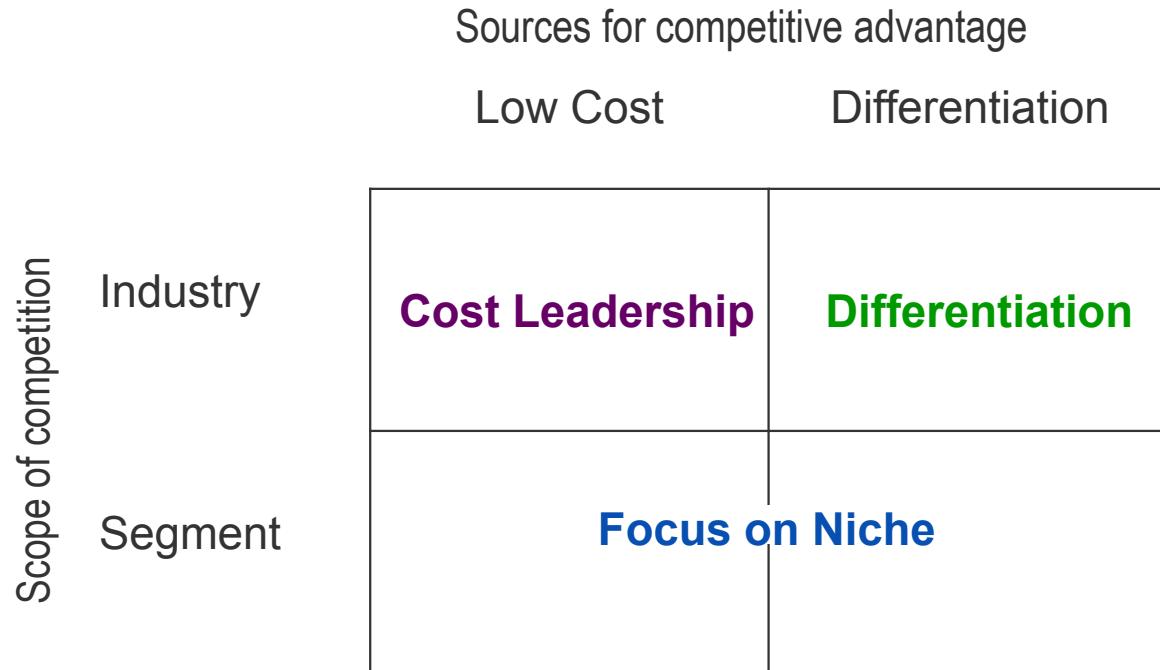


Search for attractive markets and position yourself within competition

Porter's Five Forces: Basic idea

- Assumes that a company **searches** for an attractive market and **positions** itself in the market. It does so by
 - choosing a suitable **generic strategy** (see following slides)
 - influencing the direct market surroundings
- Starting point: the **objectives** that should be reached by positioning in the competitive field
- The organizational structure of a company should **follow** these targets („Structure follows strategy“)
- Emphasizes the **role of external factors**, (e.g., attractiveness of an industry, competitive forces) for business success

Generic Strategies according to Porter



Decide for one strategy and do not get stuck in the middle!

Adapted from Porter (1980)

Generic Strategy: Cost Leadership

- Aim: striving to be the low-cost producer in an industry
- Especially effective if
 - the market is composed of many **price-sensitive** buyers
 - there are **few ways** to achieve product **differentiation**
 - buyers do **not care** much about **differences** from brand to brand
 - there are a **large number of buyers** with significant bargaining power
- Basic idea: gain market share and sales and ultimately drive competitors out of the market by
 - **underprice** competitors or
 - offer a better **cost-value** ratio (similar price, but better value)

Generic Strategy: Differentiation

- Aim: produce products that are considered **unique**
- Consumers that are strongly attached to the **differentiation features** allows a firm
 - to charge **higher prices** for its products
 - to gain **customer loyalty** because
- Risk: the unique product **may not be valued highly enough** by customers to justify the higher price.

Generic Strategy: Focus

- Aim: producing products and services that fulfill the needs of **small groups** of consumers
- Two types of focus strategies
 1. A **low-cost focus strategy** offers products or services to a small range (niche) of customers at the **lowest price** available on the market.
 2. A **best-value focus strategy** offers products to a small range of customers at the **best price-value** available on the market. This is sometimes called focused differentiation.
- Most effective if
 - the niche is profitable and **growing**
 - industry **leaders are uninterested** in the niche
 - the industry offers **several niches**
 - there is **little competition** in the niche segment

Generic Strategies according to Porter



Decide for one strategy and do not get stuck in the middle!

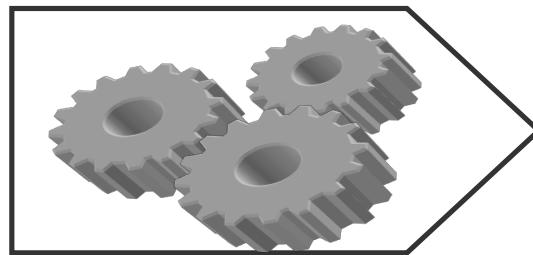
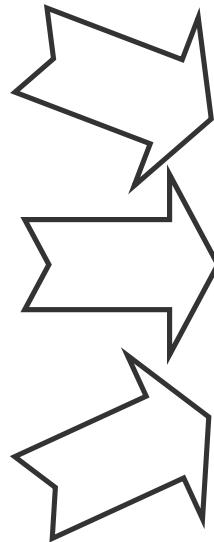
Adapted from Porter 1980



Resource-based view (RBV)

- Success & failure depends on companies' internal capabilities
 - Basic assumptions: Each company has certain **core competencies** and **resources** that are **responsible** for the company's success
 - Companies **differ** significantly in their **resources**
- Recommendations for core competency management
 - Determine **existence** of core competencies and analyze their **potential**
 - Keep tangible resources (market oriented production facilities) **up to date**
 - Develop intangible resources/ capabilities (organization culture and principles, skills, brands, ...)
- Resources for competitive advantage should be **VRIN**
 - **Valuable**: they enable a firm to implement strategies that improve its efficiency and effectiveness.
 - **Rare**: not available to other competitors.
 - **Imperfectly imitable**: not easily implemented by others.
 - **Non-substitutable**: not able to be replaced by some other non-rare resource.

Relationship of Components



Resources

Competencies

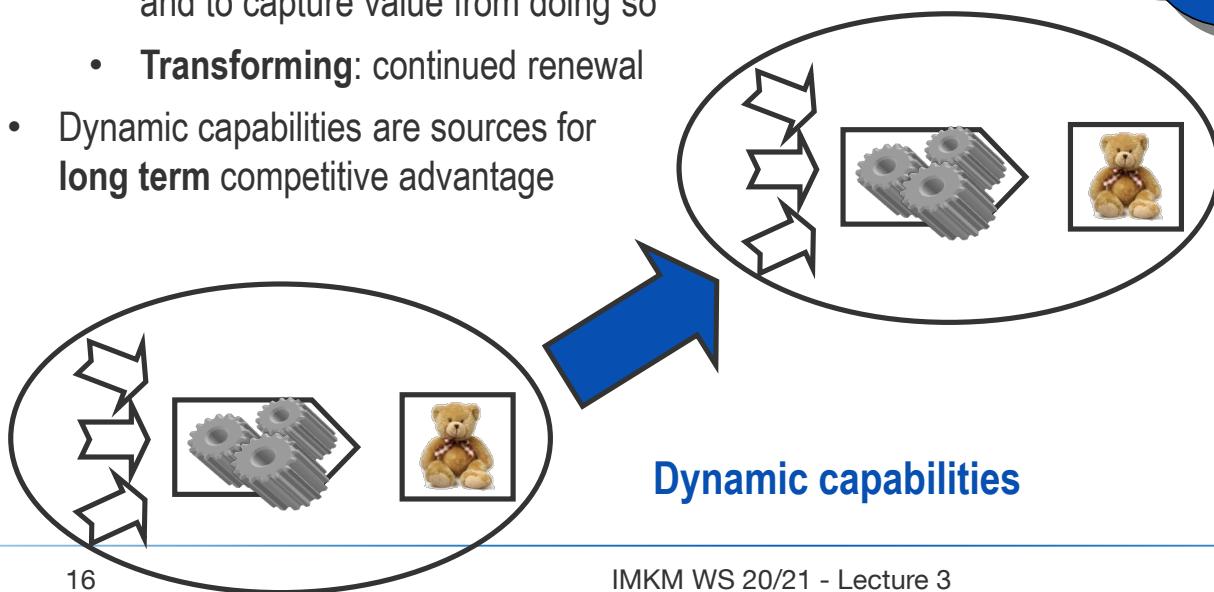
Product

Core competencies = competencies that are most important for competition

Core competencies are the starting point for strategy development

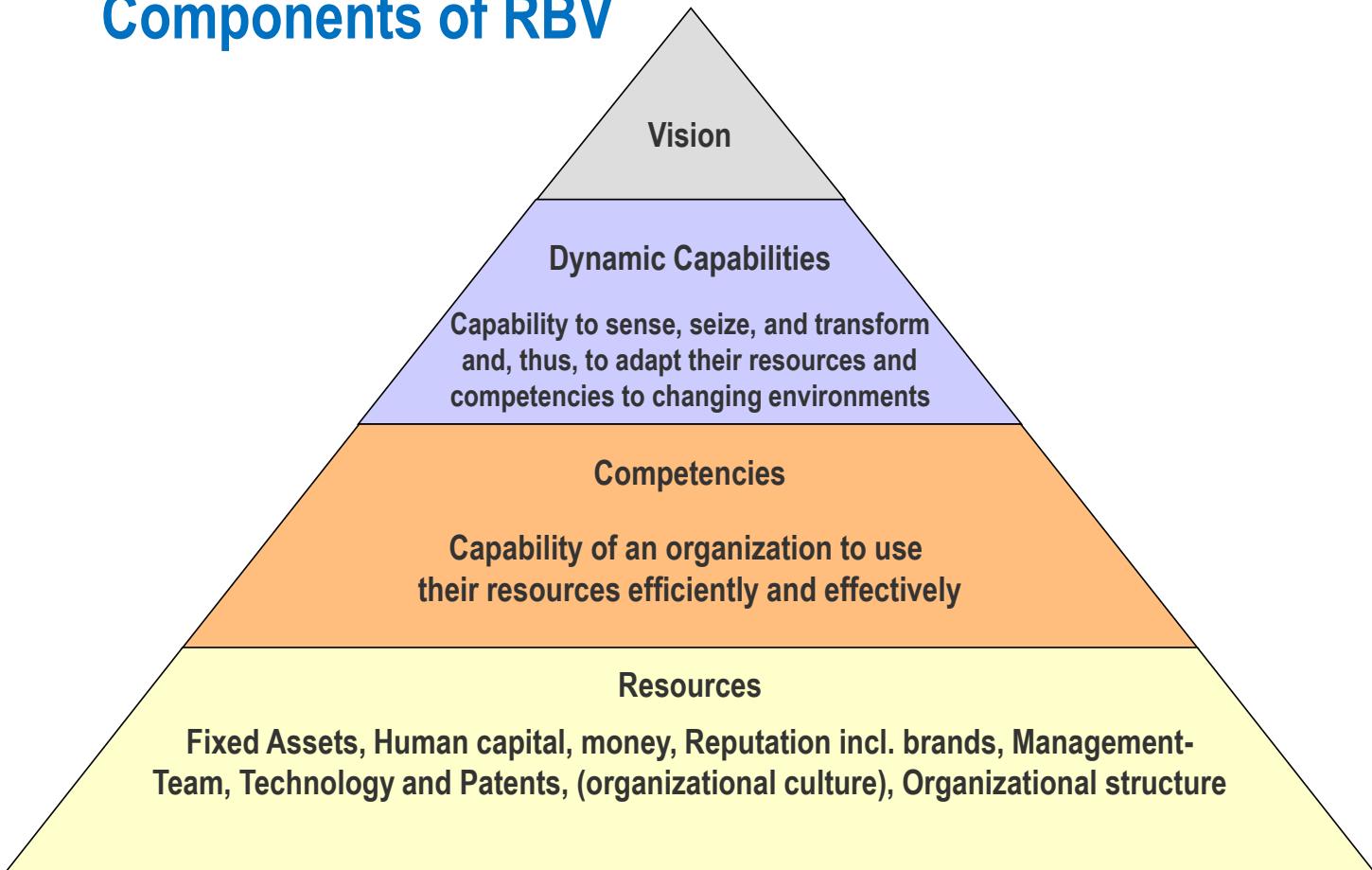
Dynamic capabilities

- Dynamic capabilities and vision relate to **change** in the organization
- Dynamic capabilities include three primary clusters of competences
 - **Sensing**: identification and assessment of an opportunity
 - **Seizing**: mobilization of resources to address an opportunity and to capture value from doing so
 - **Transforming**: continued renewal
- Dynamic capabilities are sources for **long term** competitive advantage

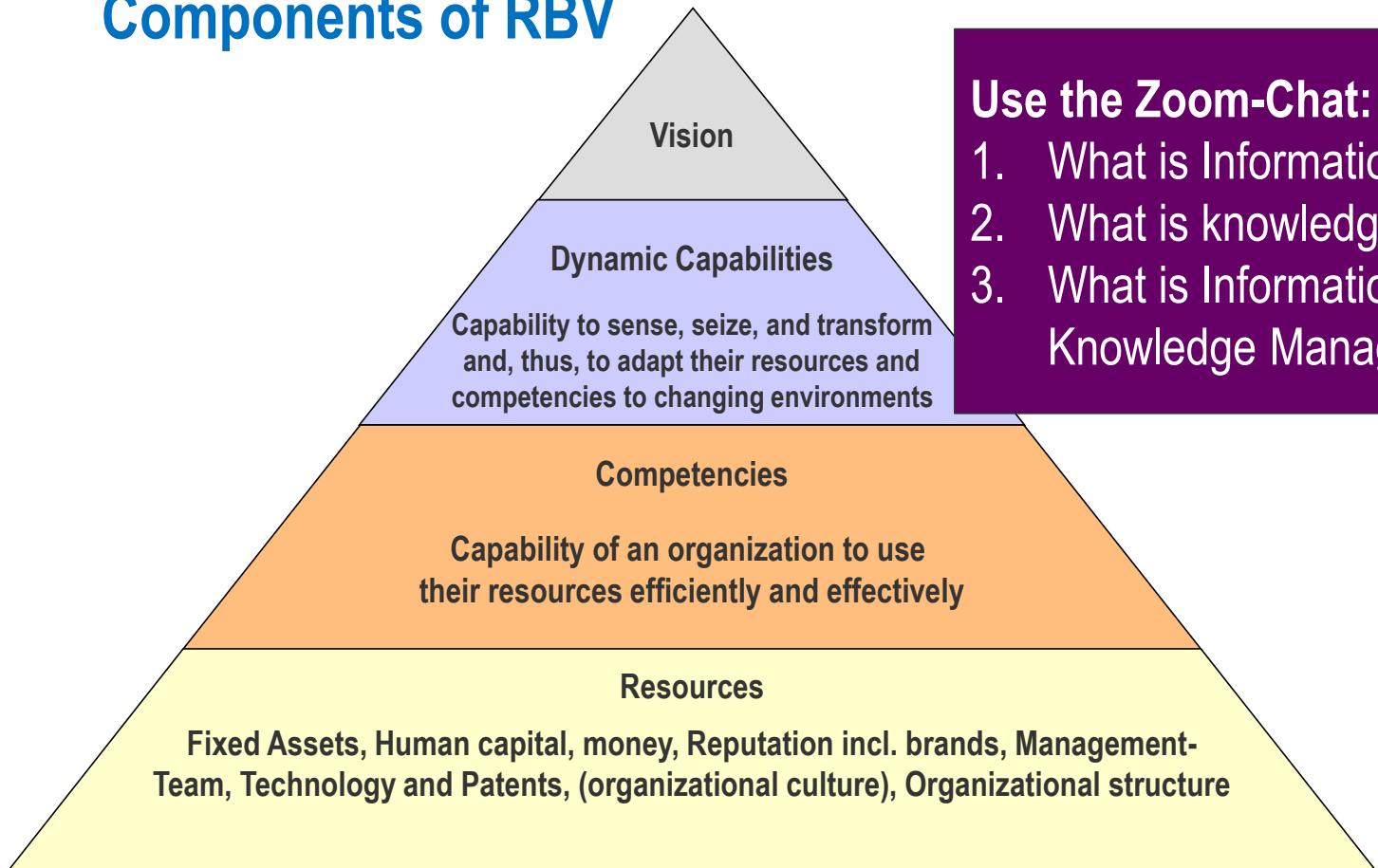


Teece, D. J. (2013)

Components of RBV



Components of RBV



Use the Zoom-Chat:

1. What is Information?
2. What is knowledge?
3. What is Information & Knowledge Management?

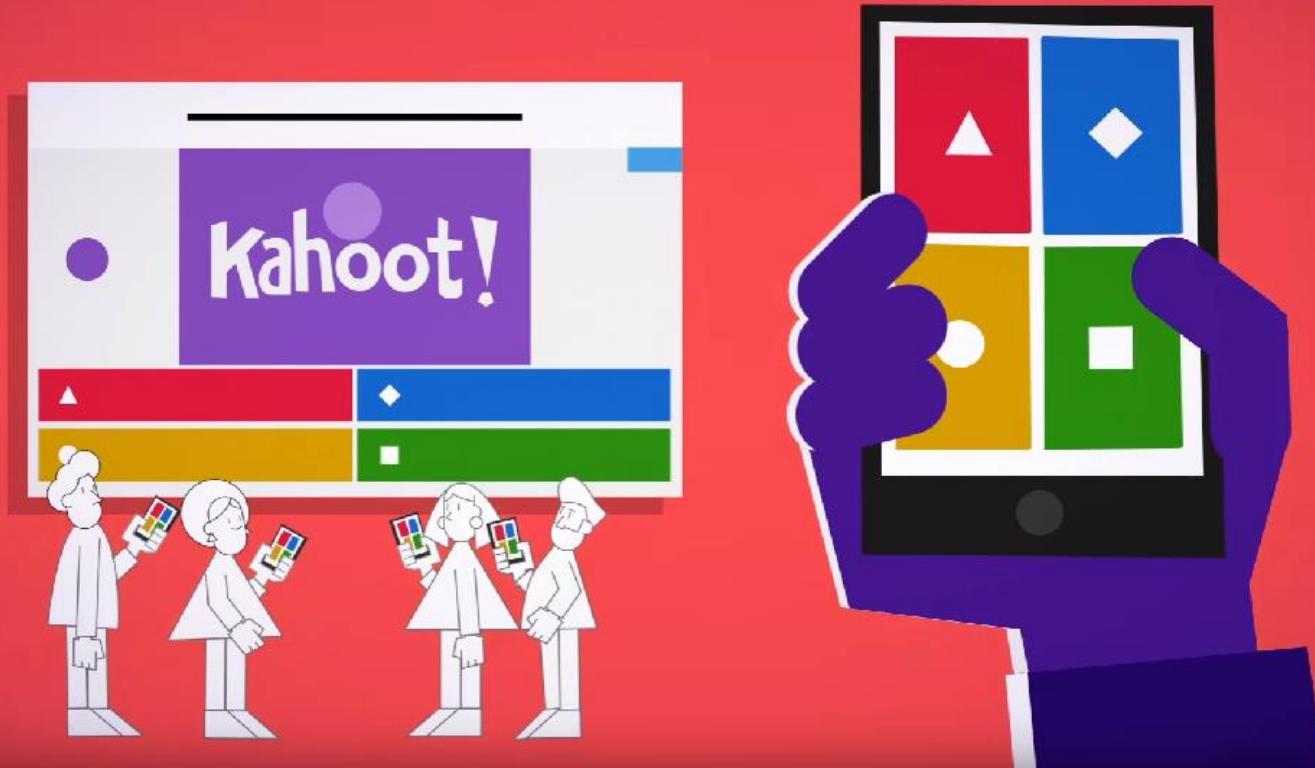
Market-based View and Resource-based View

What are **strengths** of the two views?

What are **weaknesses** of the two views?

Quiz Time!

Go to kahoot.it



IMKM Lecture 3: Strategy and Business IT Alignment

Outline

1. Strategy
 1. Market-based View
 2. Resource-based View
2. Business-IT Alignment
 1. Corporate Strategy and Information Systems
 2. Strategic Alignment Model
 3. Multi-Business Organizations

Learning Objectives

- You can differentiate different terms related to strategy.
- You understand and can apply the market-based and the resource-based view.
- You understand and can differentiate and discuss two strategic alignment models.

Reminder: Basic Terms

- **IS Strategy:** Focuses on the system or business applications of IT and is primarily concerned with **aligning** them with business needs and using them to **derive strategic benefits**
What?
- **IT Strategy:** Concerned with the various **aspects of the technology** such as architecture, technical standards, security levels, risk attitudes, and technology policies
How?
- **IM Strategy:** Concerned with the **structures and roles for the management of IS and IT**, focuses on issues such as the relationship between specialist and users, management control, performance measurement processes, management responsibilities

Which way? Who does it? Where is it located?

Source: Earl 1989, p. 65



Strategic Fit / Business IT Alignment

- **Strategic fit** among many activities is fundamental not only to competitive advantage but also to the sustainability of that advantage. It is harder for a rival to match an **array of interlocked activities** than it is merely to imitate a particular sales-force approach, match a process technology, or replicate a set of product features.

Porter (1996)

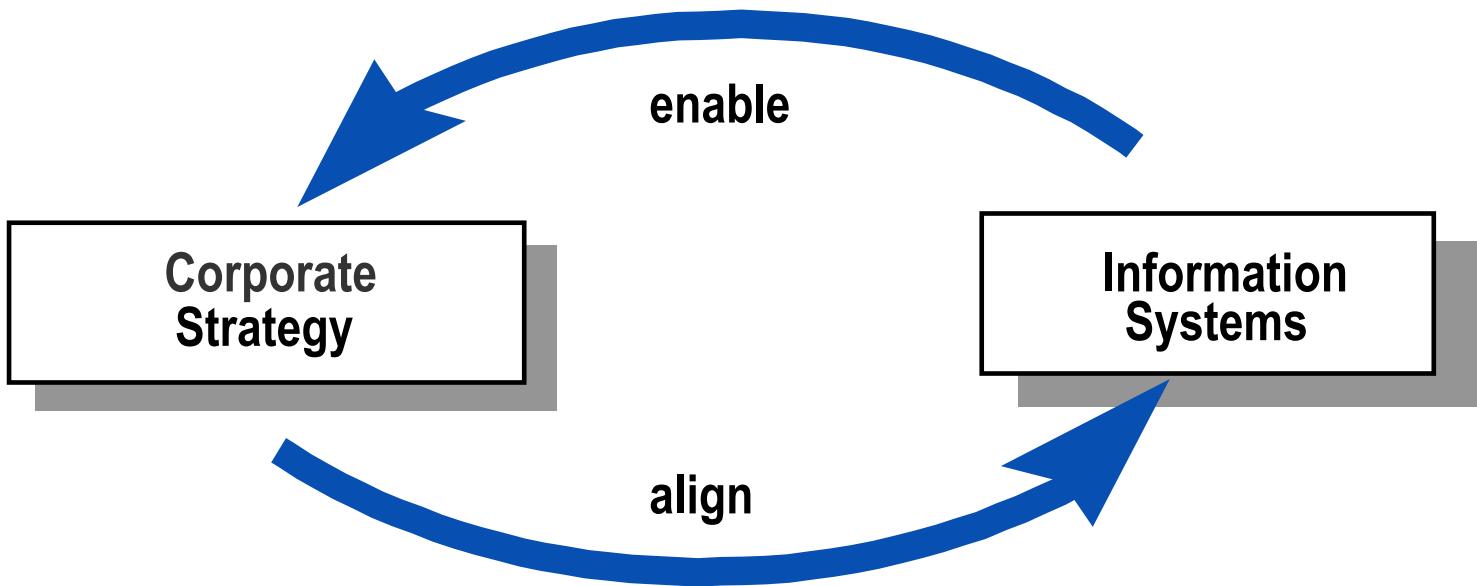
- **Strategic alignment** is the extent to which the business mission, objectives, and plans are supported by the IS mission, objectives, and plans

Reich and Benbasat, 2000; Sambamurthy and Zmud, 1999

- **Alignment** is the **degree of fit** and **integration** among business strategy, IT strategy, business infrastructure, and IT infrastructure.

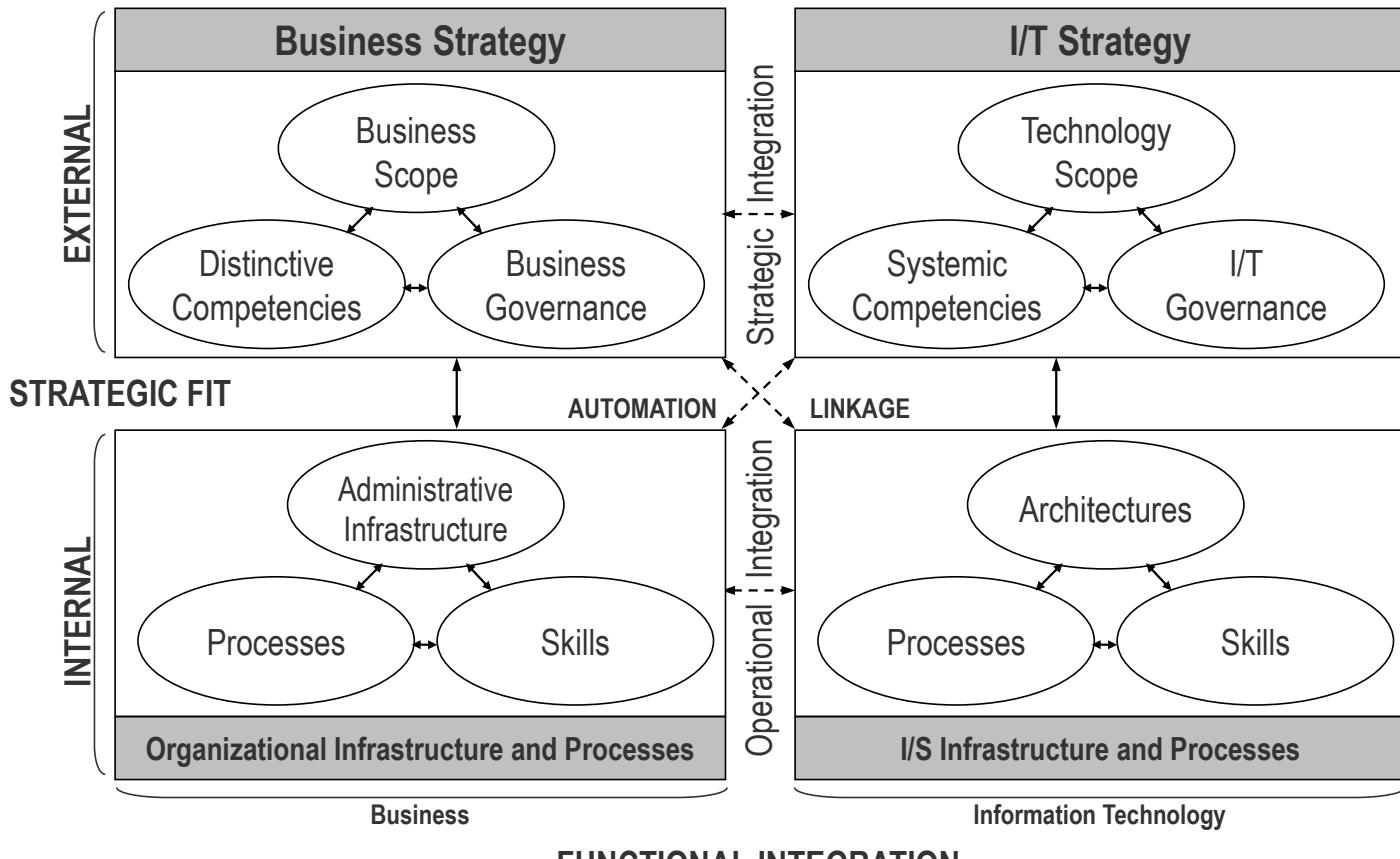
Henderson and Venkatraman (1993)

Relationship between Corporate Strategy and Information Systems

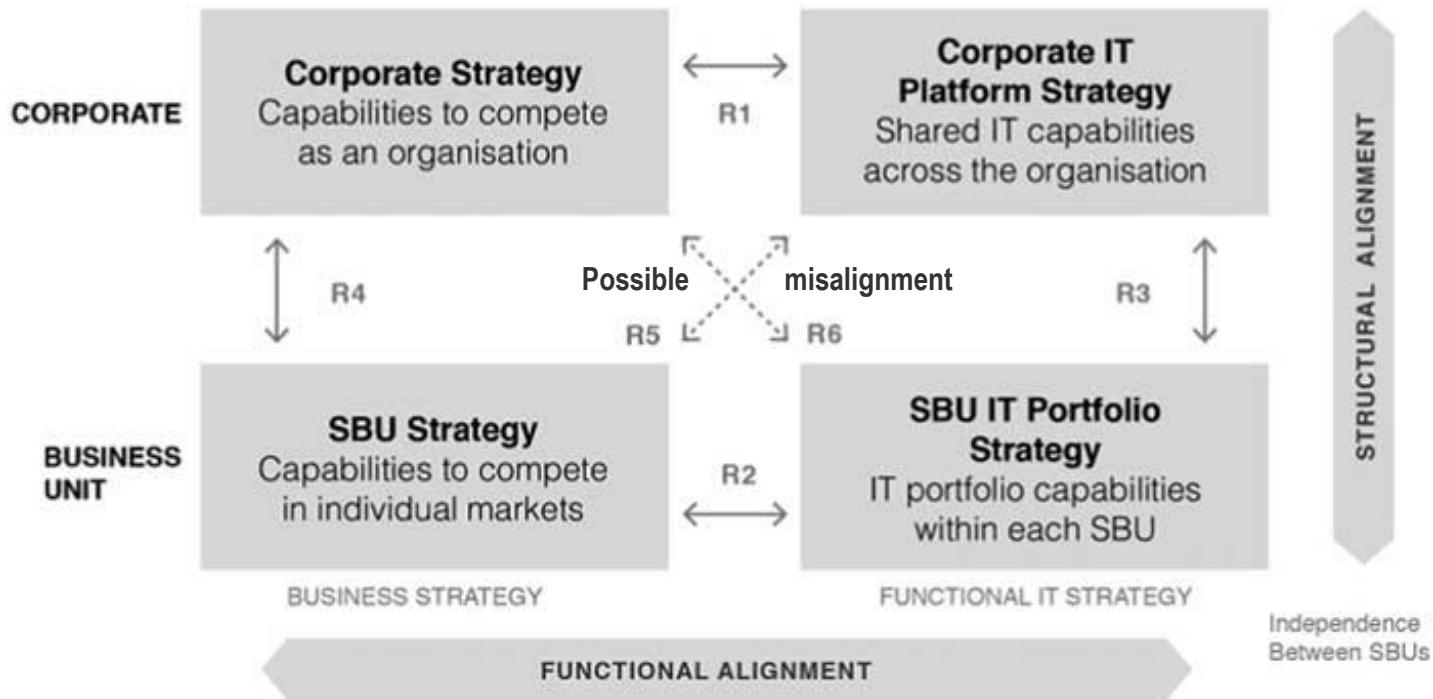


Krcmar (2015), p. 396

Strategic Alignment Model



IT Alignment in Multi-Business Organizations

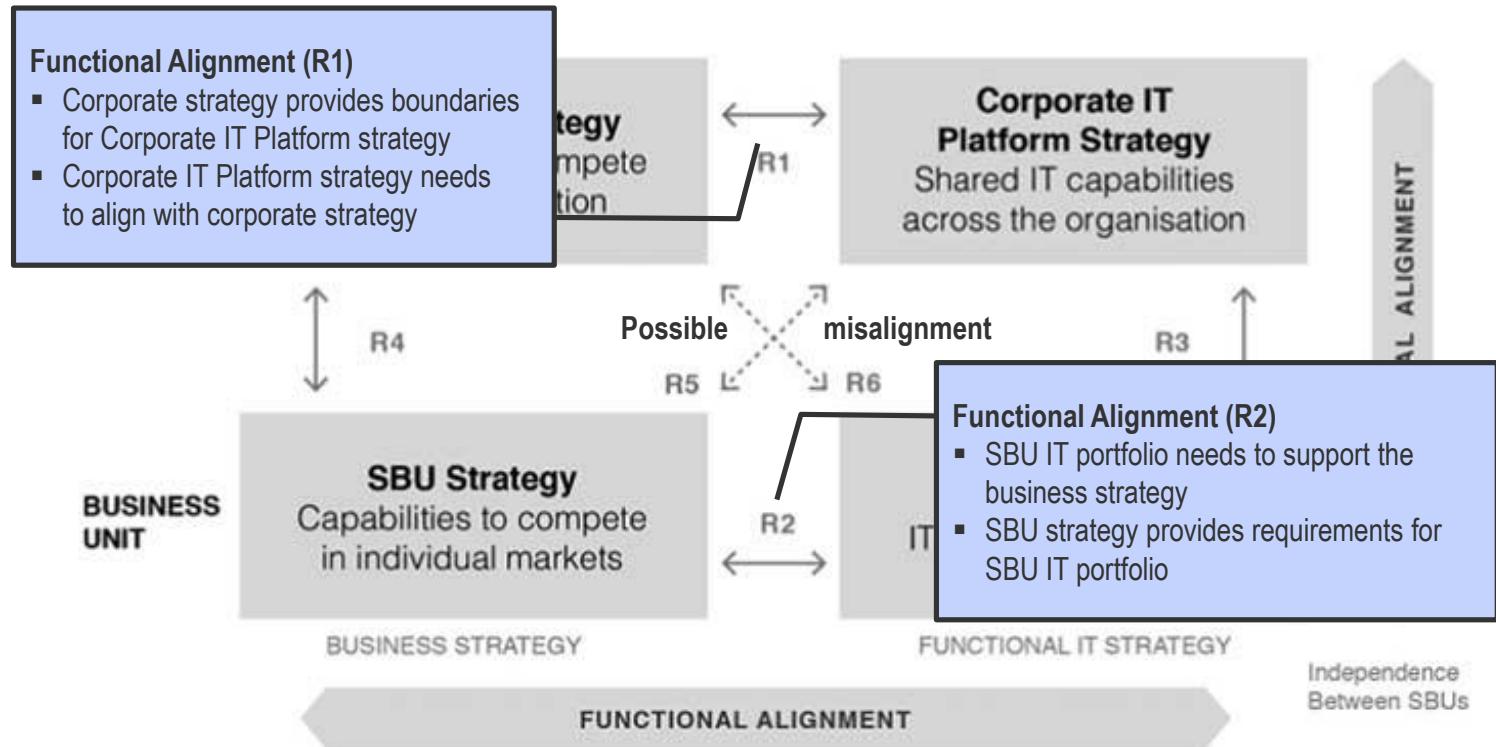


SBU = strategic business unit

R# = alignment relationship

Reynolds & Yetton (2015)

IT Alignment in Multi-Business Organizations

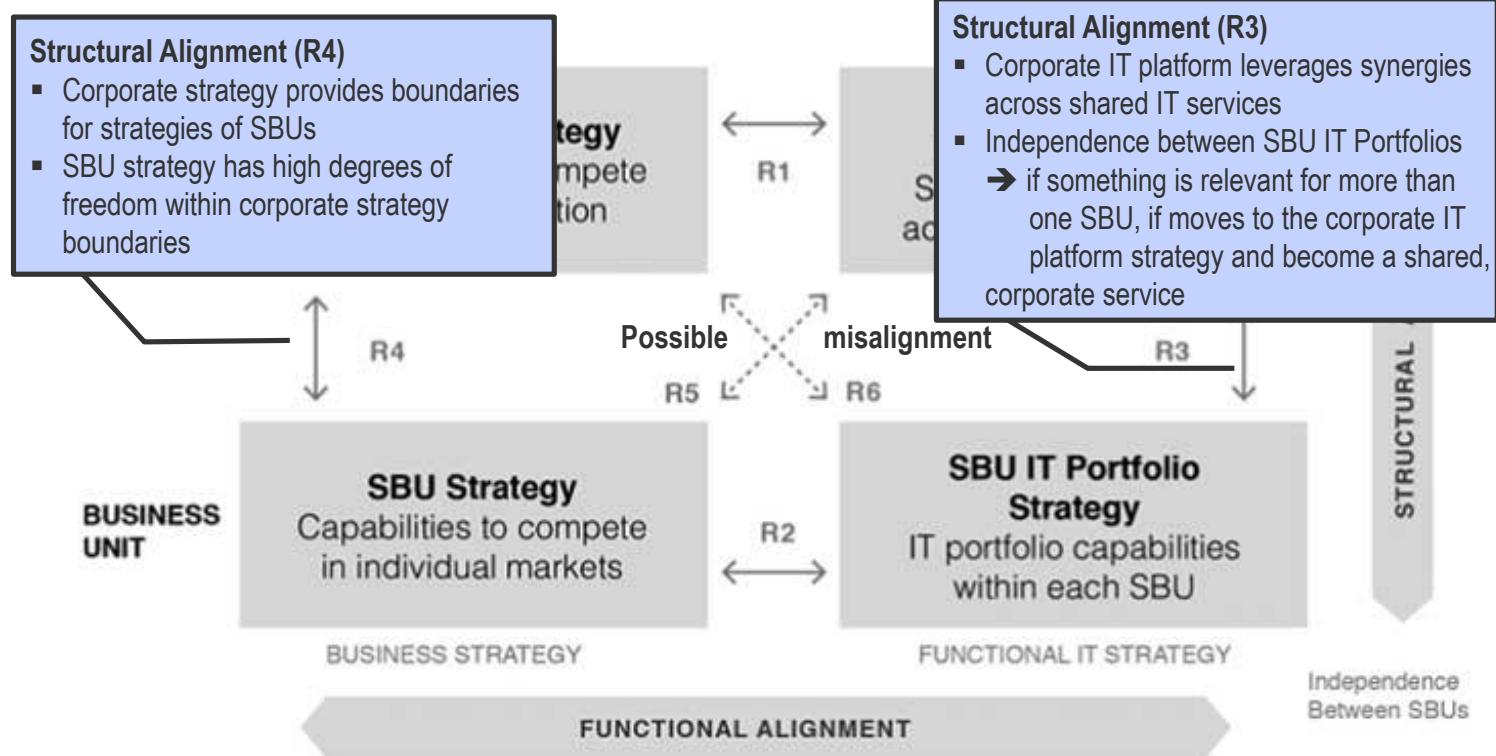


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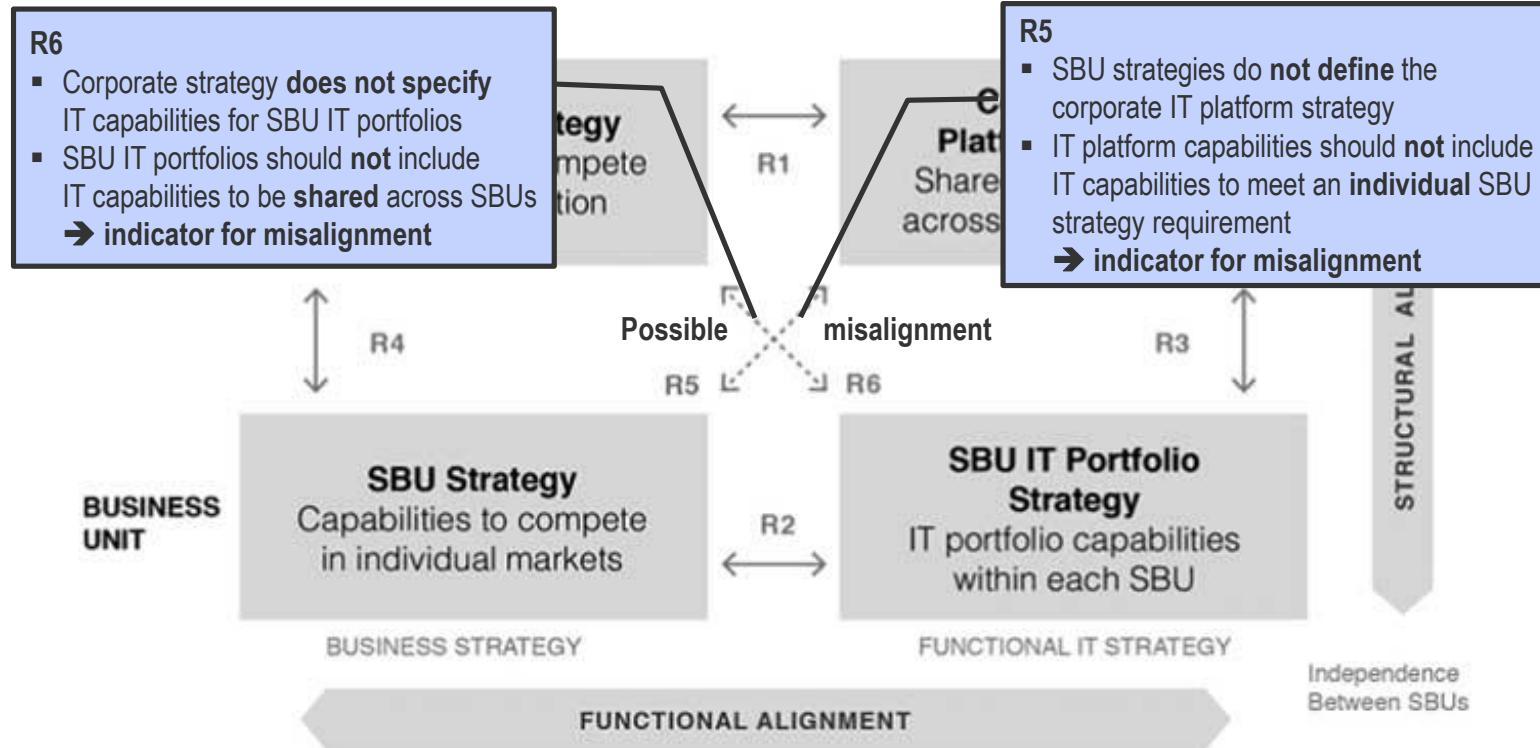


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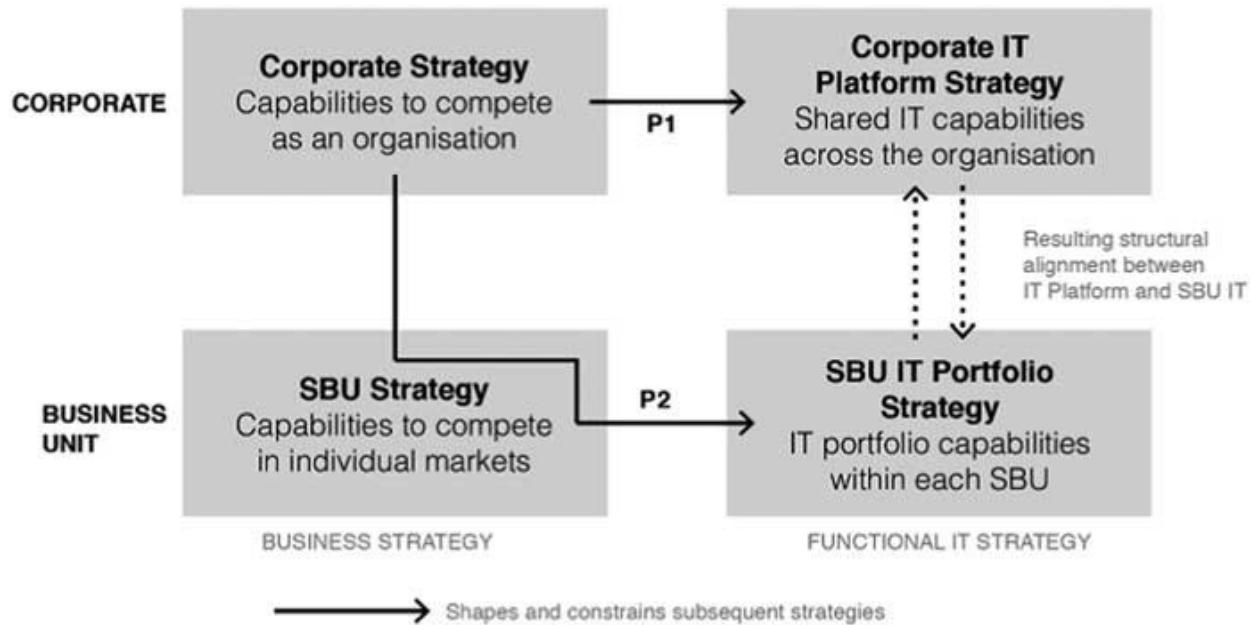


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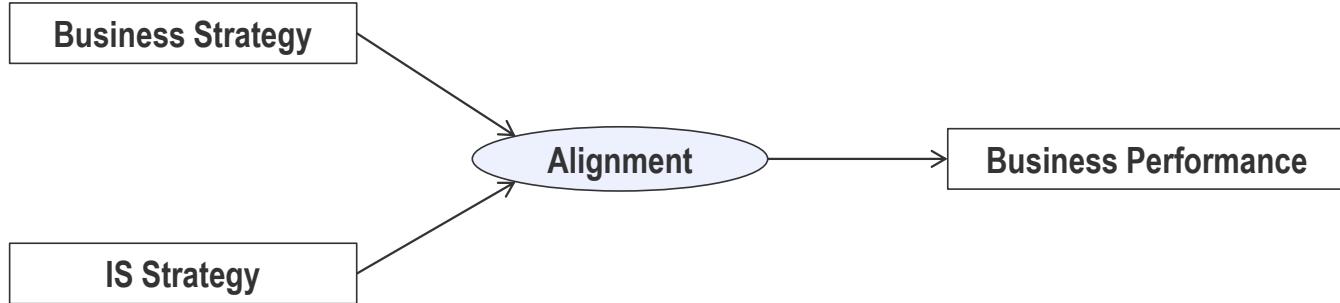


Two paths to temporal alignment in Multi-Business Organizations

- **Path 1 (P1):** sequence of strategic choices to develop the shared IT platform capabilities.
- **Path 2 (P2):** sequence of strategic choices to develop SBU IT application capabilities.
(typical top-down, business-led approach for alignment)

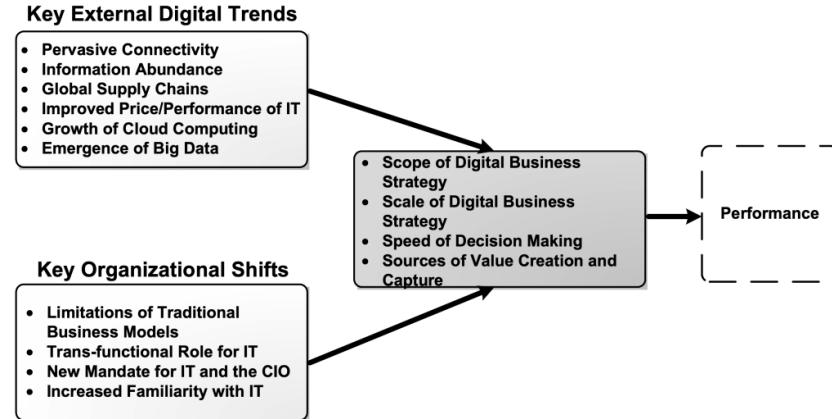
Reynolds & Yetton (2015)

Implications of Business IS Strategy Alignment



Meta-Analysis by Gerow et al. (2014, p. 1178)
 “**Analyzing 30 years of alignment research**, we examined whether IT–business strategic alignment leads to higher firm performance. We found the bulk of the extant evidence suggests **there is not much of an alignment paradox**, which suggests **alignment should lead to higher levels of performance.**”

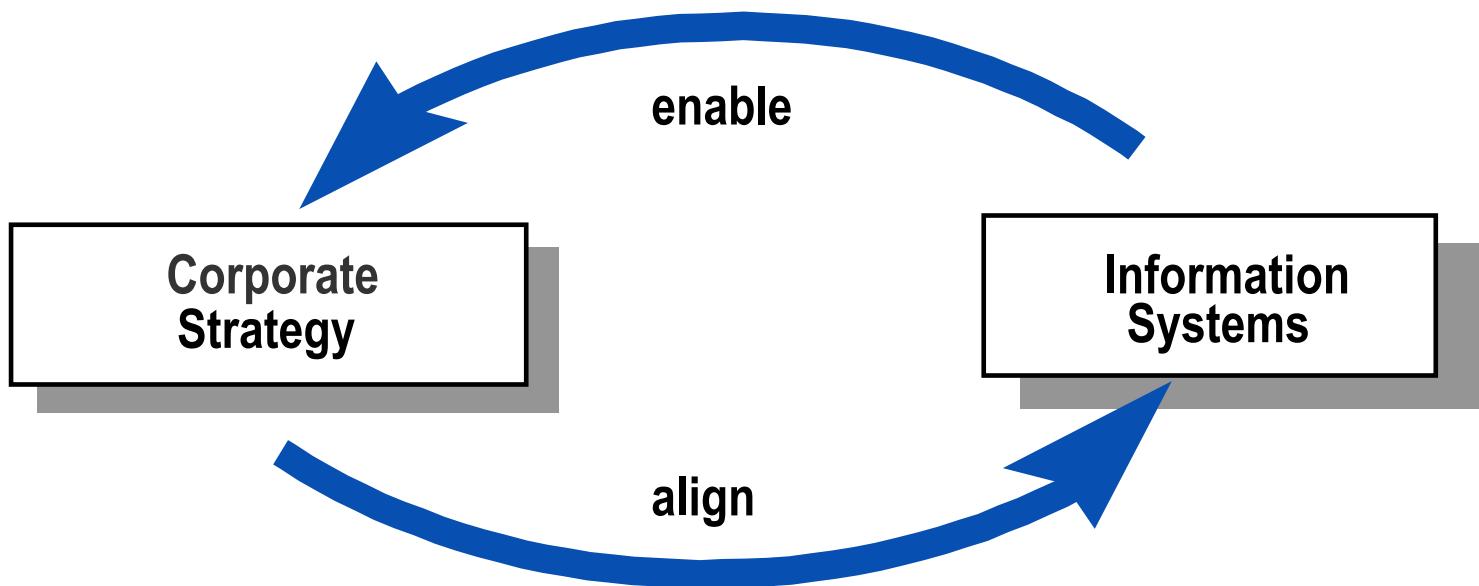
Reminder: Digital Business Strategy



- Adapt business infrastructure to the new digital era
- Traditional business strategy reshaped by digital technology: modular, distributed, cross-functional
 - Embedded technology in products and services
 - Digital platforms
 - IT as a ubiquity
- From business-IT alignment to fusion of business and IT towards a digital business strategy

Bharadwaj et al. (2013)

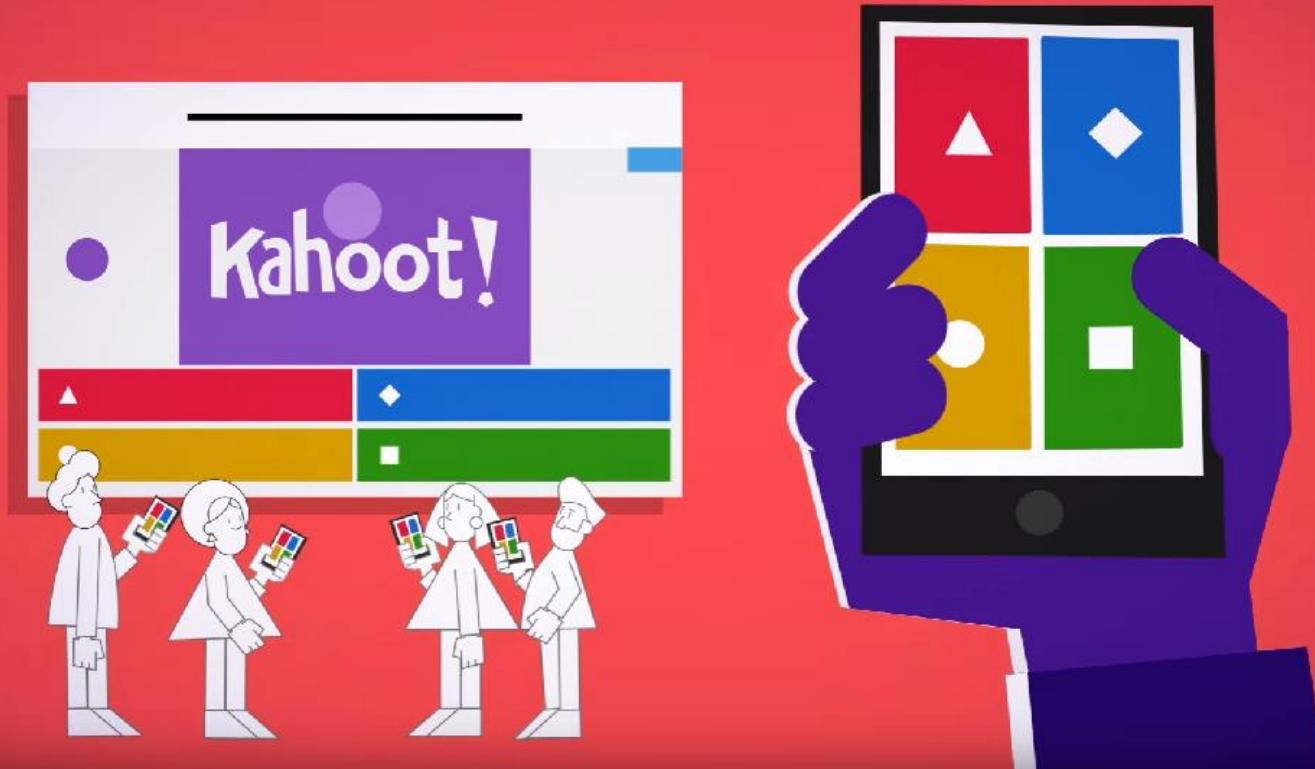
Summary



Krcmar (2015), p. 396

Quiz Time!

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8. Führungsaufgaben des Informationsmanagements (pp. 393-578)
8.1 Unternehmensstrategie und Informationsmanagement (pp. 396-427)
9. Referenzmodelle des Informationsmanagements (pp. 601-630)
10. Einsatzfelder und Herausforderungen des Informationsmanagements (pp. 633-753)
11. Fallstudie „Rockhaus AG“ (pp. 767-783)

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Information Management and Knowledge Management (IMKM)

Lecture 4 *IT-enabled Strategies*

TUM

Chair for Information Systems

© Prof. Dr. H. Krcmar

Lecture Schedule

Information Systems Strategy

Business Value of IT

Business IT Alignment

Digital Leadership and the CIO Role

IT-enabled Strategies

Digital Platforms

Information Management

IT Controlling and IT Governance

IT Sourcing and IT Off-Shoring

IT Security, Privacy and Risk Management

Guest Lecture: NLP for IM

Knowledge Management

Basics

Tools

Applications

IMKM lecture 4: IT-enabled Strategies

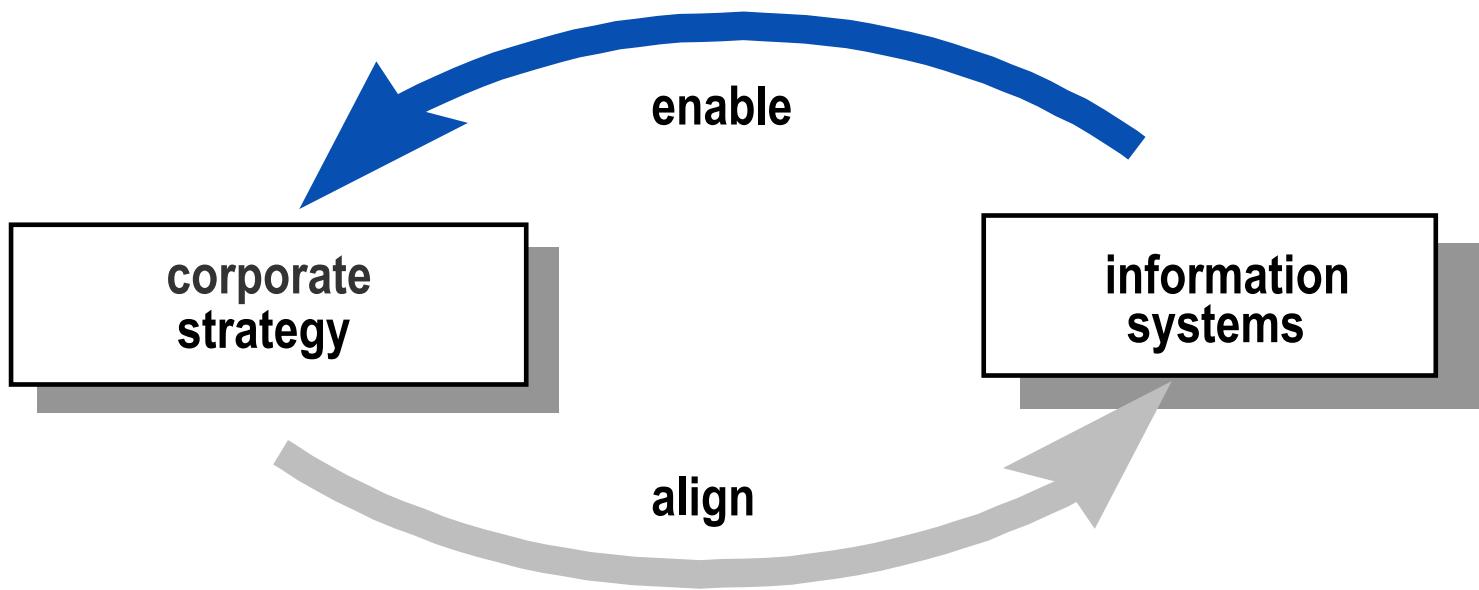
Outline

- 1. Components of IT-enabled Strategies**
 1. Strategic Information Systems
 2. Business Model
 3. Business Model Innovation
 4. Types of IT-enabled Business Models
- 2. Innovations**
 1. Types
 2. Disruptive Innovations

Learning Objectives

- You understand and can identify strategic information systems.
- You understand the business model construct and can identify and differentiate its elements in practice.
- You understand what business model innovation is and can identify it in practice.
- You understand and can identify and differentiate different types of IT-enabled business models.
- You understand and can identify and differentiate different types of innovation.

Relation between corporate strategy and information systems



Krcmar (2015, p. 396)

IT-enabled Businesses



KICKSTARTER



NETFLIX



Google

FLiXBUS

Strategic Information Systems (SIS)

Strategic information systems are IS that **assure a competitive advantage** for a company or avoid a drop of the company's competitiveness.

Krcmar (2015, p. 409)

Examples?



System Categories for Strategic Information Systems

1. Inter-Organizational Systems

- systems that connect two partners in the value chain,
- can be differentiated according to system developer or system operator

2. Value-Added Services

- support order initiation, order processing and maintenance procedures, as well as to improve customer service and intensify customer relations

3. IT for new products and services

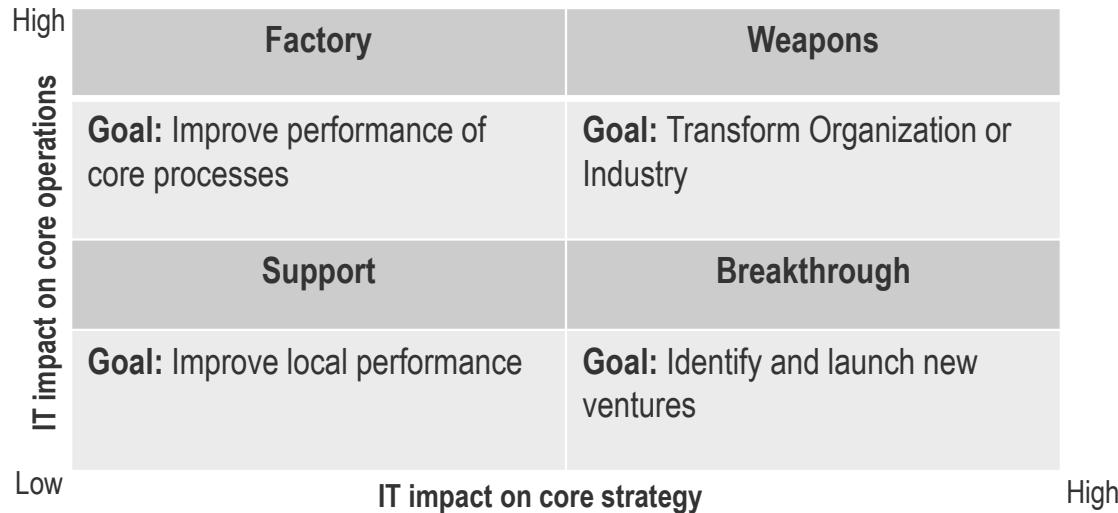
- Development of new products and business areas
- rather evolutionary than revolutionary

4. Electronic Markets

- Enabling and merging of transactions via digital platforms

Krcmar (2015, pp. 409)

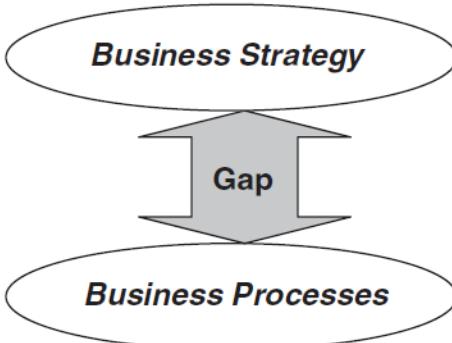
McFarlan's Strategic Grid – Determining the impact of information systems on strategy



Porter's Competitive Forces can help in framing decision making along the two dimensions depicted in McFarlan's strategic grid

Applegate et al. (2004, pp. 34)

Adaptability Gap in a World of Digital Business

<i>World of Traditional Business</i>	<i>World of Digital Business</i>
<p><i>Stable environment</i> <i>Low level of competition</i> <i>Certainty</i> <i>Knowledge utilization</i></p>	<p><i>Dynamic environment</i> <i>High level of competition</i> <i>Uncertainty</i> <i>Knowledge creation and innovation</i></p>
 <p><i>Business Strategy</i> <i>Business Processes</i></p>	 <p><i>Business Strategy</i> Gap <i>Business Processes</i></p>
<p><i>Relatively simple and static business processes</i> <i>Limited ways of doing business</i> <i>Moderate stakeholders' pressure</i></p>	<p><i>Dynamic, IT-based business processes</i> <i>Multiple ways of doing business</i> <i>Severe stakeholders' pressure</i></p>

Al-Debei, M. M., & Avison, D. (2010)

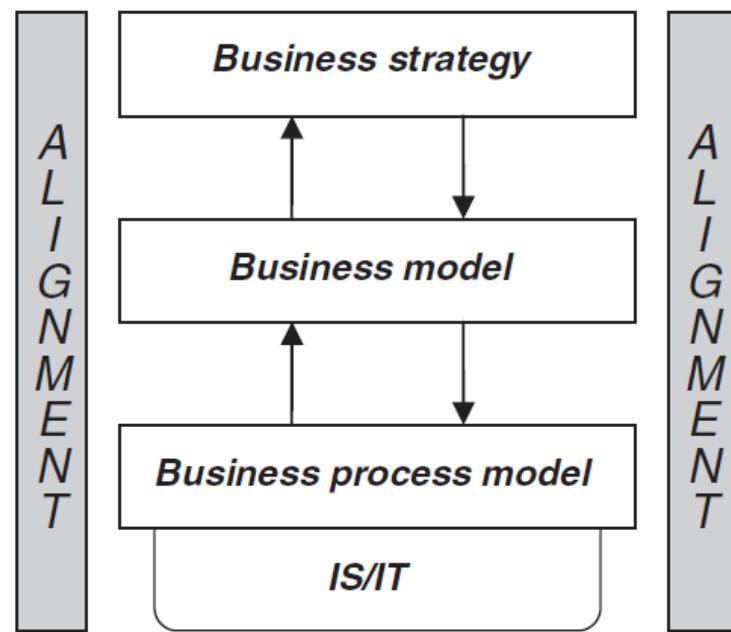
The Business Model as conceptual tool of alignment

Nature of Information

Highly aggregated

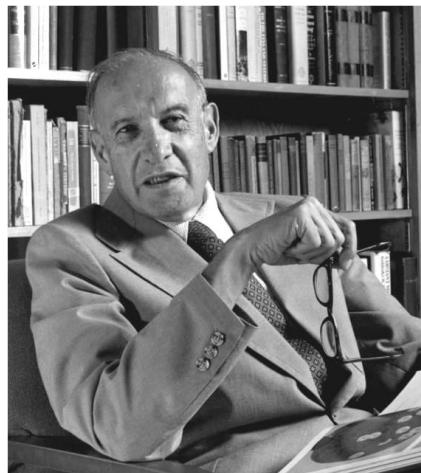
Tactical

Operational, highly detailed



Al-Debei, M. M., & Avison, D. (2010)

A Business Model – What is it actually?

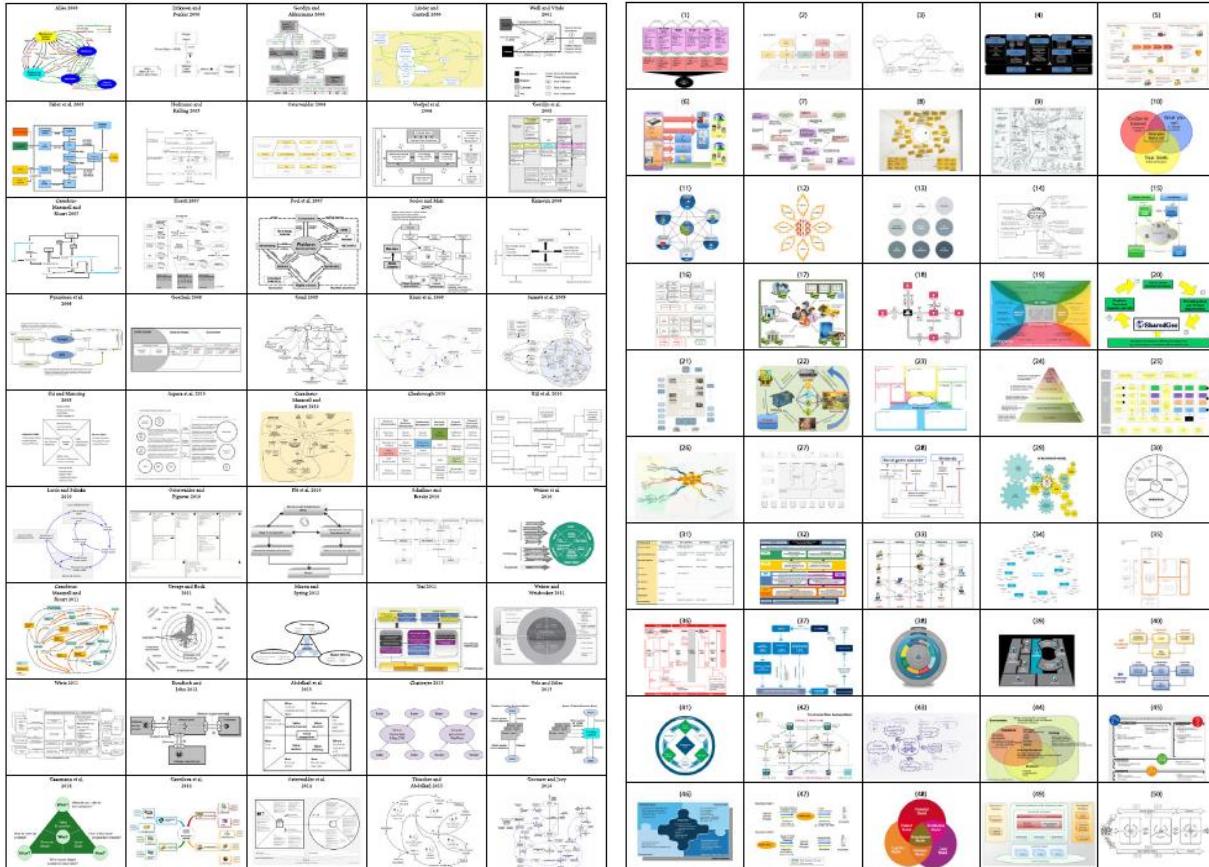


Peter Drucker's Question:

*Who is the customer,
what does he value, and
how does an organization intend to earn
money?*

Drucker 1954; Magretta 2002, wishtank.org

Business Model Representations

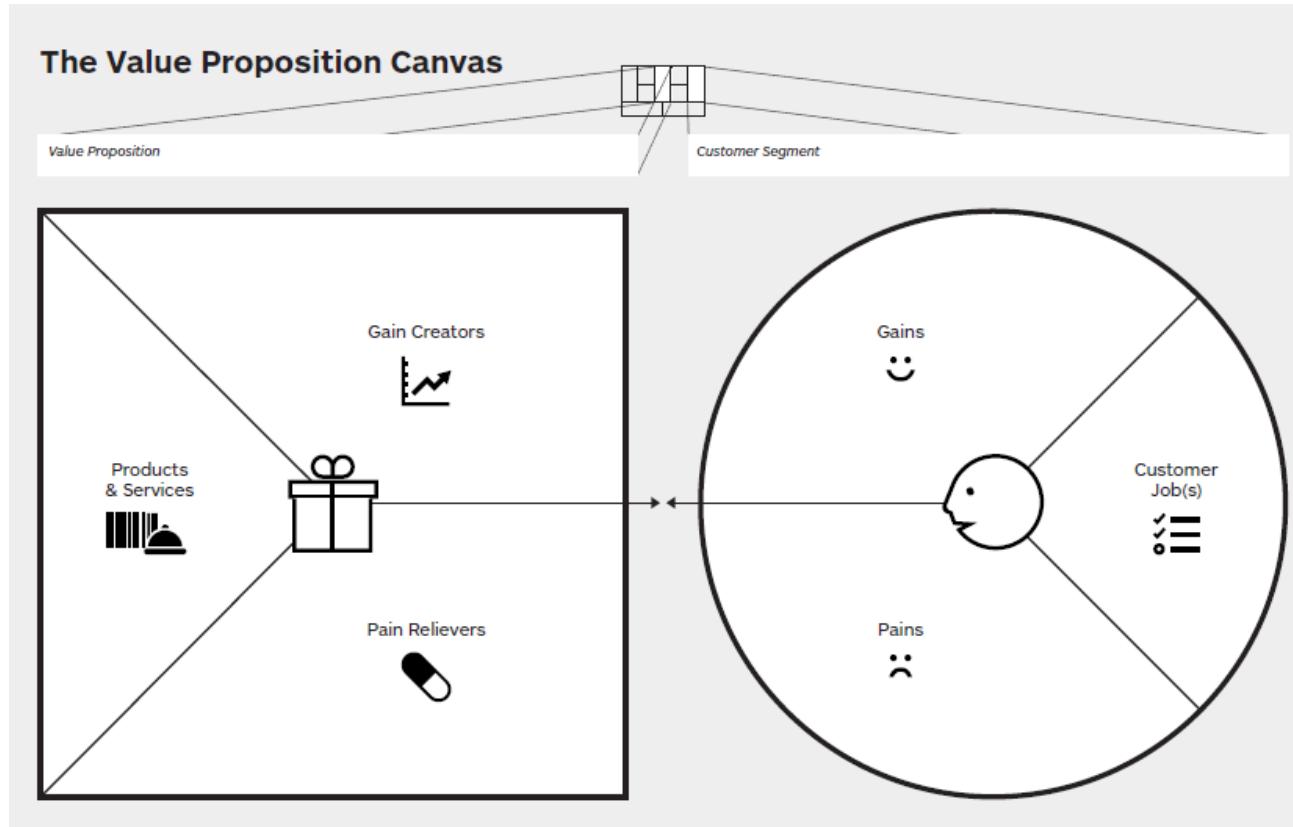


Example: Business Model Canvas

Osterwalder & Pigneur (2010)

 Key Partners	 Key Activities	 Value Proposition	 Customer Relationships	 Customer Segments
Who are our Key Partners? Who are our key suppliers? Which Key Resources are we acquiring from partners? Which Key Activities do partners perform?	What Key Activities do our Value Propositions require? Our Distribution Channels? Customer Relationships? Revenue streams?	What value do we deliver to the customer? Which one of our customer's problems are we helping to solve? What bundles of products and services are we offering to each Customer Segment? Which customer needs are we satisfying?	What type of relationship does each of our Customer Segments expect us to establish and maintain with them? Which ones have we established? How are they integrated with the rest of our business model? How costly are they?	For whom are we creating value? Who are our most important customers?
 Key Resources	 Channels			Through which Channels do our Customer Segments want to be reached? How are we reaching them now? How are our Channels integrated? Which ones work best? Which ones are most cost-efficient? How are we integrating them with customer routines?
 Cost Structure	 Revenue Streams			For what value are our customers really willing to pay? For what do they currently pay? How are they currently paying? How would they prefer to pay? How much does each Revenue Stream contribute to overall revenues?

Value Proposition Canvas



Osterwalder et al. (2015)

The Magic Triangle: Four elements of a business model

The Customer

- *Who* are our target customers?

The Value Proposition

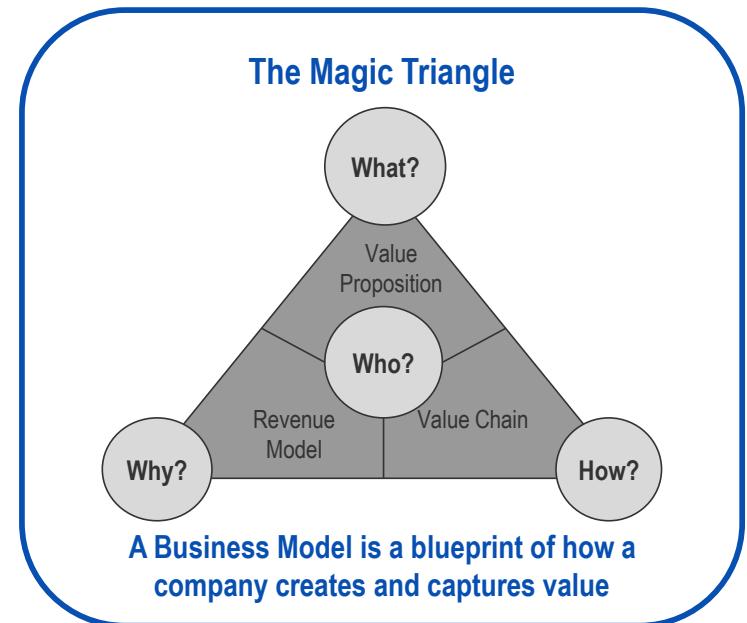
- *What* do we offer to customers?

The Value Chain

- *How* is the value proposition created?

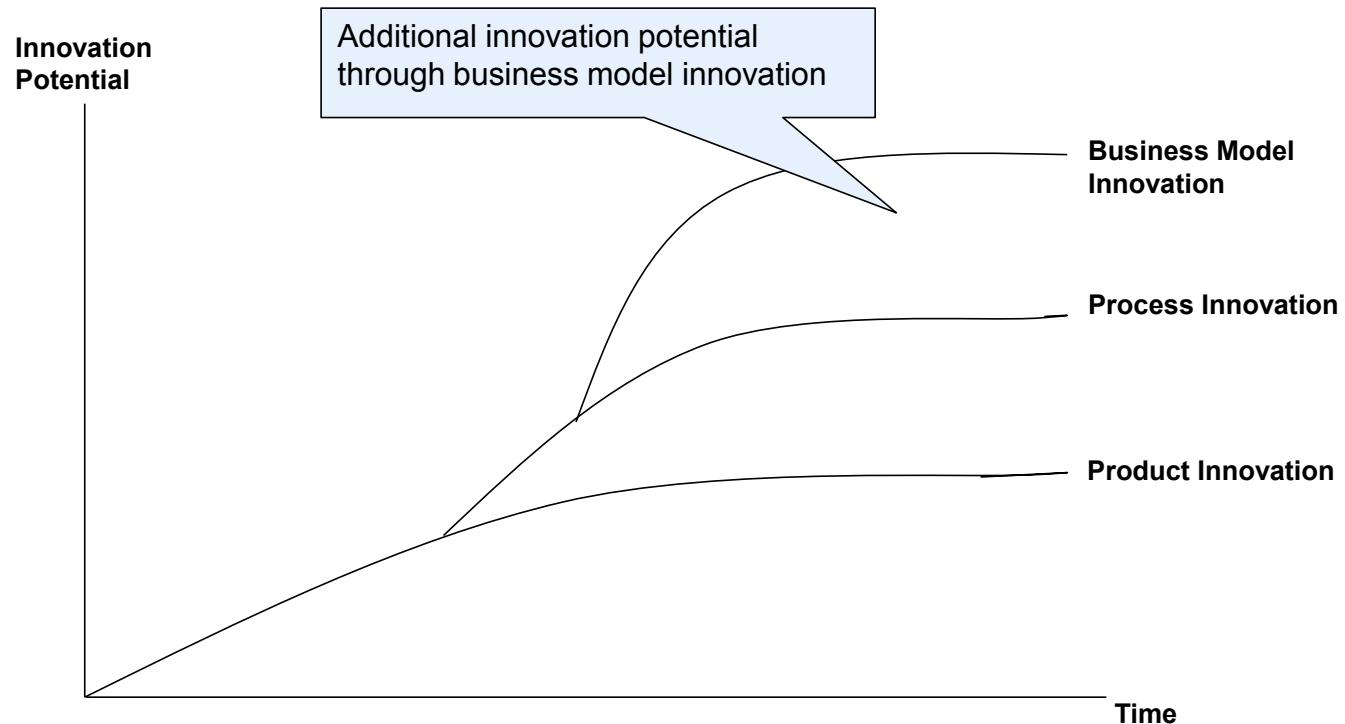
The Profit Mechanism

- *Why* does it generate profit?



Gassmann et al. (2014) The Business Model Navigator

Innovation Potential of Business Model Innovations

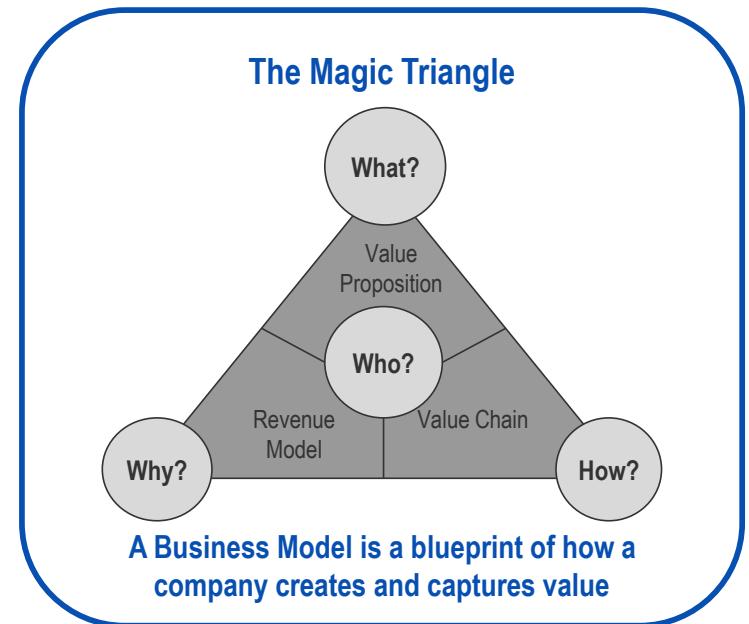


Gassmann et al. (2014) The Business Model Navigator

Business Model Innovation

A business model innovation

- creates **new logic** regarding how a company creates or captures value
- by making **changes in at least two of the What, Who, How and Why**



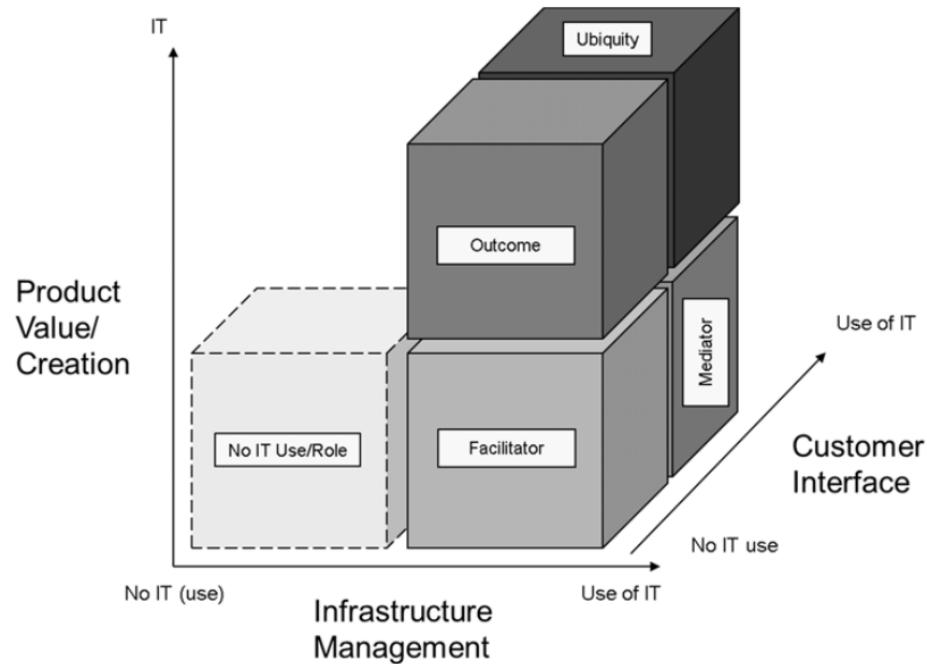
Gassmann et al. (2014) The Business Model Navigator

Types of IT–Associated Business Models

	Facilitator	Mediator	Outcome	Ubiquity
Value created through	Sale of traditional goods or services	Mediation and physical delivery, sale of traditional goods or services	Sale of hardware or software	Completely digitized product or service, digitally sold and delivered
Diffusion of IT in the business model of sample ventures	In the infrastructure management pillar of the business model	In the infrastructure management and the customer interface pillars	In the infrastructure management and the value proposition/ product pillars	In the infrastructure management, the customer interface, and the value proposition/ product pillars
Proposed definitions	<i>IT-facilitated business models</i>	<i>IT-mediated business models</i>	<i>IT-bearing business models</i>	<i>Digital business models</i>

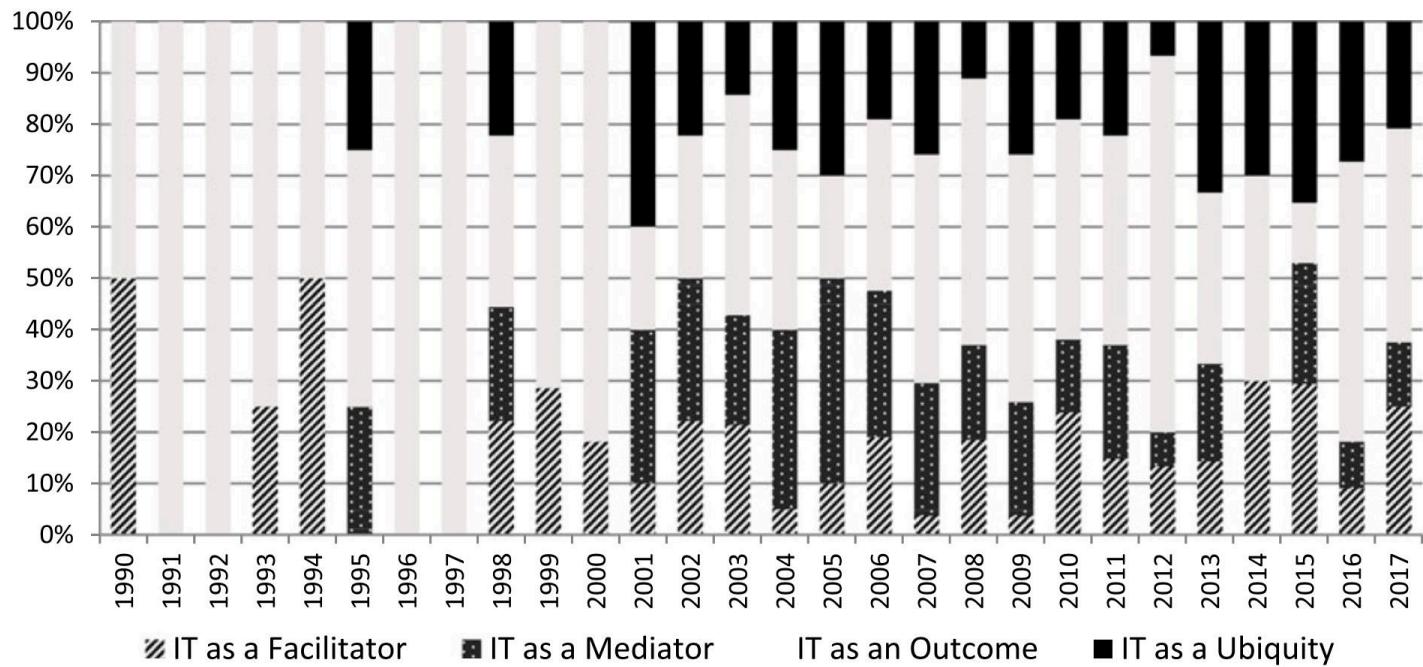
Steininger (2019)

Types of IT-Associated Business Models



Steininger (2019)

Types of IT–Associated Business Models



Steininger (2019)

IT as an Mediator/ IT-mediated business model

Example: Hummel

Hummel is a Danish fashion brand



Challenge:

- Brand was threatened to dilute
- Revenues from **B2B sales** from own operations, distributors, agents and licensed partners (large sports retail chains, departmental stores, etc.)
- Fragmented **online presence** due to websites launched by **partners** and distributors in various countries
- Different brand experience for customers in each channel

Westerman, Bonnet, and McAfee (2014)



IT as an Mediator/ IT-mediated business model

How did Hummel respond?



Hummel's approach:

In 2010, Hummel hired a new Head of Digital and began to implement an omnichannel strategy by

- Aligning online branding globally
- Enhancing e-commerce support for B2B partners
- Building the omnichannel customer community
- Complementing the physical store experience



Omni channel: a cross-channel business model to increase customer experience via online and offline marketing and sales channels



Hansen & Sia (2015)

IT as an Outcome/ IT-bearing business model

Example: Press Shop

Challenge:

Output quality varies depending on

- Quality of steel coil
- Sufficient surface oil
- Correct pressure
- Faulty tool
- ...



Westerman, Bonnet, and McAfee (2014)

IT as an Outcome/ IT-bearing business model

Example: Press Shop 4.0



Steel producer delivers steel coil + production data per meter of steel

- ▶ production conditions: e.g. temperature, roll pressure, ...
- ▶ raw material quality

Press can continuously adjust its parameters according to steel data

→ Digital Twin of the Material / Product

Westerman, Bonnet, and McAfee (2014)

IT as an Ubiquity/ Digital business model

Example: Post Denmark e-Boks

- one of the most established and successful postal digital mailbox
 - e-Boks started as a closed one-way system supporting transactional business-to-consumer and government-to-consumer communications
 - Can be accessed on the web or via an app
 - Since then e-Boks has evolved to support two-way communication, integrated payment options, and can handle contracts and agreements requiring a signature
- Digital communication replaced traditional Postal communication services



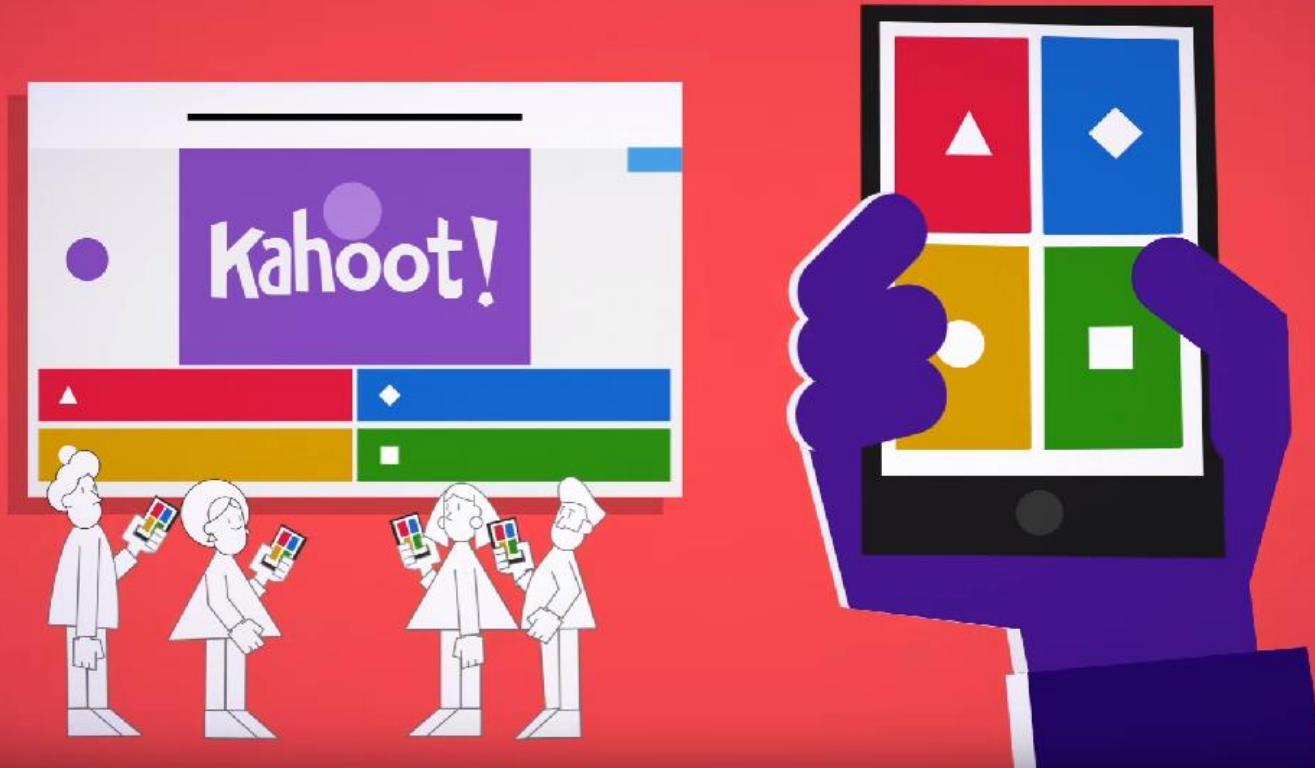
Other Example: Film photography getting replaced by Digital photography



Westerman, Bonnet, and McAfee (2014)

Quiz Time!

Go to kahoot.it



IMKM lecture 4: IT-enabled Strategies

Outline

1. Components of IT-enabled Strategies
 1. Strategic Information Systems
 2. Business Model
 3. Business Model Innovation
 4. Types of IT-enabled Business Models
2. Innovations
 1. Types
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Learning Objectives

- You understand and can identify strategic information systems.
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- You understand and can identify and differentiate different types of IT-enabled business models.
- You understand and can identify and differentiate different types of innovation.

Innovation is...

Schumpeter (1934):

- "the introduction of **new goods** (...),
- new **methods** of production (...),
- the opening of new **markets** (...),
- the conquest of new **sources of supply** (...) and
- the carrying out of a new **organization** of any industry"

Rogers (1995):

- "an idea (of an object, method, or process) that is **perceived as new** by an individual, a group, or an organization"

Christensen (1997):

- "all processes by which an organization transforms labor, capital, materials and information into products or services of **greater value**"

Types of Innovation

		Core Concepts	
		Reinforced	OVERTURNED
Linkage between Core Concepts and Components	UNCHANGED	INCREMENTAL innovation	MODULAR Innovation
	CHANGED	<ul style="list-style-type: none"> refines and extends an established design improvement in individual components underlying core design concepts, and links between them, remain the same 	<ul style="list-style-type: none"> changes only the core design concepts without changing the product's architecture
Linkage between Core Concepts and Components	CHANGED	ARCHITECTURAL Innovation	RADICAL Innovation
	CHANGED	<ul style="list-style-type: none"> reconfiguration of an established system changes only the relationships between existing core design concepts link existing components in a new way 	<ul style="list-style-type: none"> establishes a new dominant design new core components that are linked in a new architecture

Henderson & Clark, 1990

Disruptive Innovation

- New technologies or business models pushing established technology/ business models out of the market without this having been expected at first
- leads to companies losing their market positions or being completely forced out of the market

Radical Innovation ≠ Disruptive Innovation !

(However specific forms of radical innovations can be disruptive)

(Bower und Christensen 1995; Christensen 2000).

Disruptive Innovation – Christensen's Criteria

Criterion	Description
Historically most valued attributes	Innovation leads to products or services that underperform dominant ones along the dimensions historically most valued by customers in the market
Other qualities	Innovation leads to products or services superior in dimensions not valued as important before
Cost and margin	Innovation leads to products or services that are cheaper for customers and provide lower margins for vendors than dominant ones
Simplicity / convenience	Innovation leads to products or services simpler or more convenient to use
Interest of main customers	The most profitable customers of the current market's leading firms have initially little interest in products / services based on the innovation
First customers	First customers are mainly situated in niche or emerging markets
First vendors	Among the companies that commercialize the innovation is a high rate of startups or companies new to the market
Value chain	The innovation leads to a different structure of the vendors' value chain
Market disruption	Eventually, products or services based on the innovation will displace the dominant ones in the mainstream market

Christensen (1997)

Disruptive Innovation – Christensen's Criteria

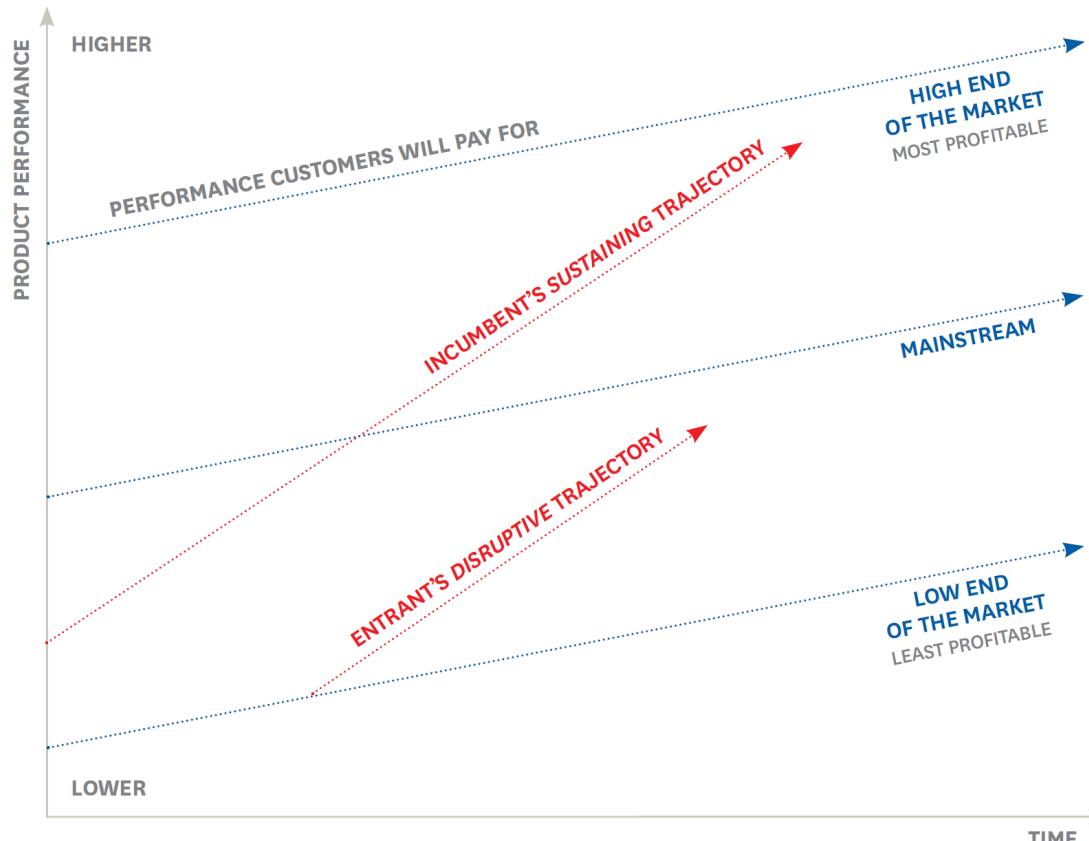
- Historically most valued attributes
- Other quality criteria
- Cost and margin
- Simplicity / convenience
- Interest of main customers
- First customers
- First vendors
- Value chain
- Market disruption

It is not possible to forecast market disruption ex-ante

Criteria are a good first indicator

Christensen (1997)

Disruptive Innovations



Christensen et al. (2015)

Is Uber disruptive?

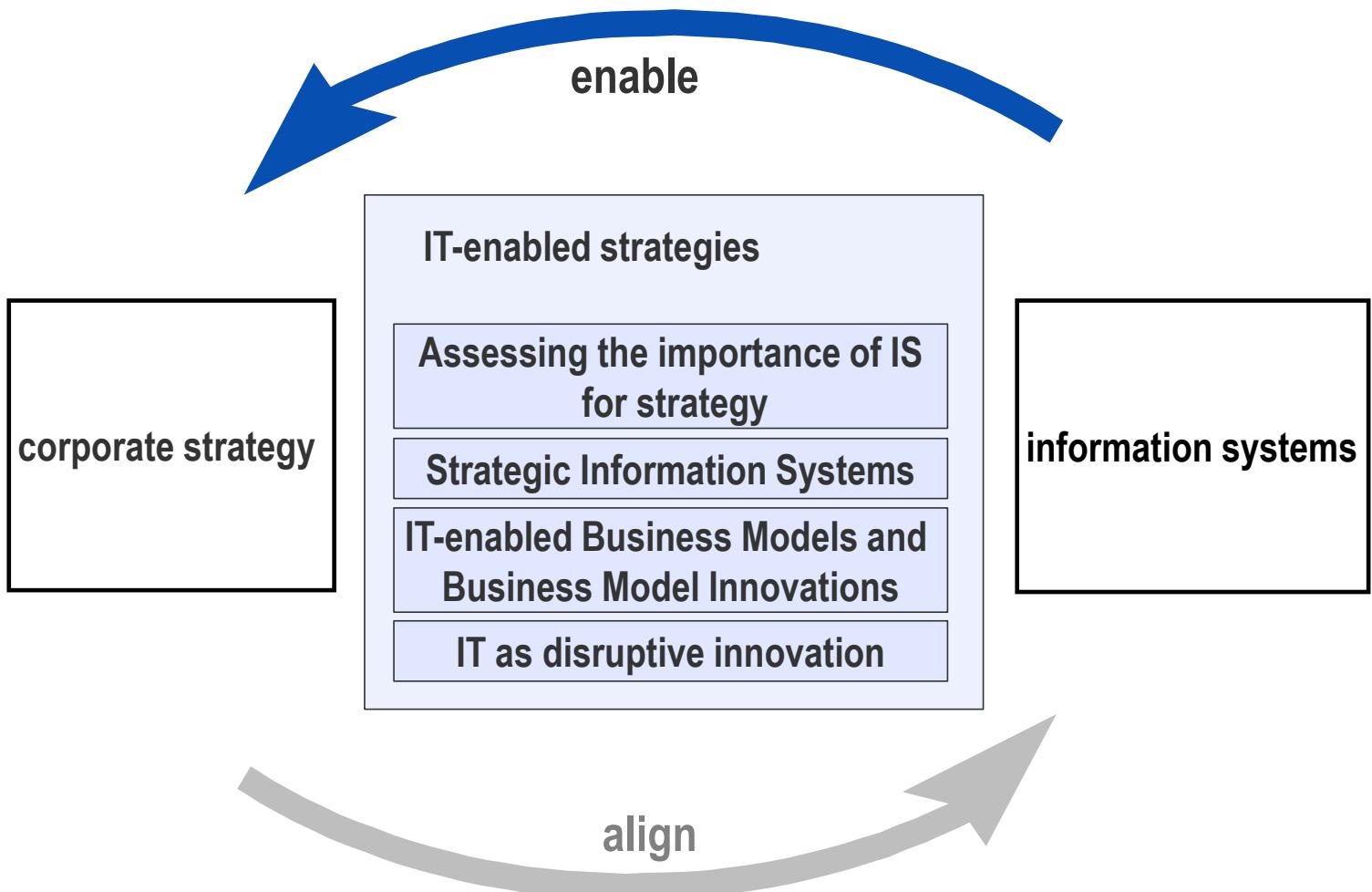
Use agree/ disagree in Zoom.

Is Uber Disruptive According to Christensen?

- Disruptive innovations originate in low-end or new-market footholds
 - providing low-end customers with a “good enough” product
 - create a market where none existed
- **Uber served mainstream customers first**
- Disruptive innovations don’t catch on with mainstream customers until quality catches up to their standards
 - considered inferior by most of an incumbent’s customers
 - customers are not willing to switch to new offering because it is cheaper
- **Many consider Uber’s service better than taxis**

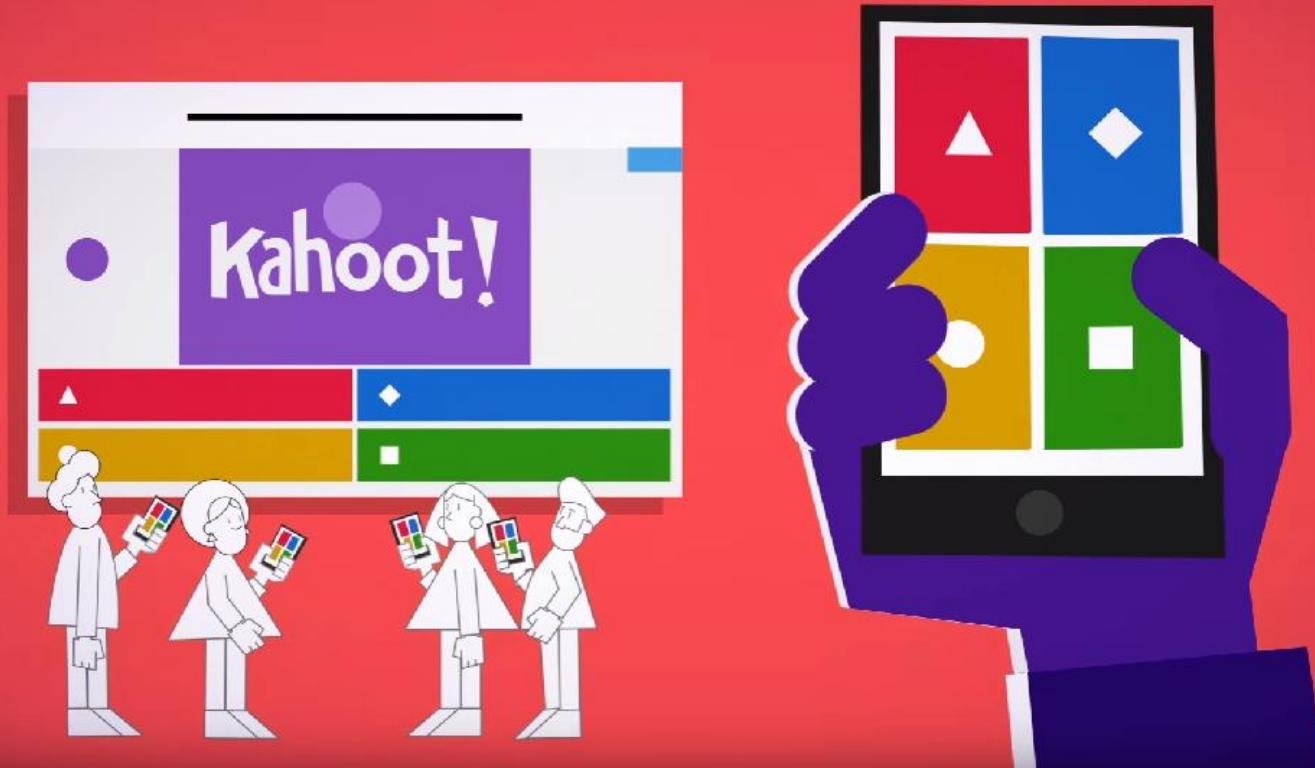
→ According to the theory, the answer is no

Christensen et al. (2015)



Quiz Time!

Go to kahoot.it



Core Literature: Krcmar, Informationsmanagement (2015)

1. Einleitung (pp.1-8)
2. Begriffe und Definitionen (pp.11-26)
3. Modellierung (pp. 31-78)
4. Aufgabe des Informationsmanagements: Informationsmanagement (pp. 85-109)
5. Aufgabe des Informationsmanagements: Management der Informationswirtschaft (pp. 113-165)
6. Aufgabe des Informationsmanagements: Management der Informationssysteme (pp. 173-302)
7. Aufgabe des Informationsmanagements: Management der Informations- und Kommunikationstechnik (pp. 315-385)
8. Führungsaufgaben des Informationsmanagements
8.1 Unternehmensstrategie und Informationsmanagement (pp. 396-427)
9. Referenzmodelle des Informationsmanagements (pp. 601-630)
10. Einsatzfelder und Herausforderungen des Informationsmanagements (pp. 633-753)
11. Fallstudie „Rockhaus AG“ (pp. 767-783)

Additional Reading

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- Täuscher, K., & Abdelkafi, N. (2017). Visual tools for business model innovation: Recommendations from a cognitive perspective. *Creativity and Innovation Management*, 26(2), 160-174.
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Information Management and Knowledge Management (IMKM)

Lecture 5 *Digital Platforms*

TUM

Chair for Information Systems

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Lecture Schedule

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IT Controlling and IT Governance

IT Sourcing and IT Off-Shoring

IT Security, Privacy and Risk Management

Guest Lecture: Natural Language Processing for IM

Knowledge Management

Basics

Tools

Guest Lecture:
Applications



IMKM lecture 5: Digital Platforms

Outline

1. Overview

1. Key Elements of Digital Platform Ecosystems
2. Multi-sided Market Business Model Characteristics

2. Value-creating Mechanisms

1. Value Creation in Digital Platform Ecosystem
2. Platform Governance

3. Ecosystem

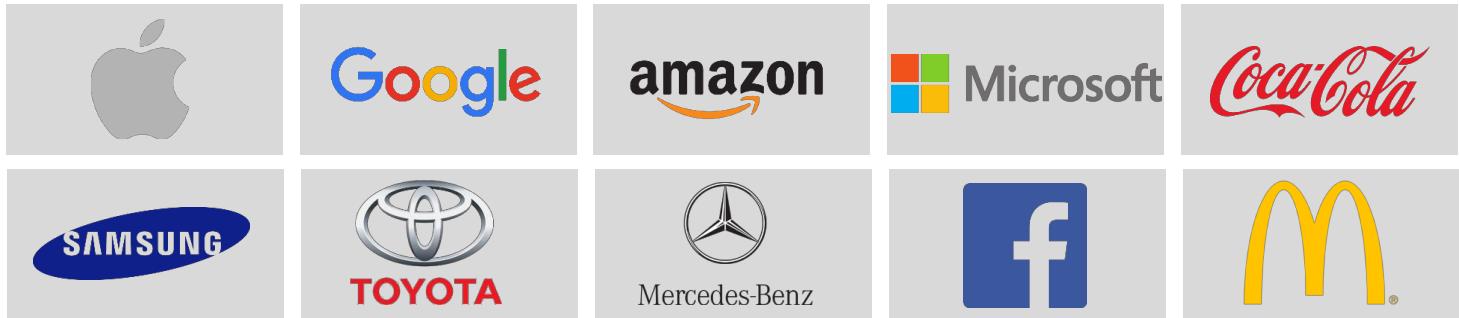
1. Complementor Autonomy
2. E³ Value Modelling

Learning Objectives

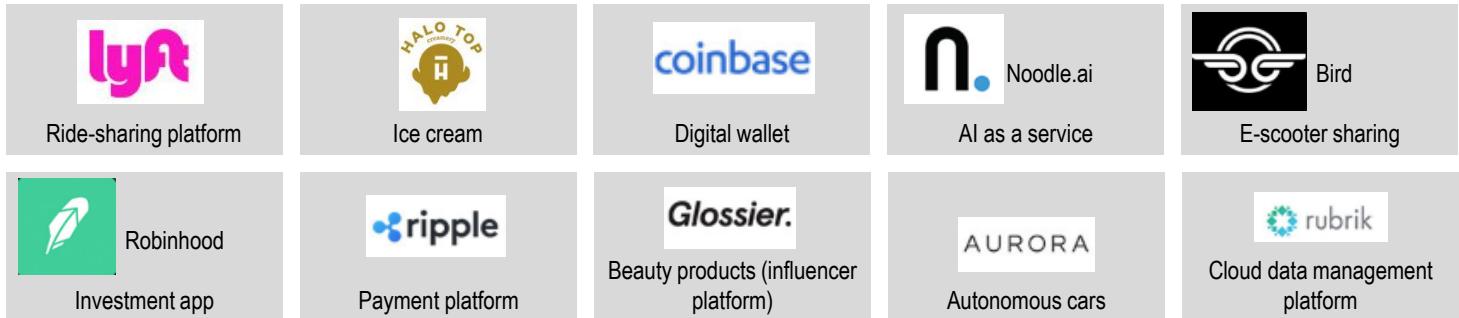
- You understand digital platforms and their ecosystems
- You understand and can analyze characteristics of multi-sided market business models
- You know and understand value-creating mechanisms on digital platforms
- You understand and can analyze three types of platforms governance and their implementation
- You know and understand different forms of complementor autonomy in platform ecosystems
- You can apply the E³-Value Modelling

Importance of platform ecosystems

Top 10 brands 2018¹



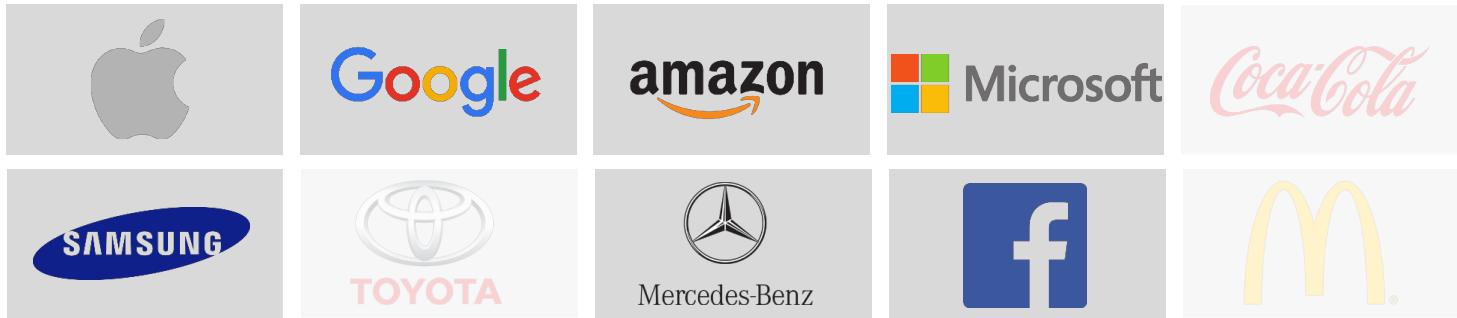
Top 10 US startups 2018²



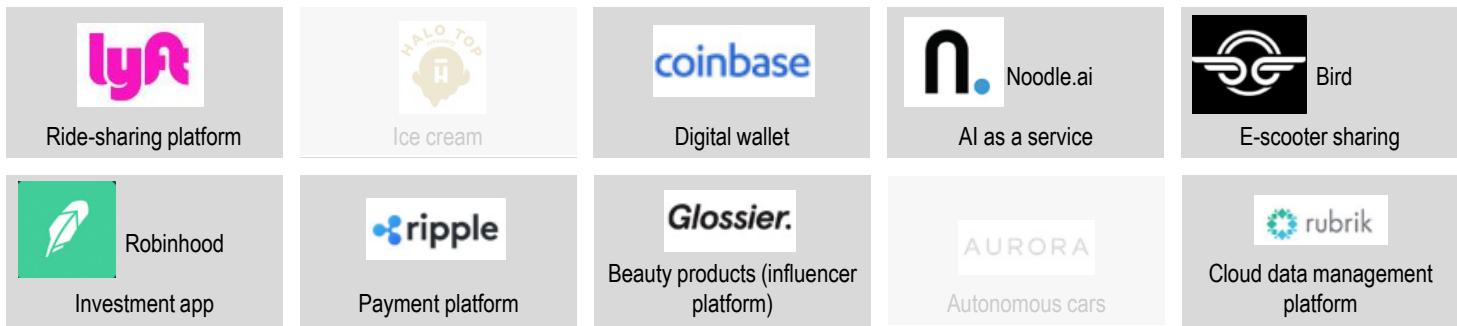
1) Interbrand (2018) 2) LinkedIn (2018)

Importance of platform ecosystems

Top 10 brands 2018¹



Top 10 US startups 2018²

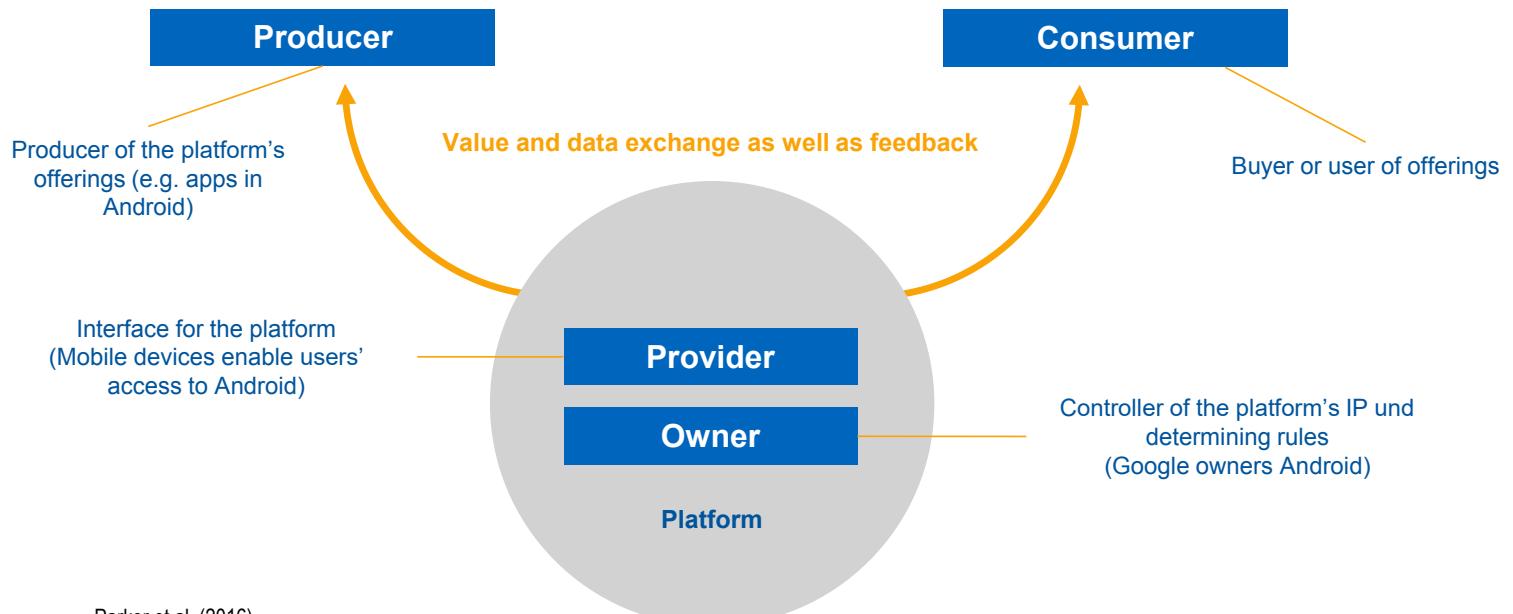


1) Interbrand (2018) 2) LinkedIn (2018)

Platform from a business perspective – Key Roles

A platform is a business based on enabling value-creating interactions between external producers and consumers.

Parker et al. (2017)

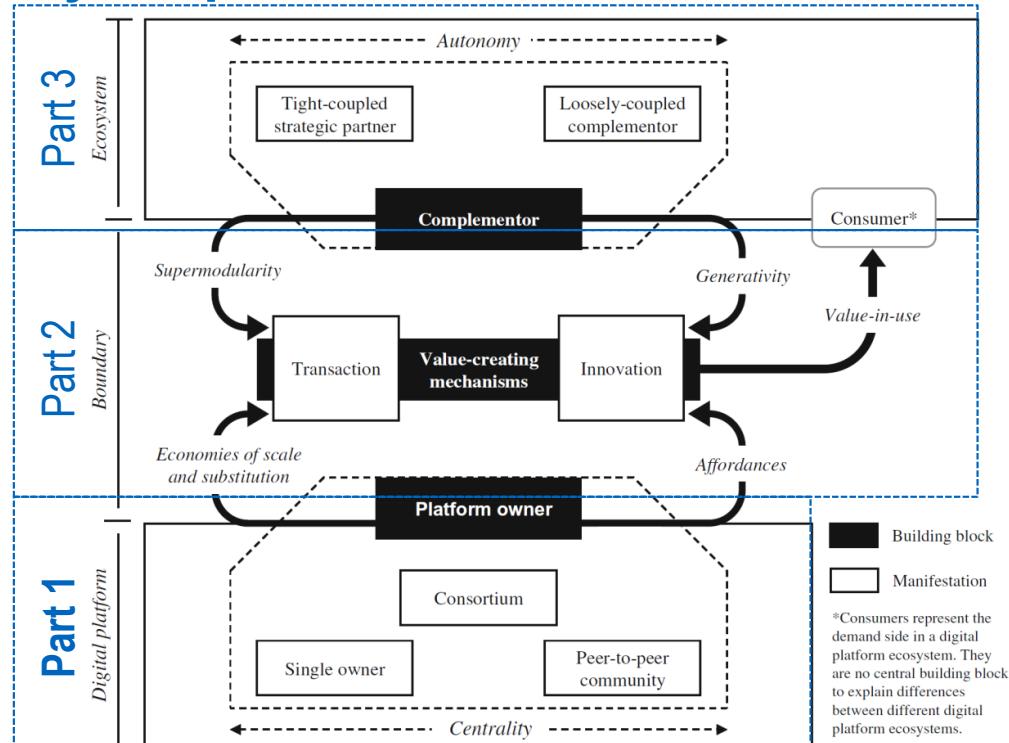


Parker et al. (2016)

What is a digital Platform?

- “**Markets**, where users’ interactions with each other are subject to **network effects** and are facilitated by a **common platform provided by one or more intermediaries**” (Eisenmann et al. 2011).
- “A platform is a business based on enabling value-creating **interactions between external producers and consumers**. The Platform provides an open, participative infrastructure for these interactions and sets governance conditions for them.” (Parker et al. 2016)
- “Digital platforms combine and **deploy [digital] technologies** in new ways to incubate and **coordinate an ecosystem** of supply and demand” (Hein et al. 2019a).
- “A **set of stable components** that supports variety and **evolvability** in a system by constraining the **linkages** among the other components” (Baldwin et al. 2008).
- “**Extensible IT artifact** that provides core functionality that can be used by applications. The **applications access the platform** via interfaces.” (Boudreau, 2010)

The Digital Platform Ecosystem and today's 3 parts of the lecture



Hein, A., Schreieck, M., Riasanow, T., Setzke, D. S., Wiesche, M., Böhm, M., & Krcmar, H. (2020). Digital platform ecosystems. *Electronic Markets*, 30(1), 87–98. doi: <https://doi.org/10.1007/s12525-019-00377-4>

Platform ownership

- Essential factor for the design and governance of digital platform ecosystems (Bakos and Katsamakas 2008; Tiwana et al. 2010)
- Defines the relationships among partners in the ecosystem
- Distribution of power in the ecosystem:
 - **Single Owner:** a single, central owner controls the digital platform ecosystem
 - E. g. Facebook, iOS, SAP Cloud Platform
 - **Consortium:** a group of actors owns the digital platform
 - E. g. Cloud Foundry
 - **Peer-to-peer Community:** a community (typically including users) governs the digital platform
 - E. g. Blockchain, Ethereum

Hein, A., et al. (2020)

IMKM lecture 5: Digital Platforms

Outline

1. Overview

1. Key Elements of Digital Platform Ecosystems
2. **Multi-sided Market Business Model Characteristics**

2. Value-creating Mechanisms

1. Value Creation in Digital Platform Ecosystem
2. Platform Governance

3. Ecosystem

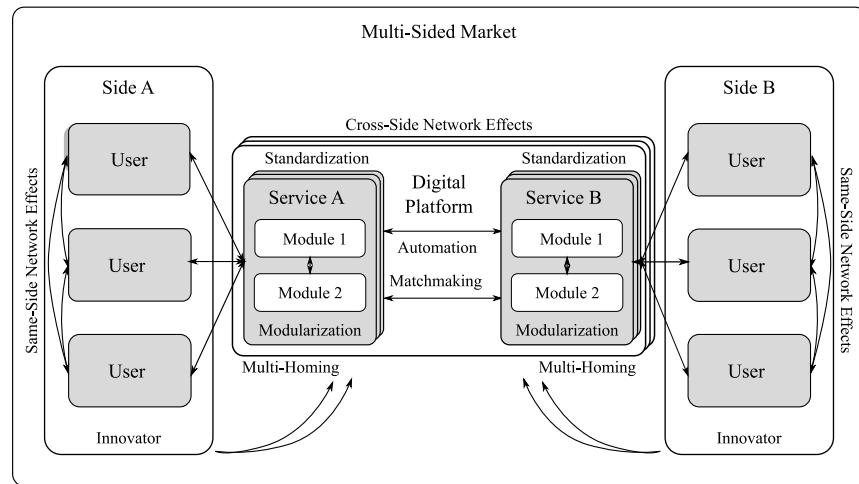
1. Complementor Autonomy
2. E³ Value Modelling

Learning Objectives

- You understand digital platforms and their ecosystems
- You understand and can analyze characteristics of multi-sided market business models
- You know and understand value-creating mechanisms on digital platforms
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- You know and understand different forms of complementor autonomy in platform ecosystems
- You can apply the E³-Value Modelling

Multi/ Two-Sided Markets

- markets in which one or several platforms **enable interactions** between **end-users** and try to get the two sides on board by appropriately charging each side
- businesses includes **two independent groups of customers**



Examples of Multi-Sided Markets

Product category	Market one	Intermediary	Market two
Portable documents	Document reader	Adobe	Document writer
Credit cards	Consumer credit	Issuing bank	Merchant processing
Operating systems	Complementary applications	Microsoft, Apple, Sun	Systems developer toolkits
Ladies' nights	Men's admission	Bars, restaurants	Woman's admission
Broadcast and publishing	Content	Magazine publisher, TV, Radio	Advertisement
Recruiting	Applicants	Monster.com, LinkedIn	Employers
Reservation systems	Travelers	Expedia, Travelocity	Hotels, airlines, rental cars
Shopping malls	Shoppers	Mall of America	Stores
TV format	Color UHF, VHF, HDTV	Sony, Phillips, RCA	Broadcast equipment
Academic journals	Articles	Management Science	Author submission
Stock exchange	Equity purchasers	NYSE, NASDAQ	Listed companies
Home real estate	Home buyers	Real estate agents	Home sellers
Paid search	Searchers	Google.com	Marketers

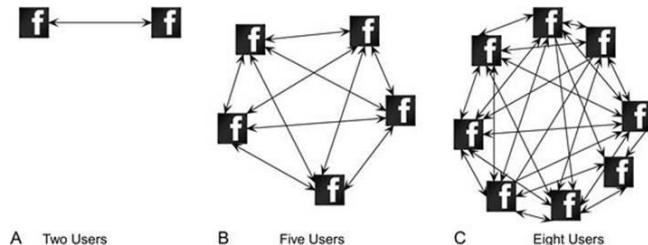
Source: Eisenmann et al. (2006): Strategies for Two-Sided Markets; Parker et al. (2005): Two-Sided Network Effects: A Theory of Information Product Design; Hyrynsalmi (2014): Letters from the War of Ecosystems

Multi-sided Market Business Model Characteristics: Network Effects

Direct/ Same-side Network Effects

increase in usage leads explicitly to **increased welfare of the same side** of the network.

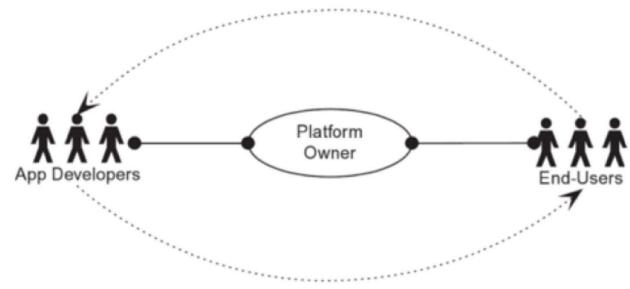
Examples: telephone or social networks



Indirect/ Cross-side Network Effects

increase in the usage of one product or service increases the value of **complementary products** in the network.

Examples: credit cards or app stores



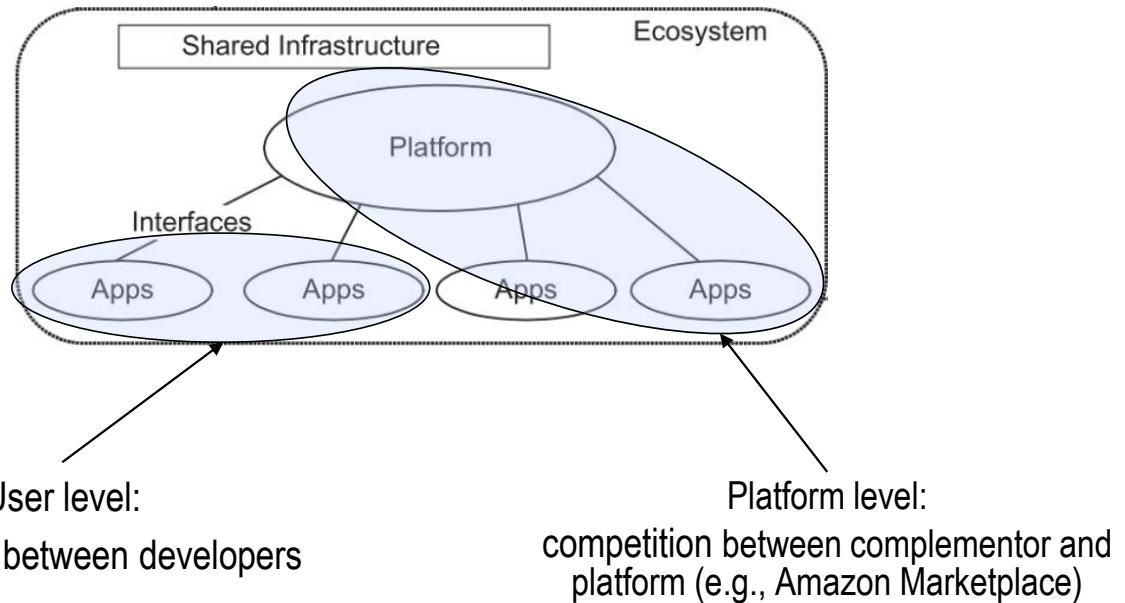
Tiwana (2014)

Multi-sided Market Business Model Characteristics: Launch Strategies

- Each side of the platform depends on the prior existence of the other side (see indirect network effects)
- How to launch a digital platform and build a user base?
 - **Follow-the-rabbit strategy:** build on existing success based on non-platforms, e.g., Amazon's own book sales
 - **Piggyback strategy:** connect with existing user base from other platform, e.g., PayPal piggybacked on eBay
 - **Seeding strategy:** Create value units that will be relevant to at least one set of potential users, .e.g., Google awarded Android app developers

Parker et al. (2016)

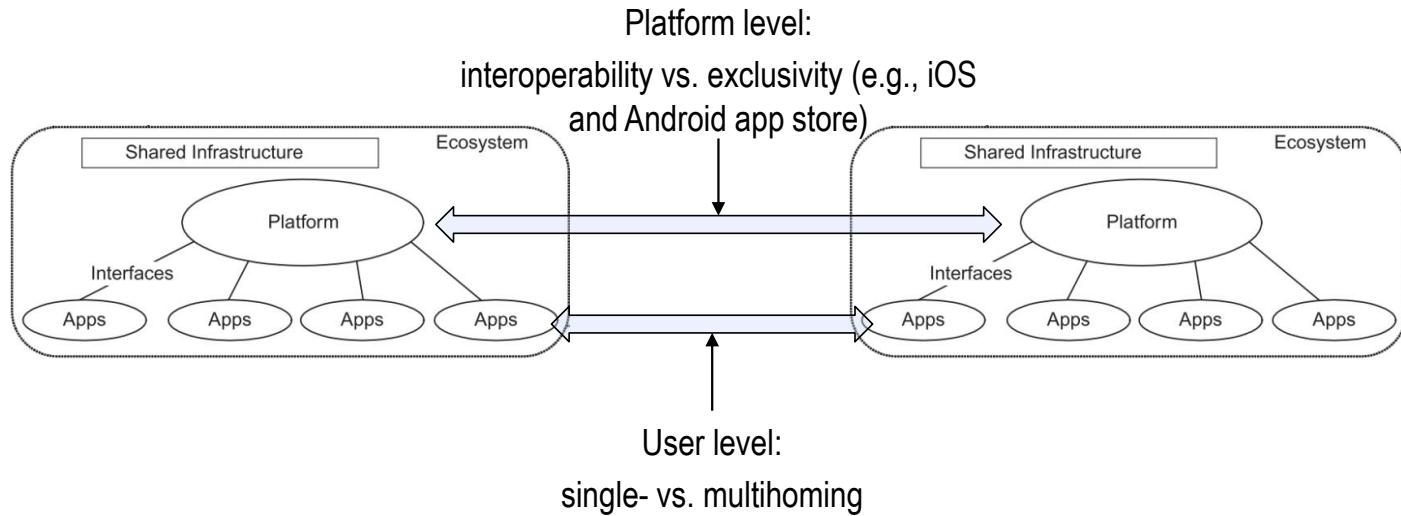
Multi-sided Market Business Model Characteristics: Competition *Within* Platform Ecosystems



Tiwana (2014)

Multi-sided Market Business Model Characteristics: Competition Between Platform Ecosystems

Competition between platform ecosystems under strong network effects evoke **winner-take-all** or **winner-take-some** markets



Multihoming in platforms refers to when a platform participant on either side participates in **more than one platform ecosystem**

Example: using Netflix and Disney+ or providing apps for iOS and Android app stores

Tiwana (2014)

Multi-sided Market Business Model Characteristics: Winner-take-all

- Four forces often characterize winner-take-all markets:
 - Supply-side economies of scale (scale leads to lower cost per unit)
 - Strong network effects
 - High multihoming or switching costs
 - Lack of niche specialization



Google

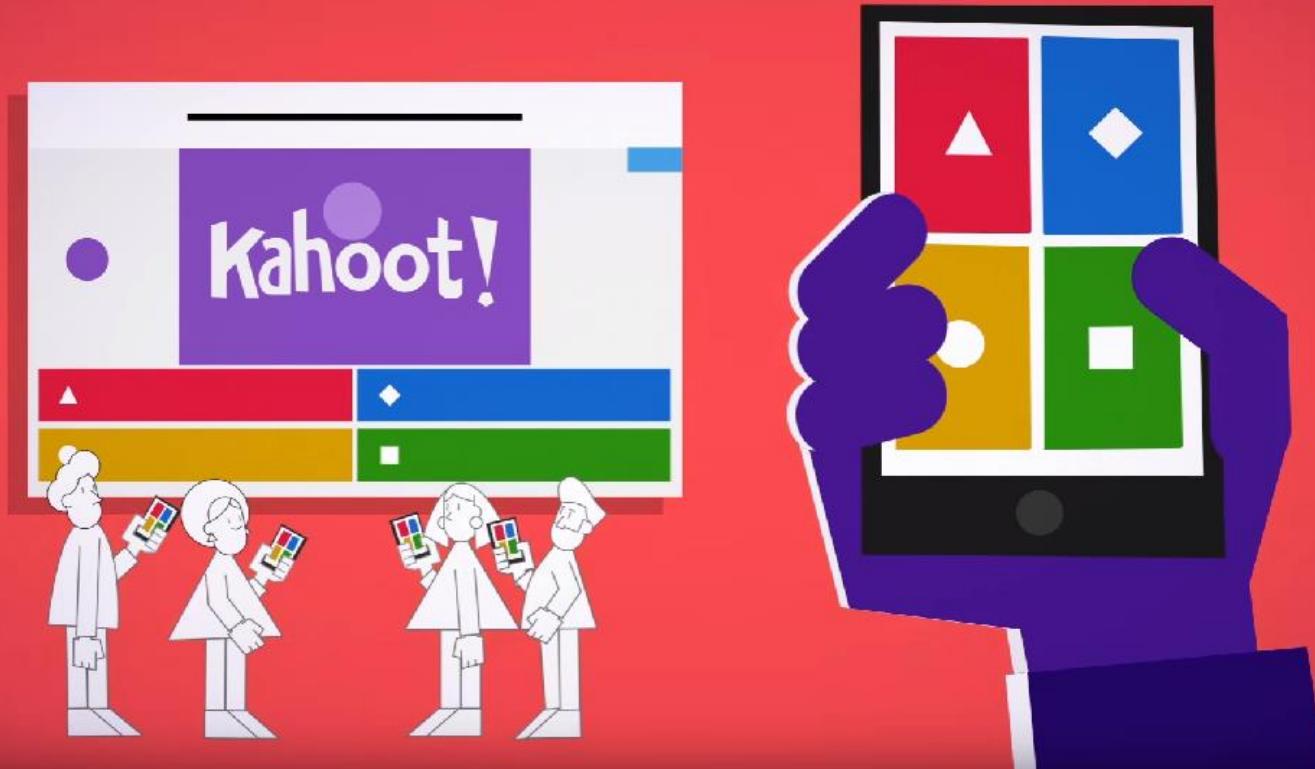
amazon

NETFLIX

Parker et al. (2016, p.224 - 228)

Quiz Time!

Go to kahoot.it



IMKM lecture 5: Digital Platforms

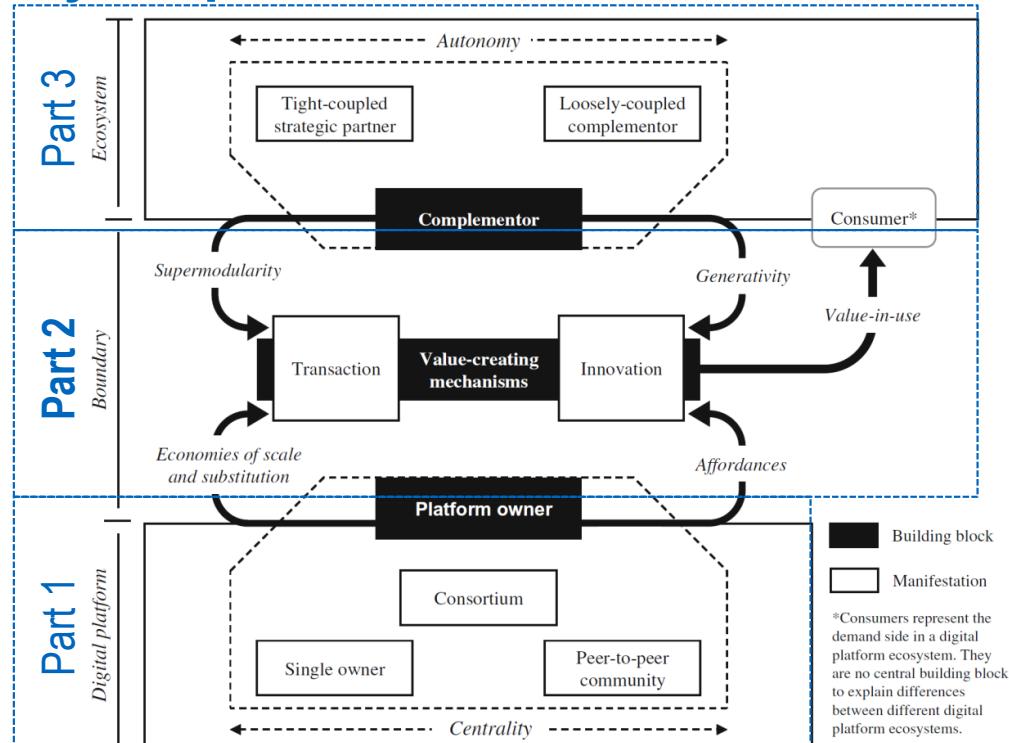
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Learning Objectives

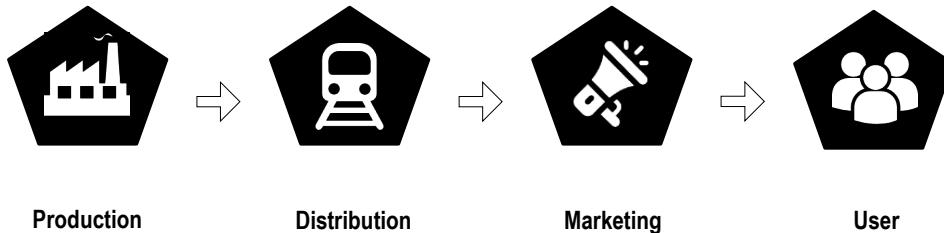
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The Digital Platform Ecosystem and today's 3 parts of the lecture

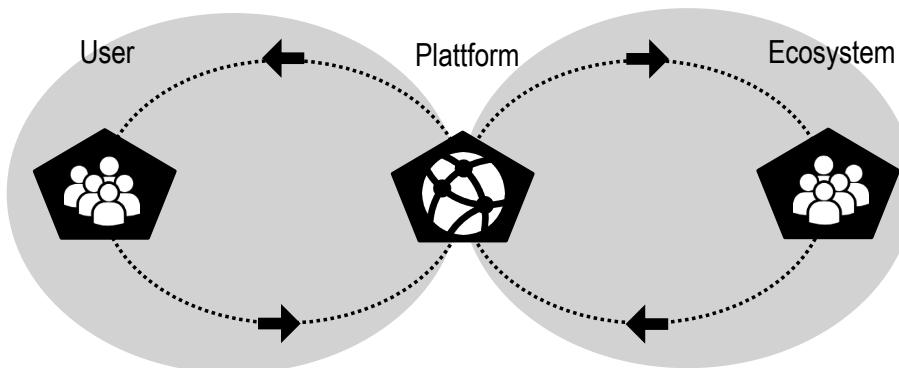


Hein, A., Schreieck, M., Riasanow, T., Setzke, D. S., Wiesche, M., Böhm, M., & Krcmar, H. (2020). Digital platform ecosystems. *Electronic Markets*, 30(1), 87–98. doi: <https://doi.org/10.1007/s12525-019-00377-4>

Value Co-Creation



Without platform: Value creation process is linear and determined



- Developer
- Publisher
- Property Owner
- Companies
- Service offerer



With platform: Value co-creation process is continuous and follows a virtuous cycle

Parker et al. (2016)

Platform value-creating mechanisms

- Efficient and convenient facilitation of **transactions** (Tiwana 2014)
 - digital platforms help complementors and consumers **locate** and **interact** with each other and **exchange value** in a mutually beneficial manner
 - acts as an intermediary by directly **matching supply to demand**
- Provision of affordances making the digital platform a breeding ground for **innovation** (Yoo et al. 2012)
 - platform owner provides **affordances** by offering development tools for complementors
 - use those **boundary resources** to co-create value-adding complements

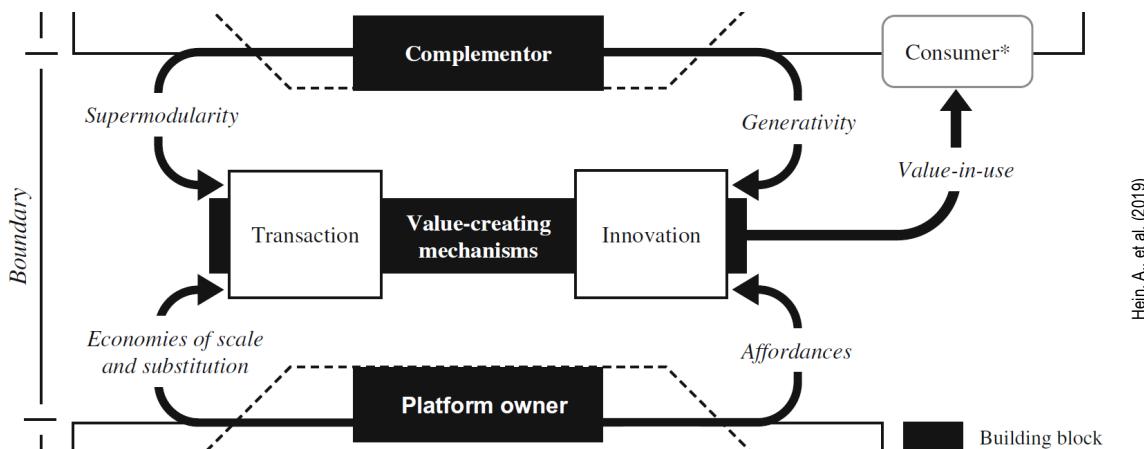
Platform value-creating mechanisms

Supermodular complementarity:

an increased amount of Product A makes Product B more valuable, where A and B are different products or services.

Generativity:

"overall capacity to produce unprompted changes driven by large, varied, and uncoordinated audiences" (Zittrain 2005)



Economies of scale and substitution:

"Reusing modular and upgradable components in a platform instead of designing a system from scratch"
(Garud and Kumaraswamy 1993)

Affordances:

Digital infrastructure building upon a modular software-based platform, meaning it can be *reconfigured* to adapt user needs and prompt new technological advances

IMKM lecture 5: Digital Platforms

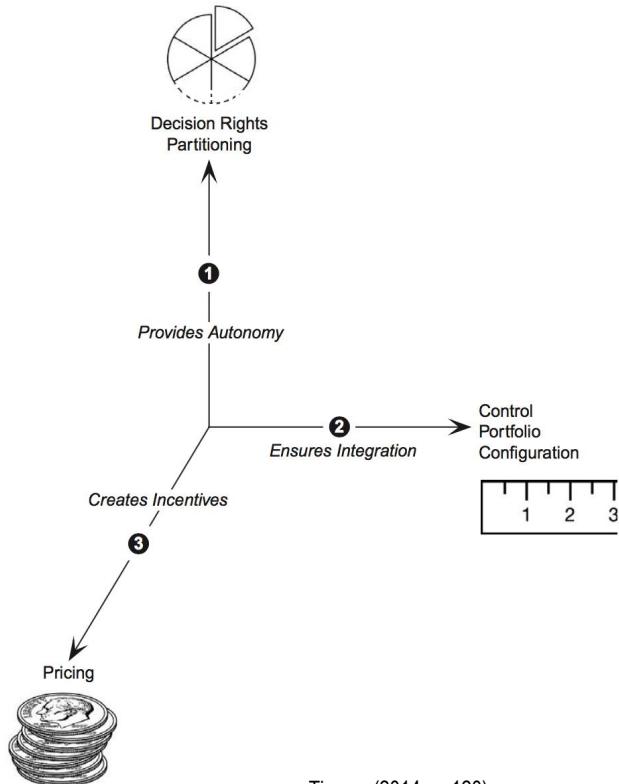
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Platform Governance in an App Store



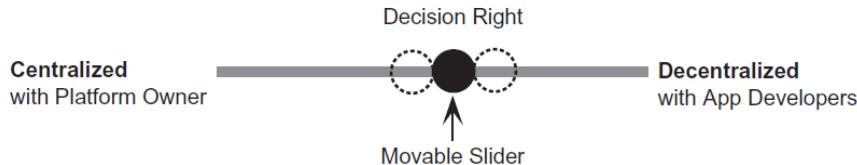
How to influence the platform's ecosystem

3 dimensions of platform governance:

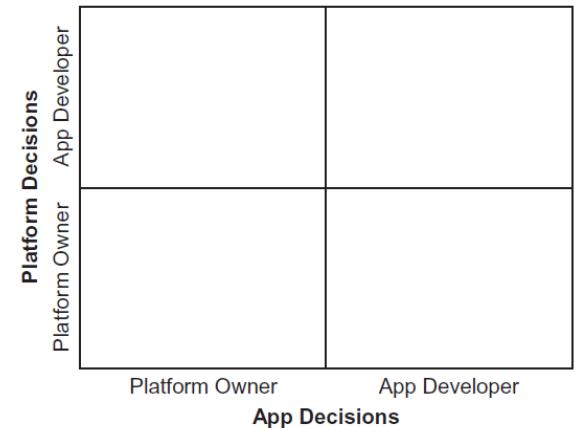
- *Decision rights partitioning – provide autonomy*
The platform owner can transfer decision rights to the app developer to trigger innovation
- *Control portfolio design – ensure integration*
The platform owner needs to control and guide the development process of third-parties.
- *Pricing – create incentives*
The platform owner needs to create incentives e.g. by sharing revenues with developers

Platform Governance: Decision Rights Partitioning

- Platform vs. App Decision Rights (degree of decentralization)
 - **Platform decision rights** refer to whether the platform owner or the app developers have the authority and responsibility for making decisions directly pertaining to the **platform**
 - **App decision rights** refer to whether the platform owner or the app developers have the authority and responsibility for making decisions directly pertaining to **apps**
- Two classes of decision rights:
 - **Strategic**: What should be accomplished
 - **Implementation**: How it should be accomplished

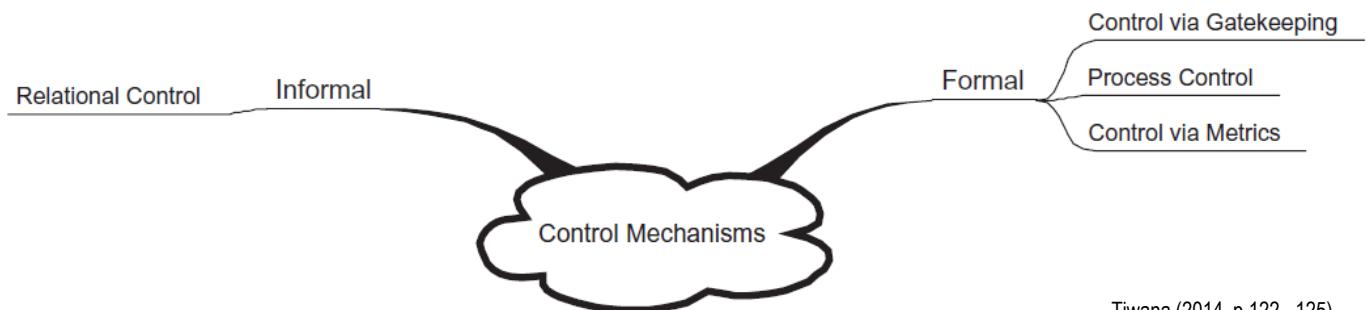


Tiwana (2014, p. 121f)



Platform Governance: Control Portfolio Design

- **Gatekeeping**: criteria who and what apps are allowed
- **Process control**: incentives to follow prescribed development methods & procedures
- **Metrics**: incentives based on predefined performance metrics
- **Relational control** (informal): the platform's norms & values



Tiwana (2014, p.122 - 125)

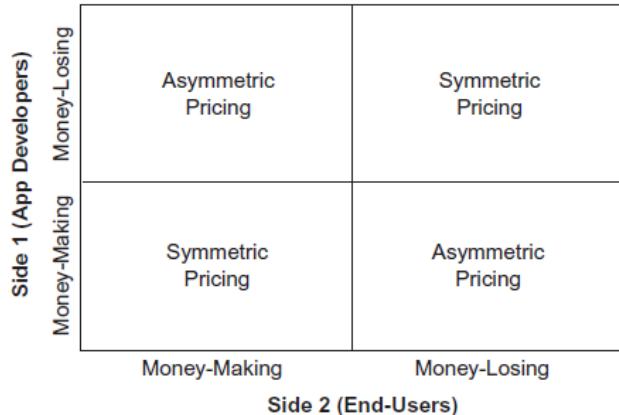
Platform Governance: Pricing Policy

Goal: Create incentives for app developers to invest in own app offerings to ensure their prosperity and the platform's vibrancy

- Symmetric or asymmetric pricing?
 - If asymmetric, who to subsidize and for how long?
- Pricing for access vs. usage?
- Pie-splitting using a fixed scale or a sliding scale
- App pricing decisions
(Single perpetual, subscription- or usage-based licence)

Tiwana (2014, p.126)

Platform Governance: Pricing Policy



"We want to make money when people use our devices, not when they buy our devices."
Jeff Bezos, CEO of Amazon

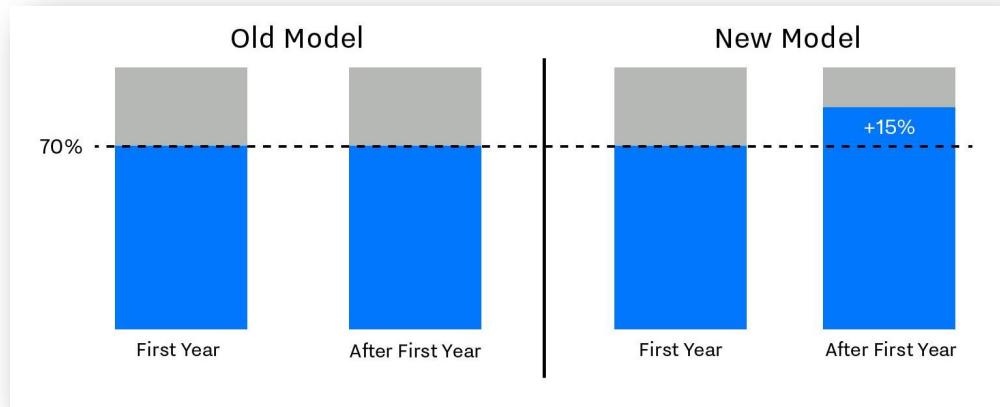
Asymmetric: subsidize one side (typically the more price sensitive or more needed side, e.g. end-users), e.g. free shipping

- Make up losses by increased profits from the other
- Considers long-term over short-term profitability

Tiwana (2014, p.127f)

Platform Governance: Pricing & Revenue Strategies

- **Revenue sharing** as incentive for third-party developers to join the ecosystem (e.g.: Apple's new revenue share for subscriptions)



Goode (2016)

- **Subsidizing** of one side of the platform



 Joe Belfiore 
@joebelfiore 

We have tried VERY HARD to incent app devs. Paid money.
wrote apps 4 them.. but volume of users is too low for most
companies to invest. 😞 twitter.com/Jadsonx/status...

18:59 - 8. Okt. 2017

870 537 1.271

Implementing platform governance: Boundary Resources

Definition Boundary Resources (BR)

Resources that **support** developers in their development efforts

They **define** interaction with the platform

They **implement** platform governance

Application BR

Technical resources

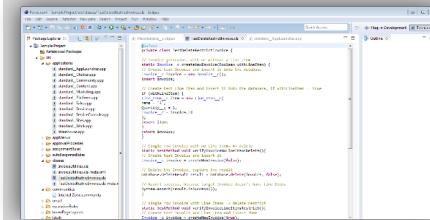
E.g.: APIs, technologies, frameworks



Development BR

Support of the development process

E.g.: SDKs, IDEs, GUI Builder, Marketplace



Social BR

Control interactions and behavior

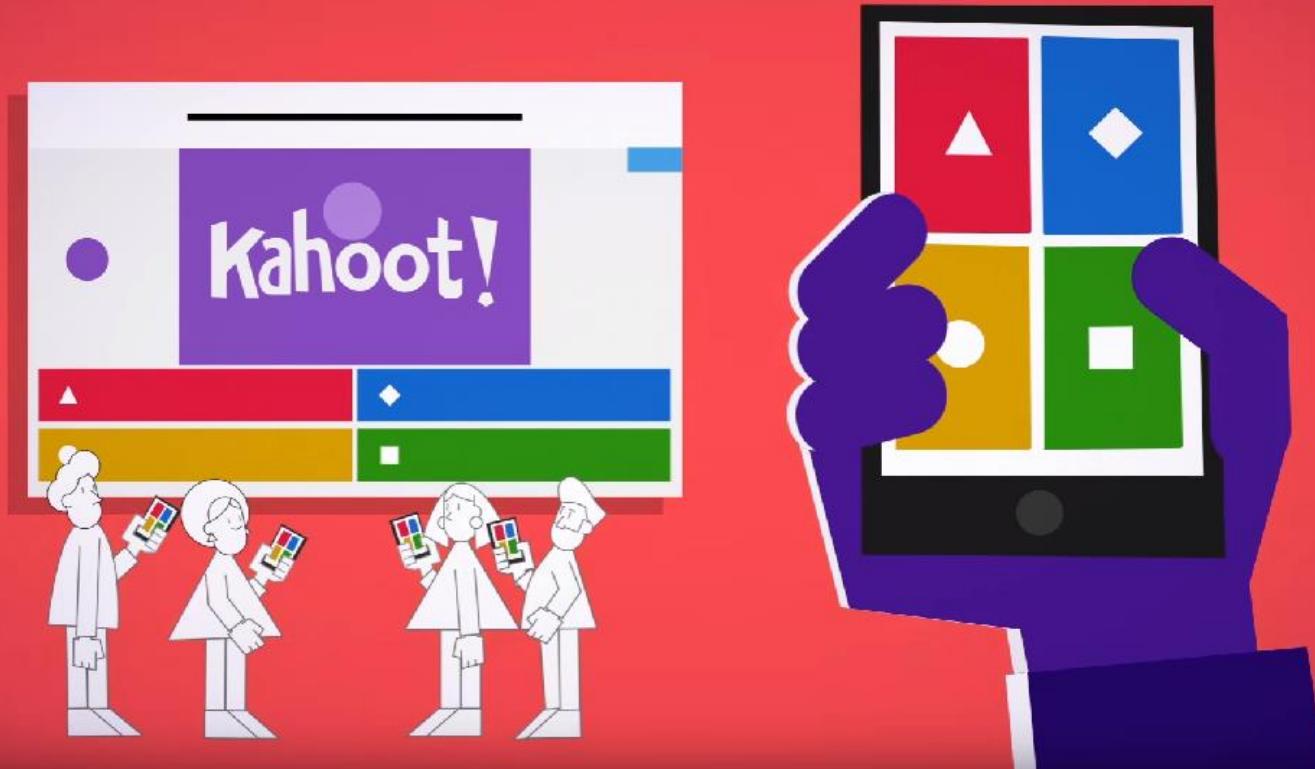
E.g.: Partner program, documentation, training



Dal Bianco et al. (2014); Ghazawneh & Henfridsson (2013)

Quiz Time!

Go to kahoot.it



IMKM lecture 5: Digital Platforms

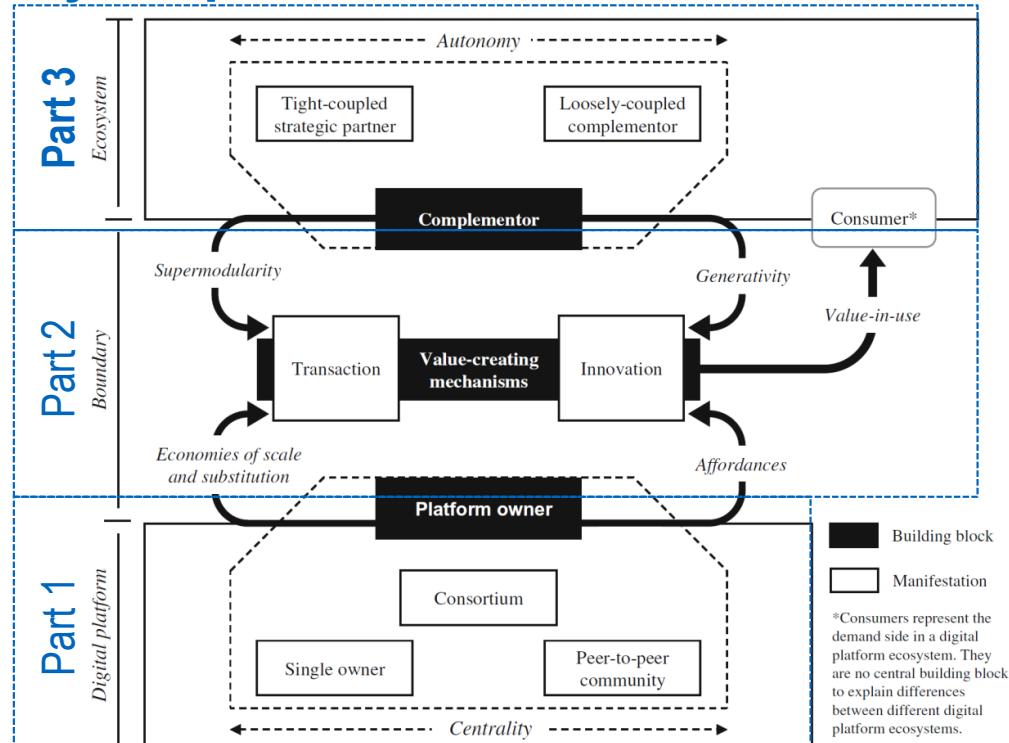
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Digital Platform Ecosystems

*A digital platform ecosystem comprises a **platform owner** that implements governance mechanisms to facilitate **value-creating mechanisms** on a **digital platform** between the platform owner and an ecosystem of autonomous **complementors** and **consumers***

Hein, A., Schreieck, M., Riasanow, T., Setzke, D. S., Wiesche, M., Böhm, M., & Krcmar, H. (2020). Digital platform ecosystems. *Electronic Markets*, 30(1), 87–98. doi: <https://doi.org/10.1007/s12525-019-00377-4>

Why „ecosystem“?



Picture: Shutterstock

The ecosystem analogy

- Reservoir of **finite resources**
- Populations are controlled by **impulses**
- **Interactions** between participating units
- **Adaption** of individuals and the system
- Need for **balance/adaption**
- Why does **diversity** matter?

	Ecosystem – Biology/Ecology	Ecosystem – IT
Description	Physical and biological components of an environment considered in relation to each other as a unit	A set of actors functioning as a unit and interacting with a shared market for software and services, together with the relationships among them
Measurement	Degree of variation of all life forms	Variety in the developer and user communities
Purpose	Higher biodiversity supports a more stable equilibrium of an ecosystem	When one market segment is obsolete because of competing technological platforms, the ecosystem can still foster other areas
Dynamics	Food web: top-down (predator & prey), bottom-up (limited resource availability)	Interfirm network: top-down (one dominant keystone firm), bottom-up (e.g., open source consortium)

Mens et al (2014); Willis (1997); Jansen et al. (2009)

Ecosystem Integration: Tight- and Loose-Coupling

(1) Tight Coupling:

- › Mutual dependent elements,
- › Responsiveness without distinctiveness,
- › Close relationships and low degree of information asymmetry.

(2) Loose Coupling:

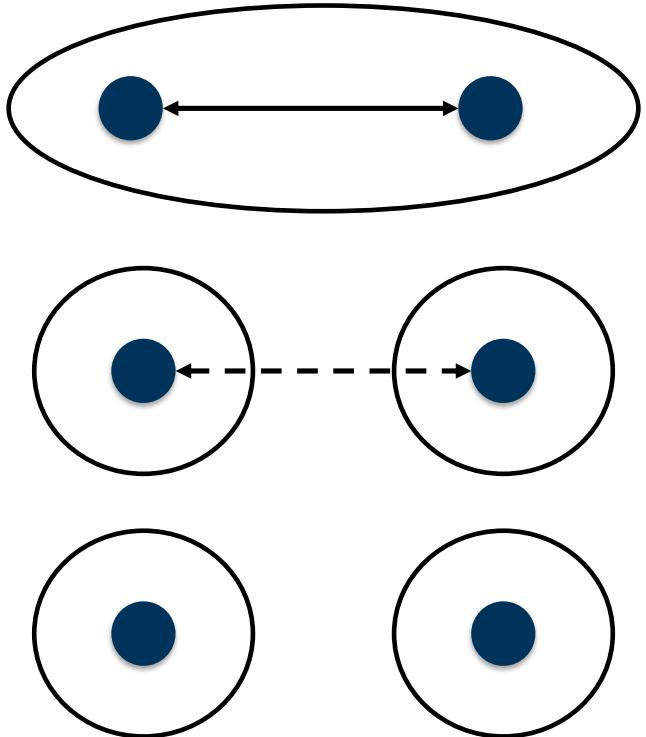
- › Independent and distinct elements,
- › Distinctive responsiveness,
- › Flexible (outside) scalability (inside)

(3) Decoupling:

- › Independent elements,
- › Distinctiveness without responsiveness

Responsiveness: extent of responses to other element's changes

Distinctiveness: extent to which the elements are different from each other



Complementor autonomy

- = Degree of freedom complementors have when co-creating value with the digital platform (Ye and Kankanhalli 2018)
 - High autonomy → loosely-coupled complementor → contribute to the variety and amount of complements
 - Low autonomy → tightly-coupled strategic partner → strengthen the core focal-value proposition
- Depending on the autonomy of complementors, the platform owner must cope with varying levels of control, scalability, and flexibility

IMKM lecture 5: Digital Platforms

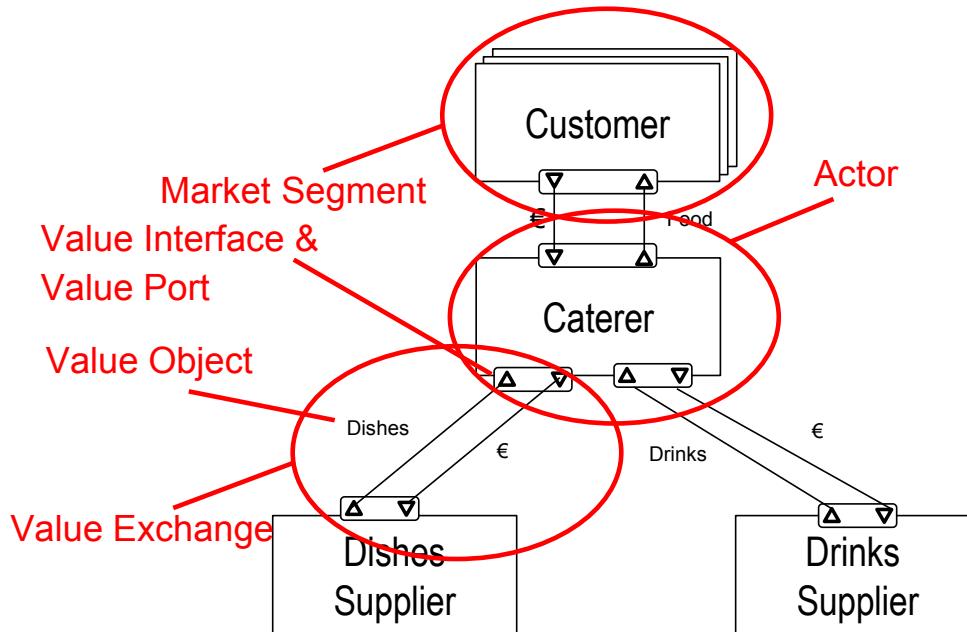
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E³-Value Model – Concepts



Actor

Independent economic unit

Market Segment

Set of actors having equal value objects and value interfaces

Value Object

Object, which is being exchanged between actors, that represents a value (e.g. assets, money)

Value Port

Supply/Demand indicator for value objects

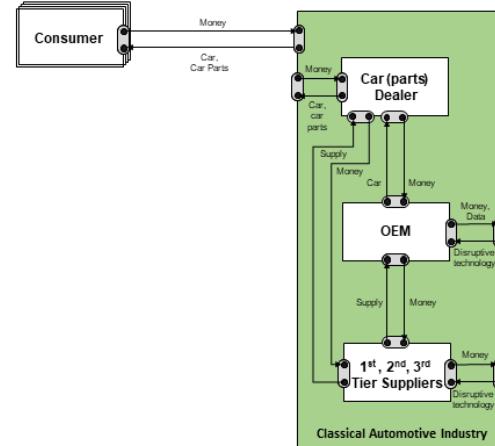
Value Interface

Contains value ports and shows, what is exchanged for what

Value Exchange

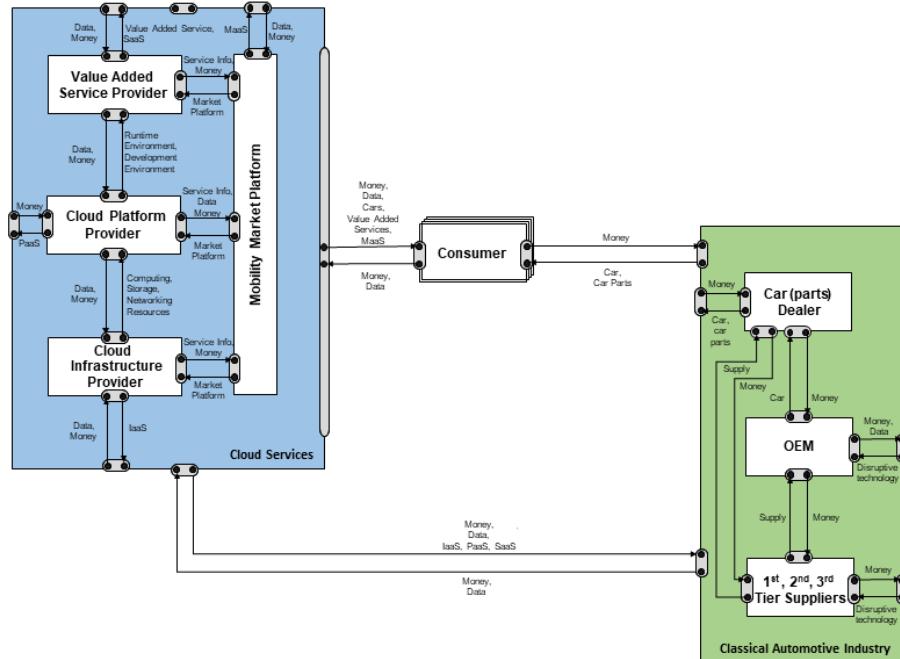
Connection of two value ports having an exchange relationship

Example: Ecosystem Change in the Mobility Context



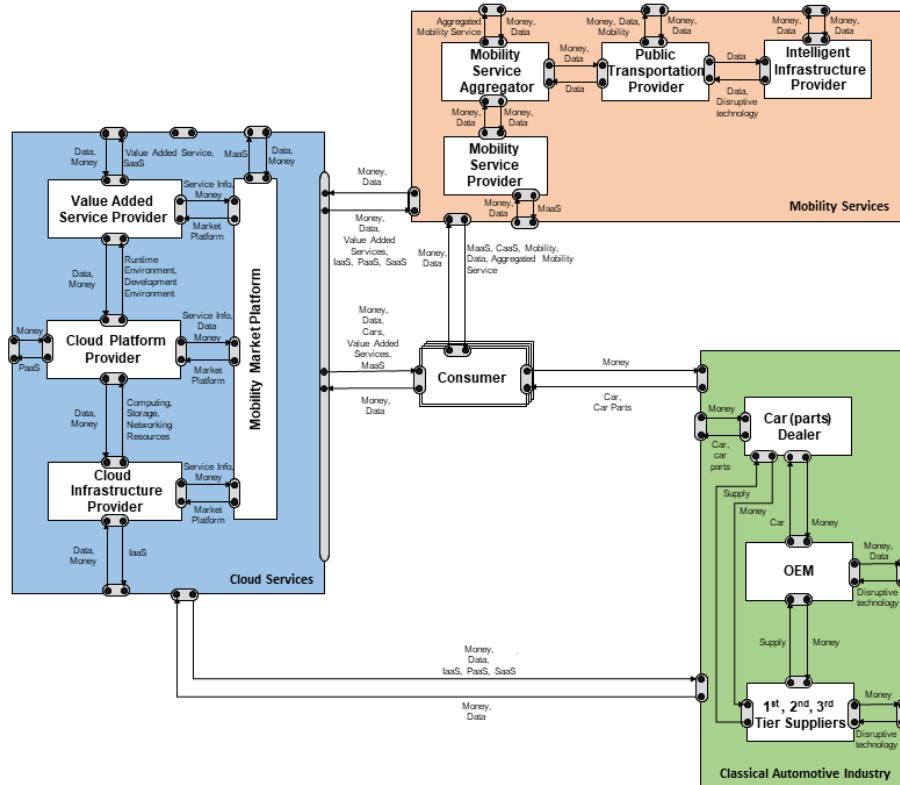
Riasanow et al. (2017)

Example: Ecosystem Change in the Mobility Context



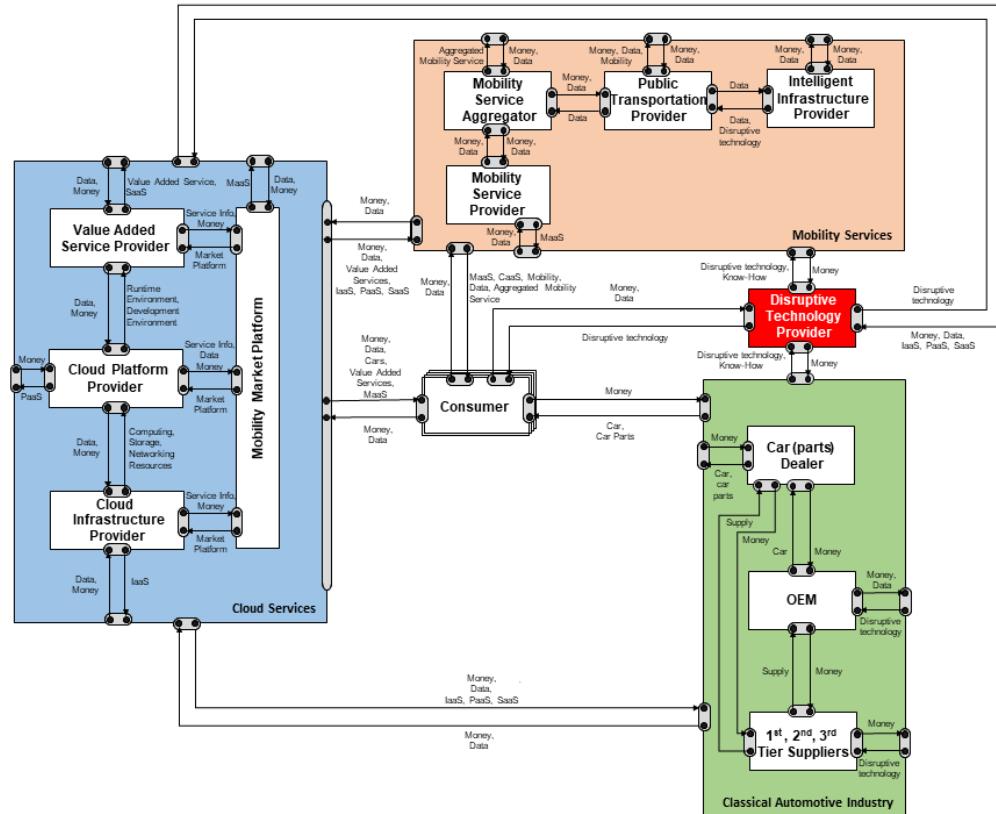
Riasanow et al. (2017)

Example: Ecosystem Change in the Mobility Context



Riasanow et al. (2017)

Example: Ecosystem Change in the Mobility Context



Riasanow et al. (2017)

Core Literature: Krcmar, Informationsmanagement (2015)

1. Einleitung (pp.1-8)
2. Begriffe und Definitionen (pp.11-26)
3. Modellierung (pp. 31-78)
4. Aufgabe des Informationsmanagements: Informationsmanagement (pp. 85-109)
5. Aufgabe des Informationsmanagements: Management der Informationswirtschaft (pp. 113-165)
6. Aufgabe des Informationsmanagements: Management der Informationssysteme (pp. 173-302)
7. Aufgabe des Informationsmanagements: Management der Informations- und Kommunikationstechnik (pp. 315-385)
8. Führungsaufgaben des Informationsmanagements
8.1 Unternehmensstrategie und Informationsmanagement (pp. 396-427)
9. Referenzmodelle des Informationsmanagements (pp. 601-630)
10. Einsatzfelder und Herausforderungen des Informationsmanagements (pp. 633-753)
11. Fallstudie „Rockhaus AG“ (pp. 767-783)

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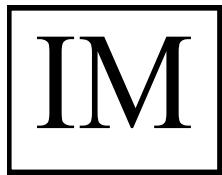
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Information Management and Knowledge Management (IMKM)

Lecture 7 *IT Controlling & IT Governance*

TUM

Chair for Information Systems

© Prof. Dr. H. Krcmar

Lecture Schedule

Information Systems Strategy

Business Value of IT

Business IT Alignment

IT-enabled Strategies

Guest Lecture: Digital Leadership and the CIO Role

Digital Platforms

Information Management

IT Controlling and IT Governance

IT Sourcing and IT Off-Shoring

IT Security, Privacy and Risk Management

Guest Lecture: Natural language processing for IM

Knowledge Management

Basics

Tools

Guest Lecture:
Applications

IMKM Lecture 7: IT Controlling & IT Governance

Outline

1. IT Controlling

1. Objectives and Functions
2. Methods

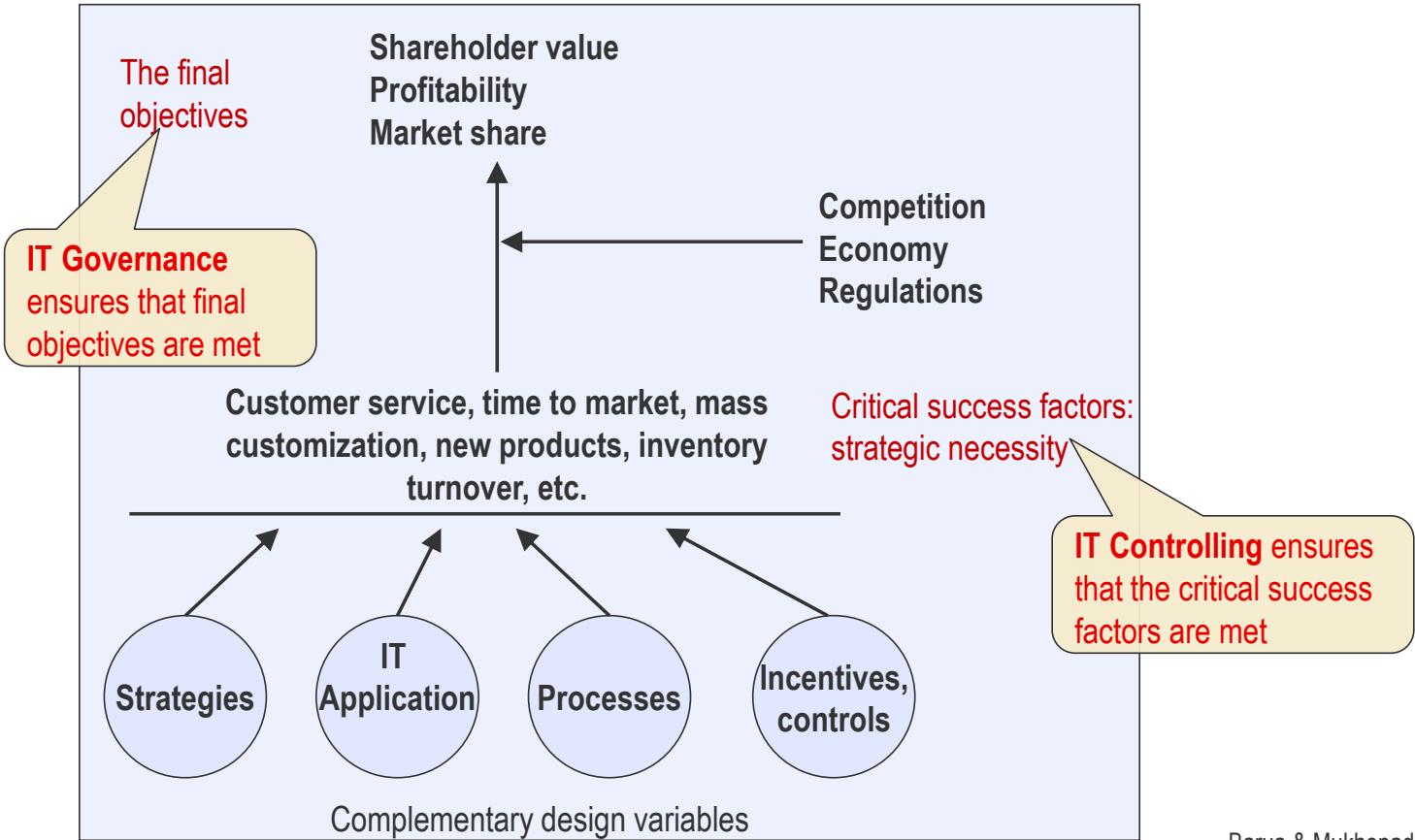
2. IT Governance

1. Definition and relation to Corporate Governance
2. COBIT 2019

Learning Objectives

- You understand the objectives of IT controlling.
- You understand and can identify and differentiate the functions of IT controlling.
- You know and understand different methods of IT controlling.
- You know and understand IT governance and its relation to corporate governance.
- You know and understand what COBIT 2019 is and its six principles.

Relationship between IT Governance & IT Controlling



Controlling and IT Controlling

Controlling

- a management concept for a future-oriented **corporate and profit controlling** and
- a strategy for safeguarding corporate existence and jobs.
- Provides **essential decision support** via recipient-oriented and future-oriented reporting.

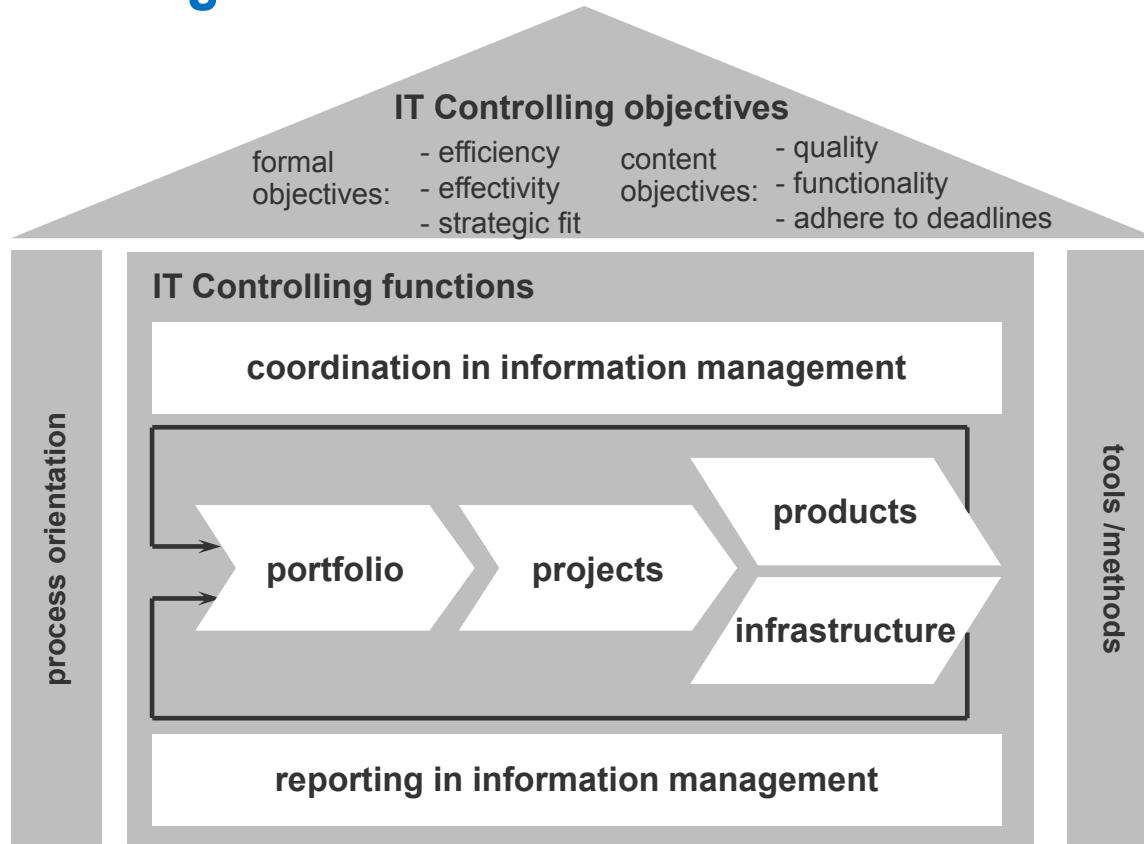
IT Controlling

the controlling of IT in an organization

- guarantees **formal** objectives (efficiency & effectiveness) and
- **content** objectives (quality, functionality, adherence to schedule) of information processing.
- Not merely a supervision/ **elementary controlling** function, but rather a **coordination** function for information management.

Gadatsch & Mayer (2014); Krcmar (2015), p. 497

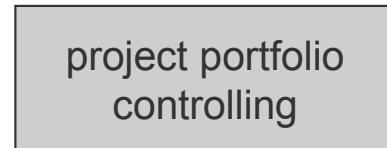
IT Controlling Framework



Krcmar (2015), p. 498

IT Controlling Functions

to select projects
that fit



Portfolio controlling makes the process of evaluating and selecting new, planned or ongoing IS projects more transparent.

to execute projects
correctly

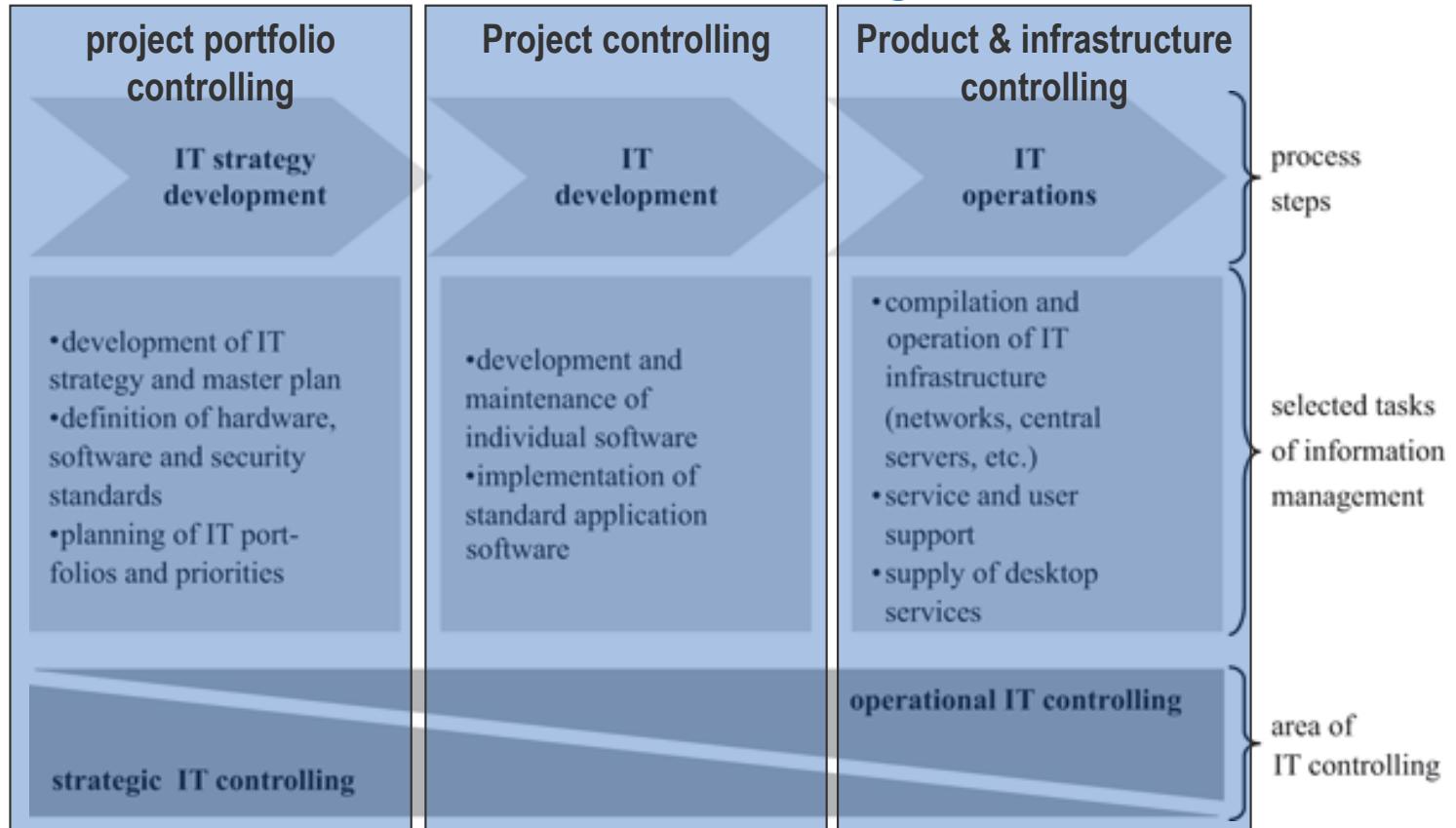
Project controlling is an integrated system for planning, management and monitoring of costs, schedules and services of a project.

to handle operation
correctly

Product and infrastructure controlling ensures the ongoing monitoring of product use throughout the remaining part of the product life cycle.

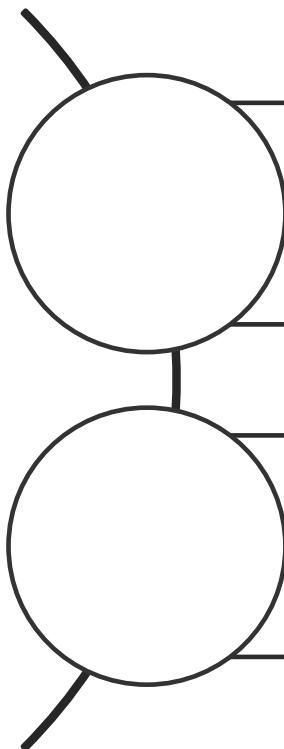
Krcmar (2015), p. 500ff

IT Process Model & IT Controlling Functions



Gadatsch (2009)

IT Controlling Methods Overview



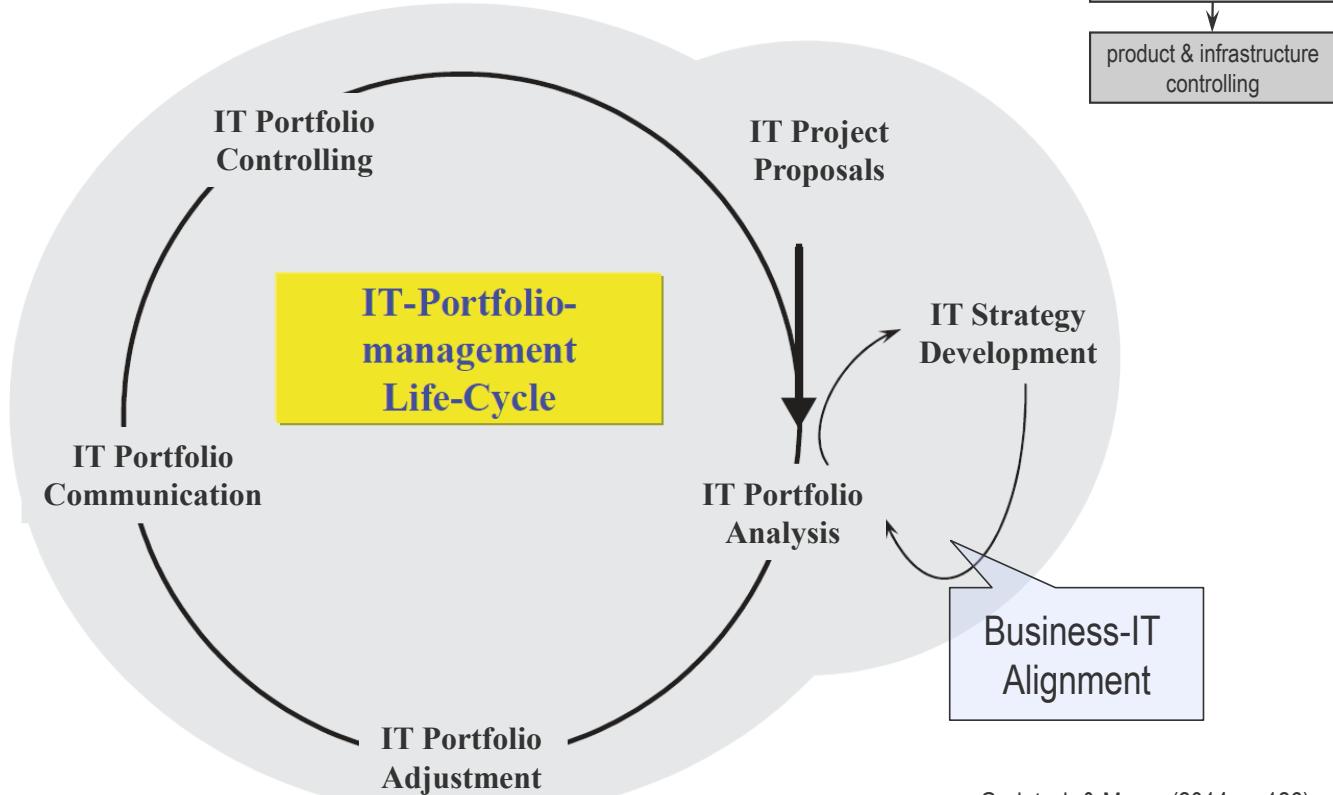
Strategic

- IT Portfolio Controlling – Life-Cycle
- IT Portfolio Controlling – Selection Criteria
- IT Balanced Scorecard

Operative

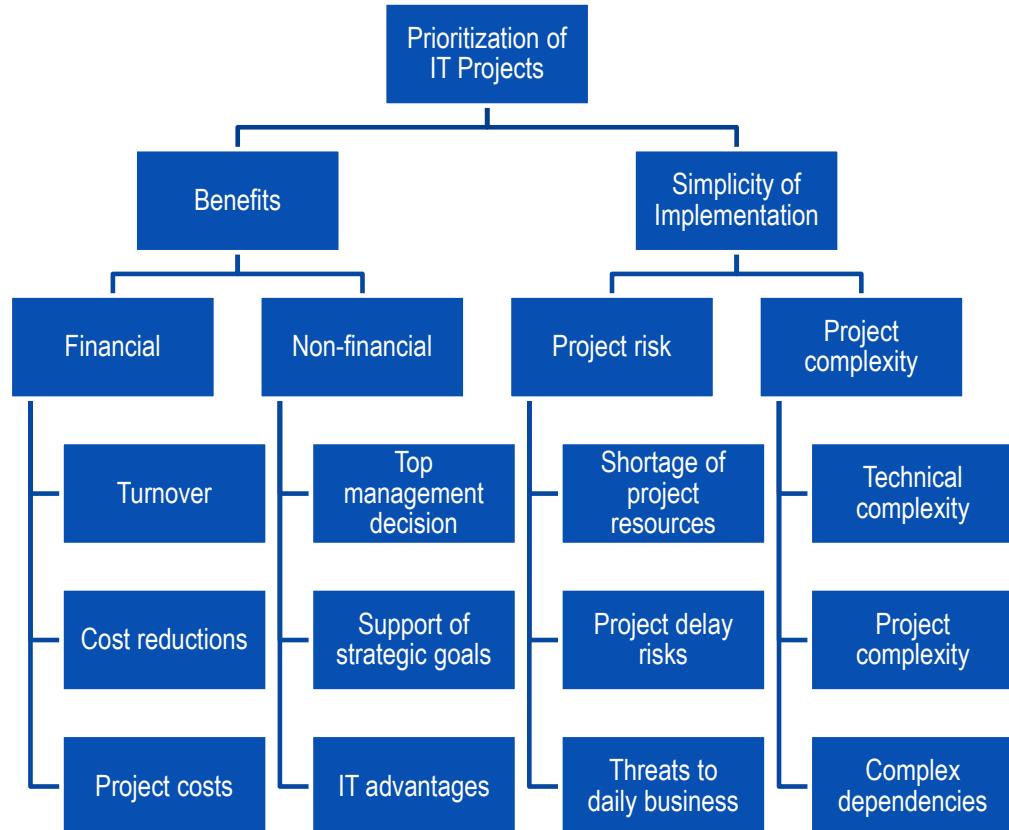
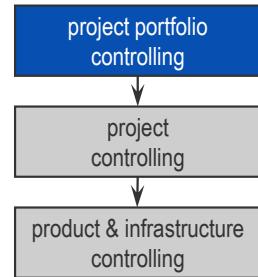
- IT Project Controlling
- IT Key Performance Indicators: Metrics System

IT Portfolio Controlling – Life-Cycle



Gadatsch & Mayer (2014, p. 126)

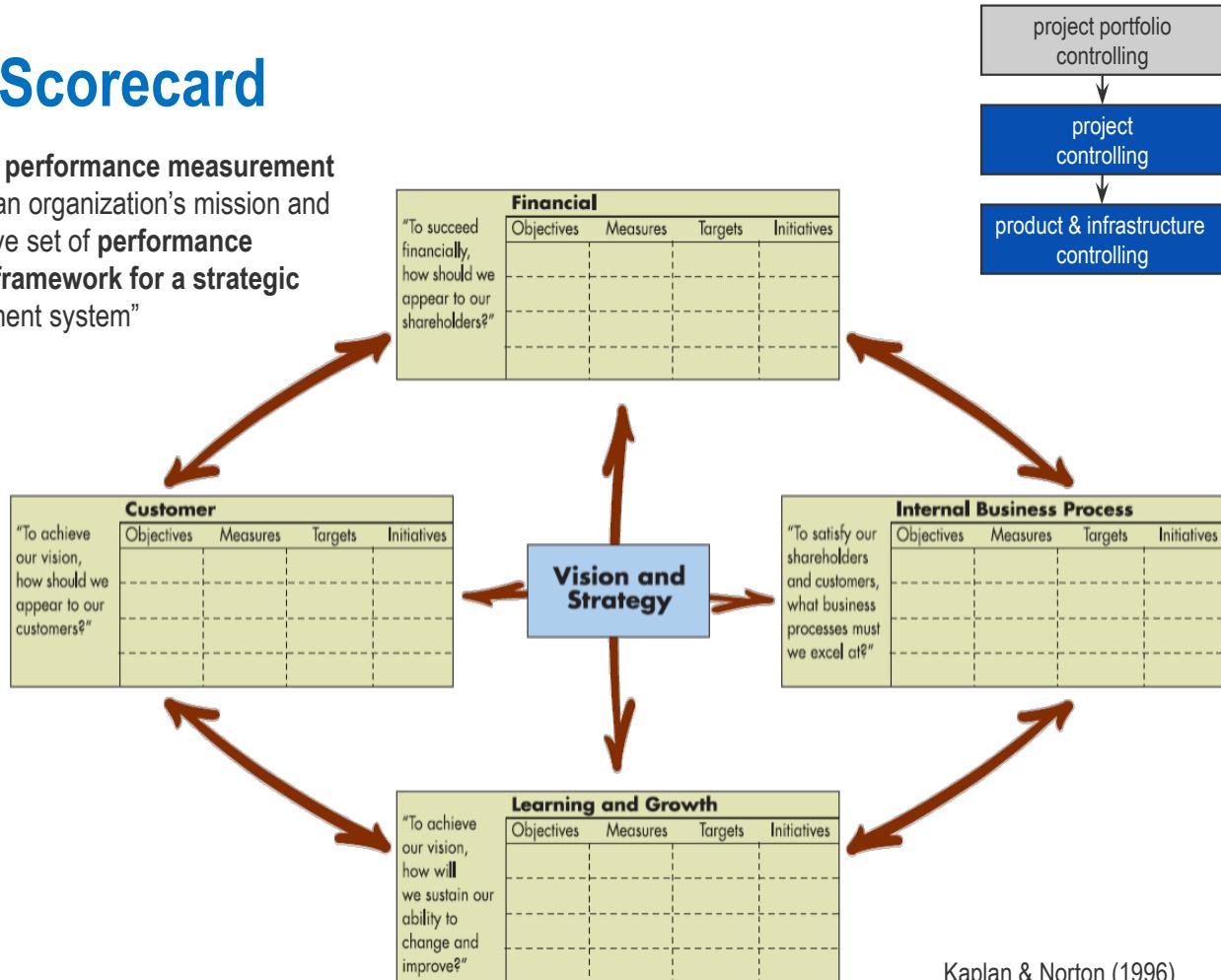
IT Portfolio Controlling – Selection Criteria



Gadatsch & Mayer (2014, p.123)

Balanced Scorecard

The Balanced Scorecard is a **performance measurement framework** that “**translates** an organization’s mission and **strategy** into a comprehensive set of **performance measures** that provides the **framework for a strategic measurement and management system**” (Kaplan & Norton, 1996).



Kaplan & Norton (1996)

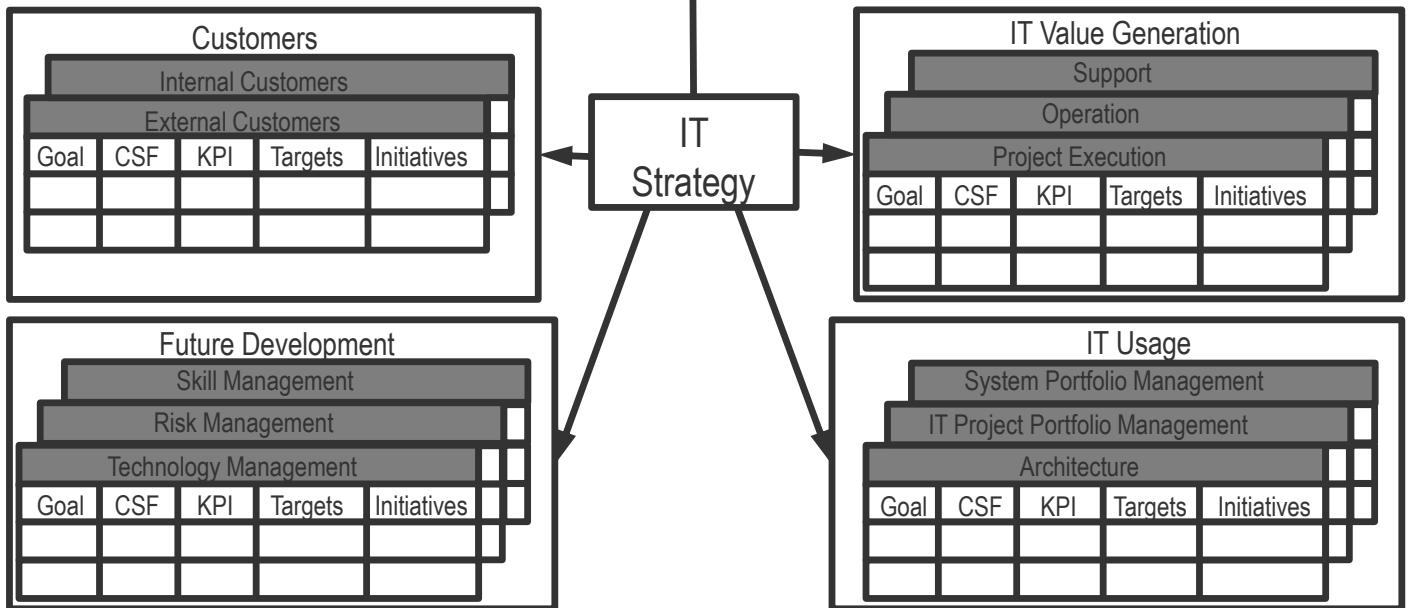
Balanced IT Scorecard

CSF = Critical success factor

- Vital elements for strategy, higher-level, **not measurable**

KPI = key performance indicator

- Quantifies strategy statement, more concrete, **measurable**



project portfolio controlling

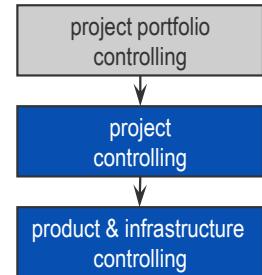
project controlling

product & infrastructure controlling

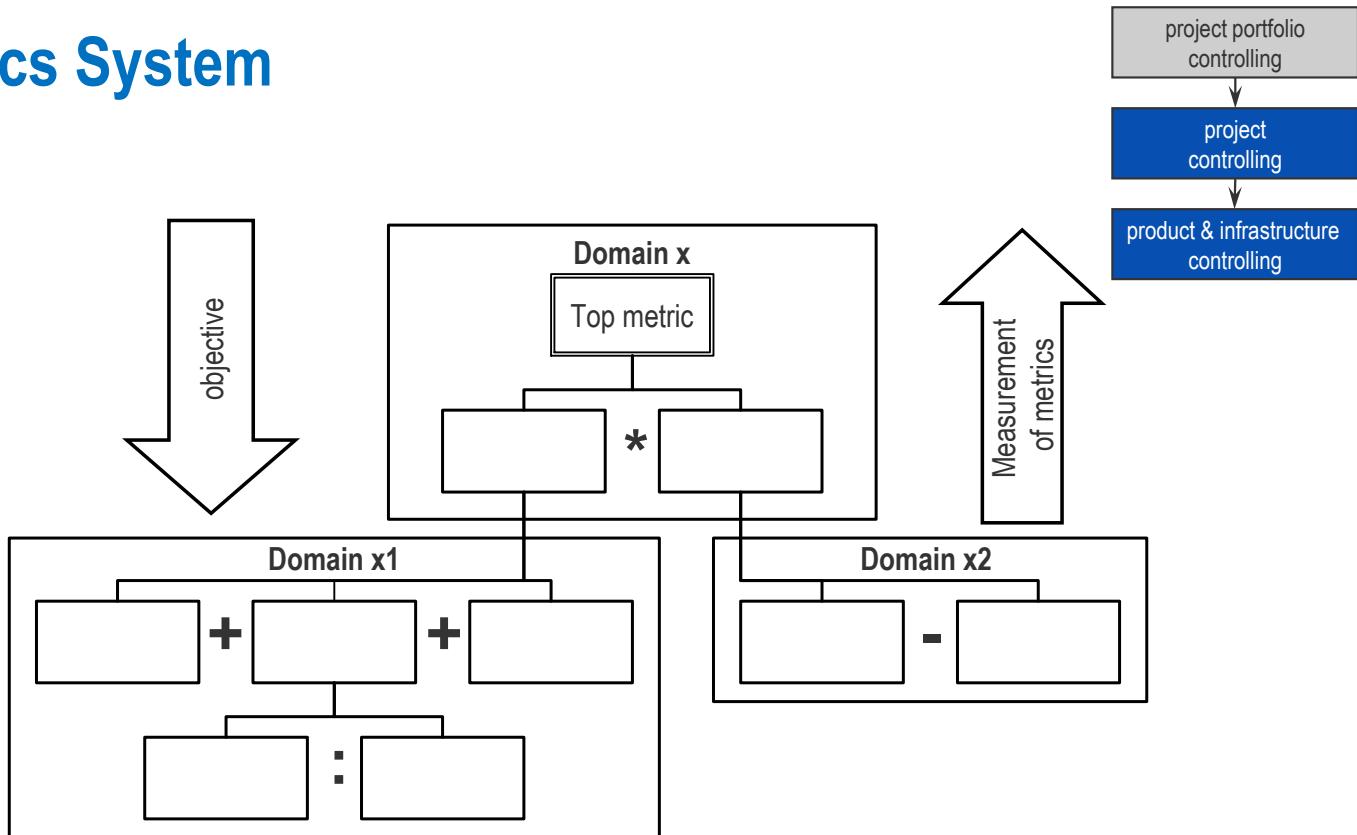
(Krcmar 2015, p. 513; Schmid-Kleemann 2004, p. 147)

Metrics System

- Metric: A **quantitative judgement** on a planned or actual **value** of a criteria of a steering object, at a certain point in time.
- Types of metrics
 - Steering metrics
 - Information metrics
 - Benchmarks
 - Quantitative vs. Qualitative metrics
 - Retrospective vs. Predicting metrics



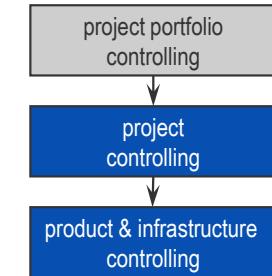
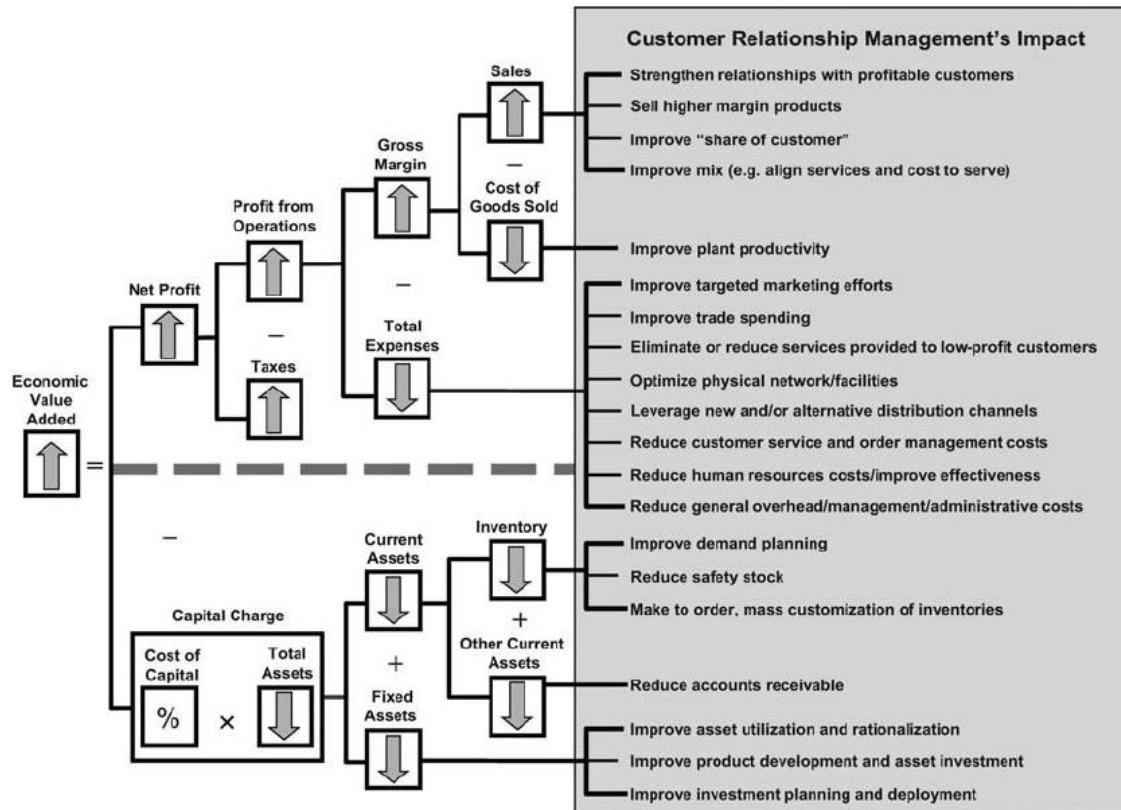
Metrics System



Krcmar (2010), p. 553

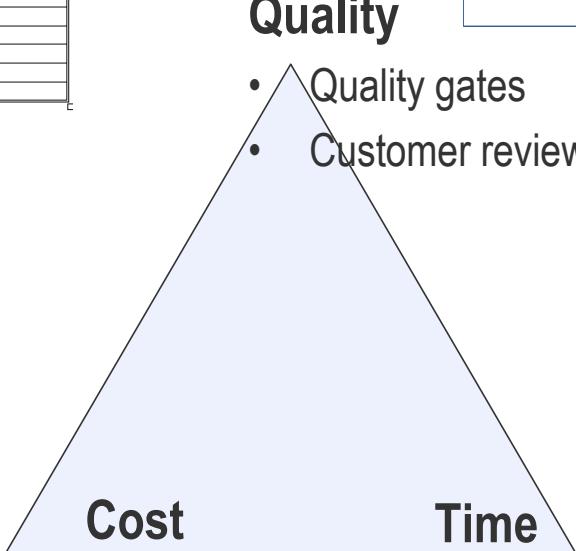
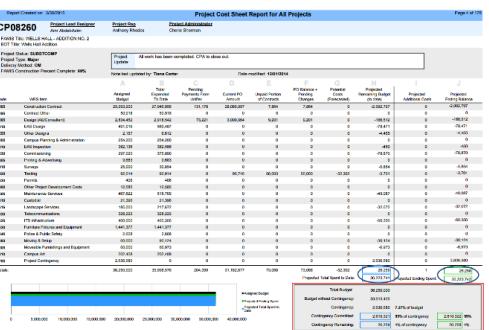
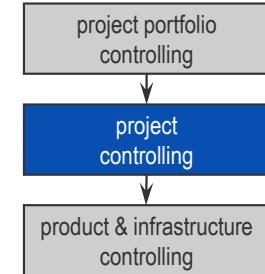
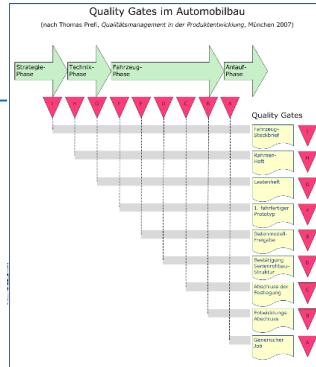
Metrics System

Example: Economic Value Added

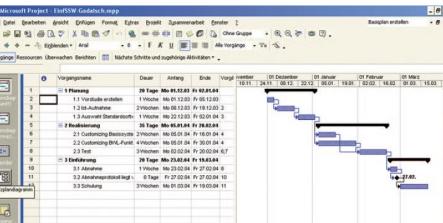
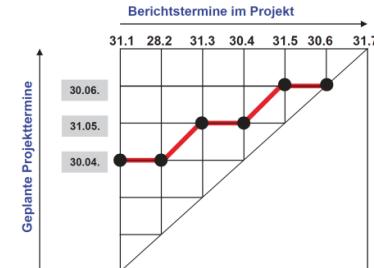


IT Project Controlling

TYPE	COMPLEXITY OF COMPONENT			Total
	Low	Average	High	
External Inputs	__ *3=	__ *4=	__ *6=	
External Output	__ *4=	__ *5=	__ *7=	
External Inquiries	__ *3=	__ *4=	__ *6=	
Internal Logical files	__ *7=	__ *10=	__ *15=	
External Interface File	__ *5=	__ *7=	__ *10=	
TOTAL UAF				

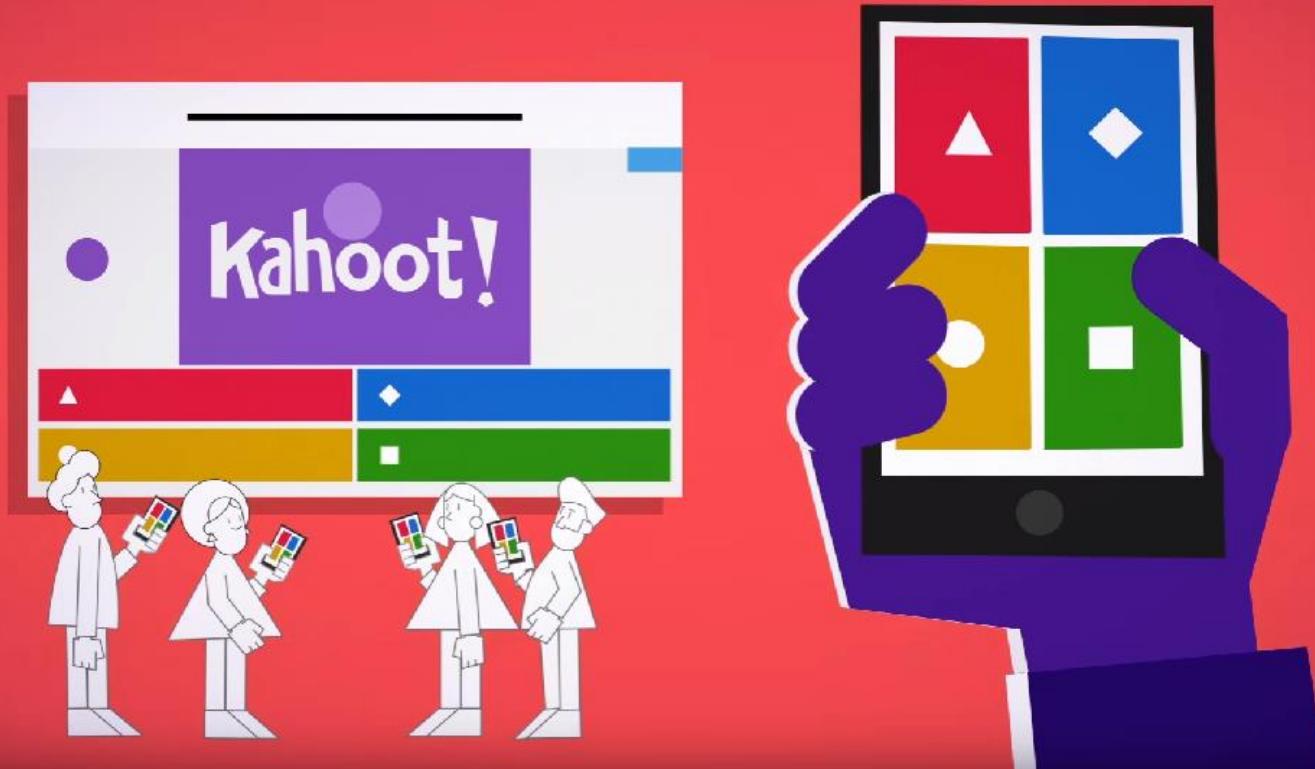


- Estimation (Function Point analysis, COCOMO (Constructive Cost Model))
 - Reporting



Quiz Time!

Go to kahoot.it



IMKM Lecture 7: IT Controlling & IT Governance

Outline

1. IT Controlling

1. Objectives and Functions
2. Methods

2. IT Governance

1. Definition and relation to Corporate Governance
2. COBIT 2019

Learning Objectives

- You understand the objectives of IT controlling.
- You understand and can identify and differentiate the functions of IT controlling.
- You know and understand different methods of IT controlling.
- You know and understand IT governance and its relation to corporate governance.
- You know and understand what COBIT 2019 is and its six principles.

The wirecard Scandal

"On 25 June 2020, Wirecard filed for insolvency after revelations that €1.9 billion was "missing", the termination and arrest of its CEO Markus Braun. Questions are raised with regards to the regulatory failure on the part of Federal Financial Supervisory Authority (BaFin), Germany's top financial watchdog, and possible malpractice of its long time auditor Ernst & Young."

**Was this scandal
related to
governance?**

(Use yes/agree, no/disagree
in Zoom)



<https://www.ft.com/content/39087386-2114-403f-8f9b-ca24fdcc668c>
https://en.wikipedia.org/wiki/Wirecard_scandal

Why do we need Corporate Governance?

Corporations have two important virtues:

- They allow shareholders (investors) to reduce risk by **limiting their liability** to the value of their investment.
- They allow shareholders to **buy and sell their ownership interests** easily.

But there is a big problem that creates a **potential misalignment** of interests between shareholders and managers:

The Separation of Ownership and Control!

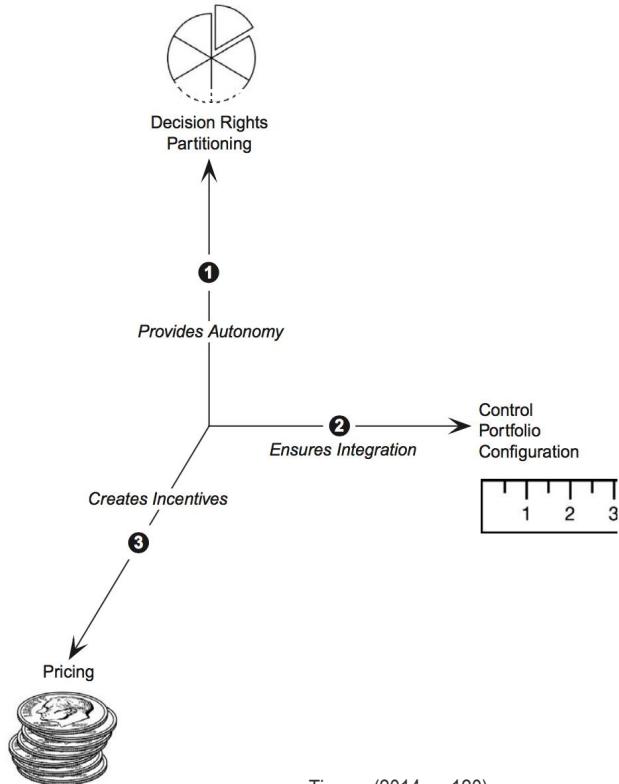
What is Corporate Governance?

Corporate governance is the system by which business corporations are **directed and controlled**. The corporate governance structure specifies the distribution of **rights and responsibilities** among different participants in the corporation, such as the board, managers, shareholders and other stakeholders, and spells out the **rules and procedures** for making decisions on corporate affairs.

By doing this, it also provides the **structure** through which the company **objectives are set**, and the **means** of attaining those objectives and **monitoring** performance.

OECD (1999)

Reminder: Platform Governance in an App Store



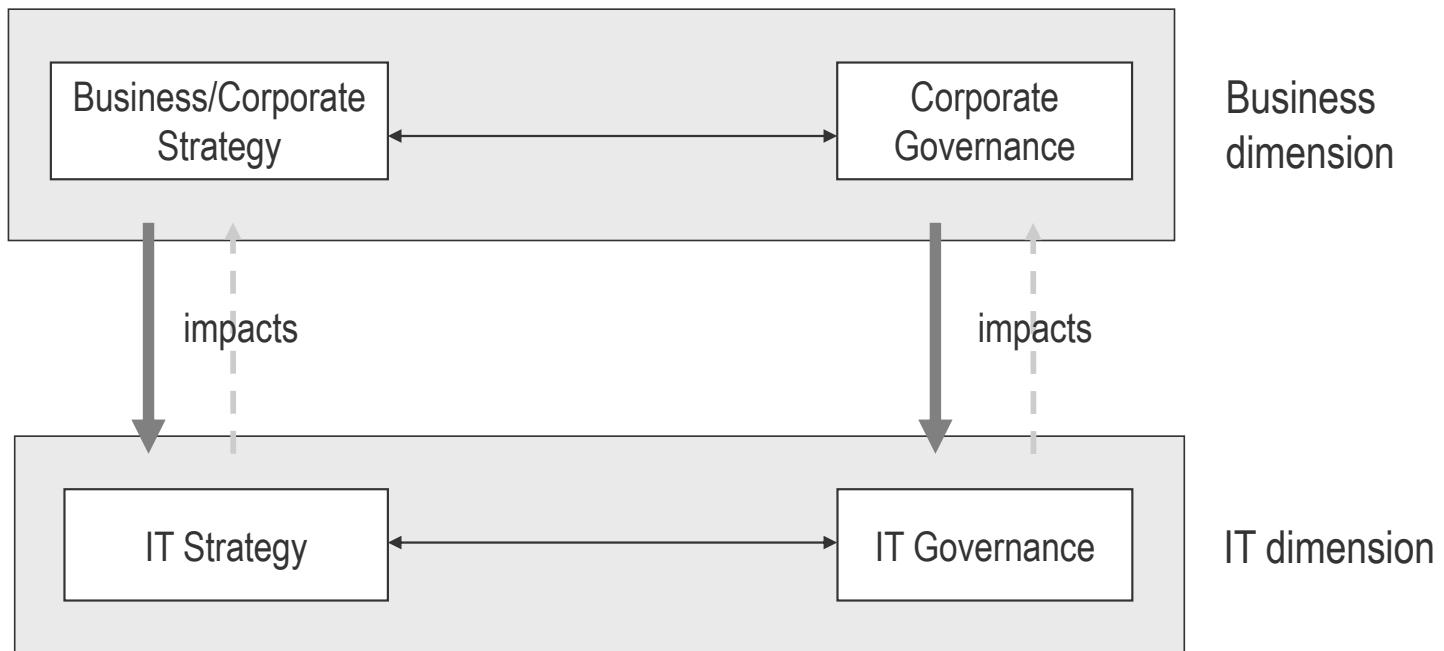
How to influence the platform's ecosystem

3 dimensions of platform governance:

- *Decision rights partitioning – provide autonomy*
The platform owner can transfer decision rights to the app developer to trigger innovation
- *Control portfolio design – ensure integration*
The platform owner needs to control and guide the development process of third-party.
- *Pricing – create incentives*
The platform owner needs to create incentives e.g. by sharing revenues with developers

Tiwana (2014, p. 120)

From Corporate Governance to IT Governance



IT Governance

“IT governance represents the **framework for decision rights and accountabilities** to encourage desirable behavior in the use of IT”

Weill & Woodham (2002), cited in Krcmar (2015), p. 444

“IT governance is not about what specific decisions are made. That is management. Rather, governance is about systematically determining who makes each type of decision (**a decision right**), who has input to a decision (**an input right**) and how these people (or groups) are held **accountable** for their role. Good IT governance draws on corporate governance principles to manage and use IT to achieve **corporate performance goals**. ”

Weill & Ross (2004)

Design of IT Governance

Business Goals

*Build current
and future
shareholder/
stakeholder
value*

at

*An
acceptable
level of risk*

by

*Engaging and
aligning
business
leadership*

IT Governance Goals

Establish / Enforce Accountability for IT Operational Performance

Establish / Enforce Accountability for IT Projects

Align IT Investment to Business Strategy and Objectives

Manage IT Related Risks

Involve Key Business Stakeholders

Build Decision Making Transparency

IT Governance Core Components

Structure,
Accountability,
Authorities

Targets
and Feedback

Compliance
and
Reinforcement

Process,
Participation,
and Timing



Control OBjectives for Information and related Technology (COBIT)

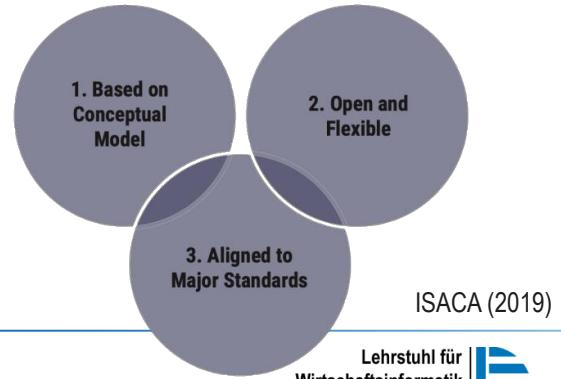
COBIT = Framework for the **governance & management** of enterprise information & technology (I&T)

- defines the **components** to build and sustain a governance system
 - **which decisions** should be taken, and **how** and **by whom** they should be taken
 - defines the **design factors** that should be considered (enterprise strategy, goals, size, role of IT, IT sourcing model, compliance requirements, etc.)
 - addresses governance issues by grouping relevant governance components into **governance** and **management** objectives
- no silver bullet to design, implement and maintain effective IT governance within an organization
- need to tailor to own specific context and needs

Components:

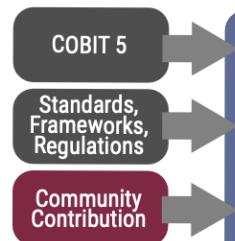


Principles:



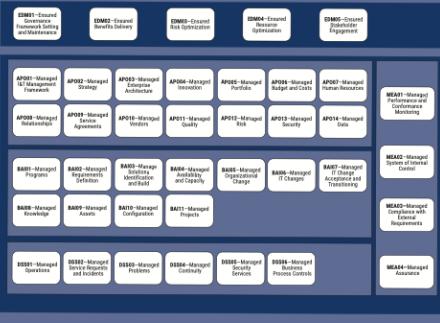
COBIT 2019 Overview

Inputs to COBIT® 2019



COBIT® 2019

COBIT Core Reference Model of Governance and Management Objectives



COBIT Core Publications

COBIT® 2019 Framework:
Introduction and Methodology

COBIT® 2019 Framework:
Governance and Management Objectives



Design Factors



Tailored Enterprise Governance System for Information and Technology

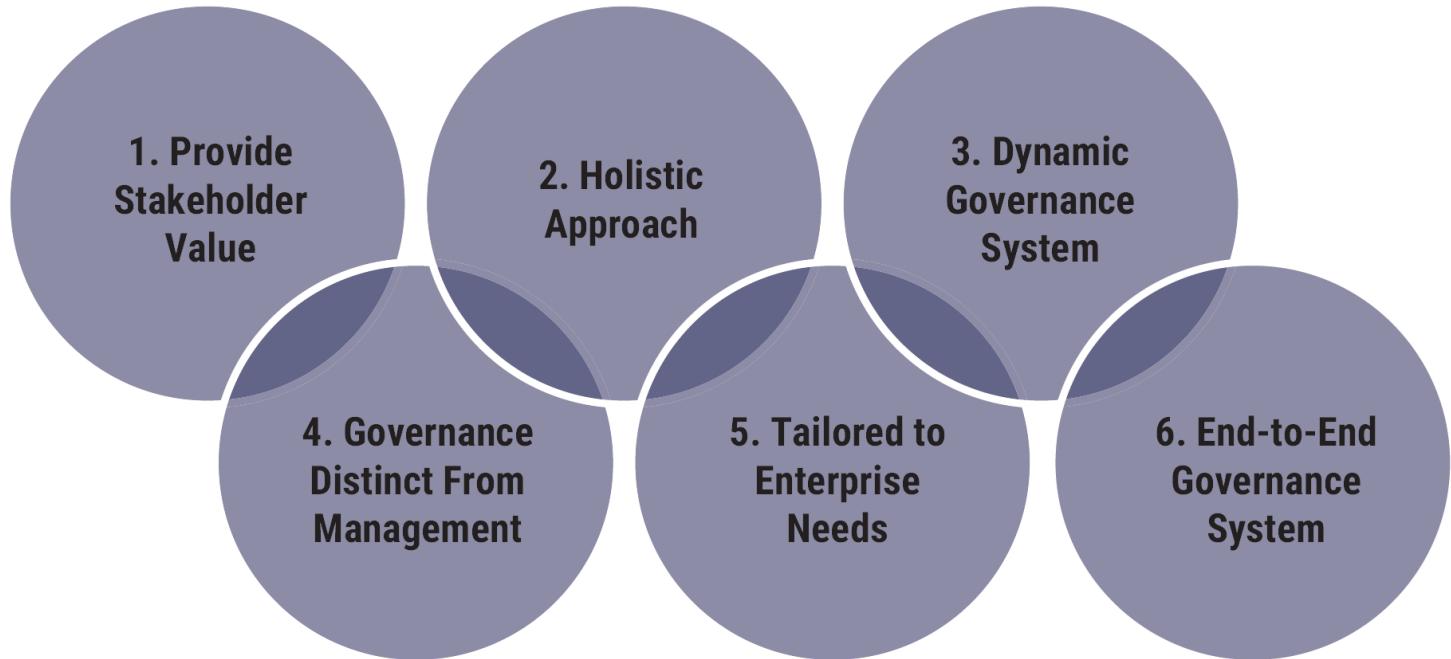
Focus Area



- Priority governance and management objectives
- Specific guidance from focus areas
- Target capability and performance management guidance

COBIT® 2019 Implementation Guide:
Implementing and Optimizing an Information and Technology Governance Solution

COBIT 2019 Principles

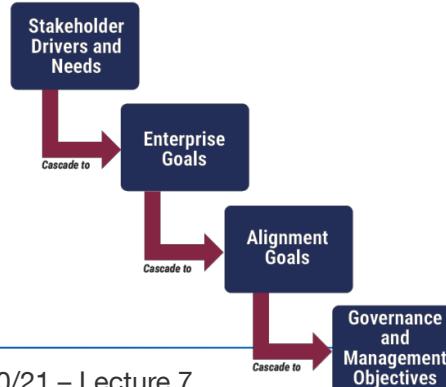


ISACA (2019)

COBIT 2019 Principle 1: Provide Stakeholder Value

- Each enterprise needs a governance system
 - to **satisfy stakeholder needs** and
 - to **generate value** from the use of I&T
- Value reflects a balance among **benefits, risk and resources**.
- Enterprises need an **actionable strategy and governance system** to realize this value.

Stakeholder	Benefit of COBIT
	Internal Stakeholders
Boards	Provides insights on how to get value from the use of I&T and explains relevant board responsibilities
Executive Management	Provides guidance on how to organize and monitor performance of I&T across the enterprise
Business Managers	Helps to understand how to obtain the I&T solutions enterprises require and how best to exploit new technology for new strategic opportunities
IT Managers	Provides guidance on how best to build and structure the IT department, manage performance of IT, run an efficient and effective IT operation, control IT costs, align IT strategy to business priorities, etc.
Assurance Providers	Helps to manage dependency on external service providers, get assurance over IT, and ensure the existence of an effective and efficient system of internal controls
Risk Management	Helps to ensure the identification and management of all IT-related risk
External Stakeholders	
Regulators	Helps to ensure the enterprise is compliant with applicable rules and regulations and has the right governance system in place to manage and sustain compliance
Business Partners	Helps to ensure that a business partner's operations are secure, reliable and compliant with applicable rules and regulations
IT Vendors	Helps to ensure that an IT vendor's operations are secure, reliable and compliant with applicable rules and regulations



ISACA (2019)

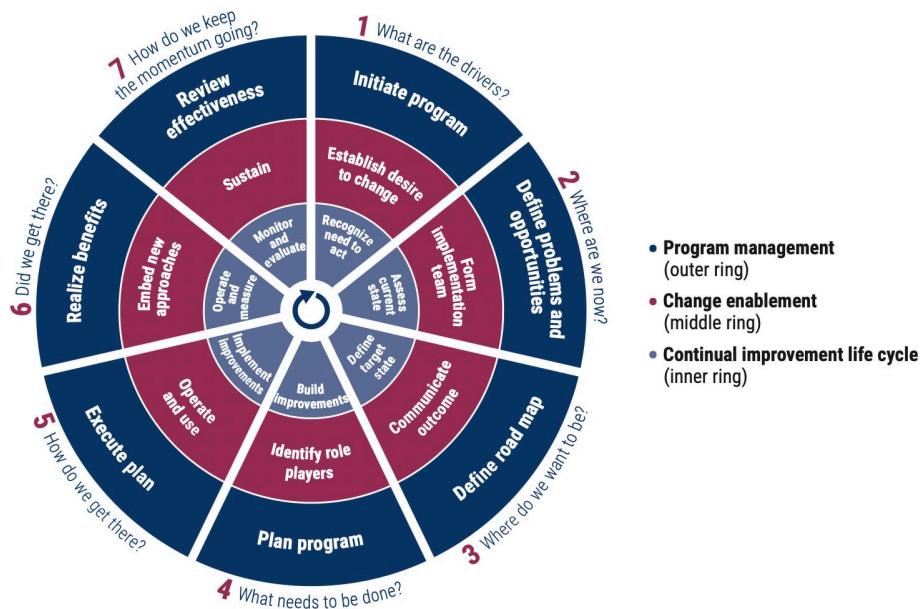
COBIT 2019 Principle 2: Holistic Approach

A governance system for enterprise I&T is built from a number of **components** that

- can be of different types and
- work together in a holistic way.



COBIT 2019 Principle 3: Dynamic Governance System



A governance system should be dynamic:

Each time one or more of the design factors are **changed** (e.g., a change in strategy or technology), the impact of these changes on the enterprise governance of information and technology (EGIT) system must be considered.

A dynamic view of the governance system will lead toward a viable and **future-proof** governance system.

ISACA (2019)

COBIT 2019 Principle 4: Governance Distinct From Management

A governance system should **clearly distinguish** between governance and management activities and structures.

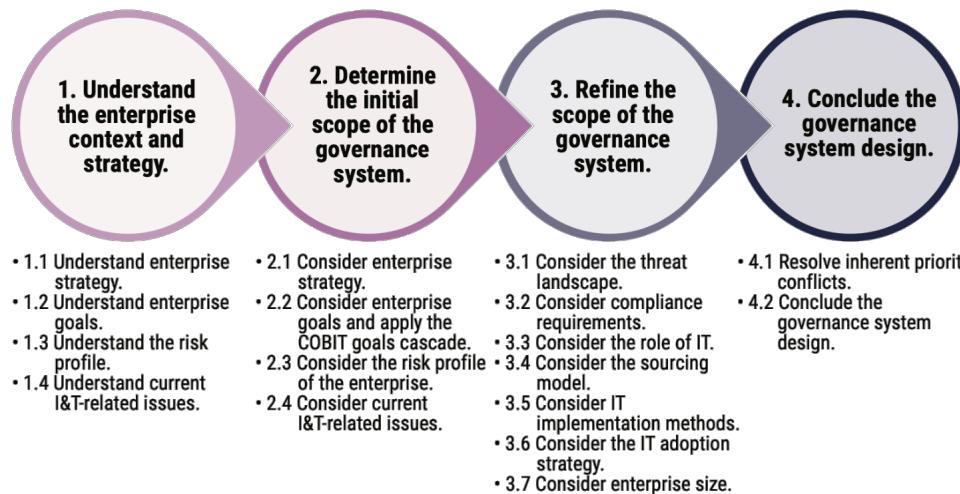
- **Governance ensures that:**
 - **Stakeholder needs**, conditions and options are evaluated to determine balanced, agreed-on enterprise **objectives**.
 - **Direction** is set through prioritization and decision making.
 - Performance and compliance are **monitored** against agreed-on direction and objectives.
 - Governance is the responsibility of the **board of directors**/ supervisory board.
 - Specific governance responsibilities **may be delegated** to special organizational structures at an appropriate level
 - **Processes:** Evaluate, Direct and Monitor (EDM)
- **Management**
 - plans, builds, runs and monitors activities,
 - **in alignment with the direction** set by the governance body,
 - to achieve the enterprise **objectives**.
 - Management is the responsibility of the **executive management**, under leadership of the CEO
 - **Processes**
 - Align, Plan and Organize (APO)
 - Build, Acquire and Implement (BAI)
 - Deliver, Service and Support (DSS)
 - Monitor, Evaluate and Assess (MEA)

ISACA (2019)



COBIT 2019 Principle 5: Tailored to Enterprise Needs

- A governance system should be **tailored to the enterprise's needs**, using a **set of design factors** as parameters to customize and prioritize the governance system components.
- **Governance System Design Workflow** for designing a governance system that is tailored to the needs of a specific enterprise.



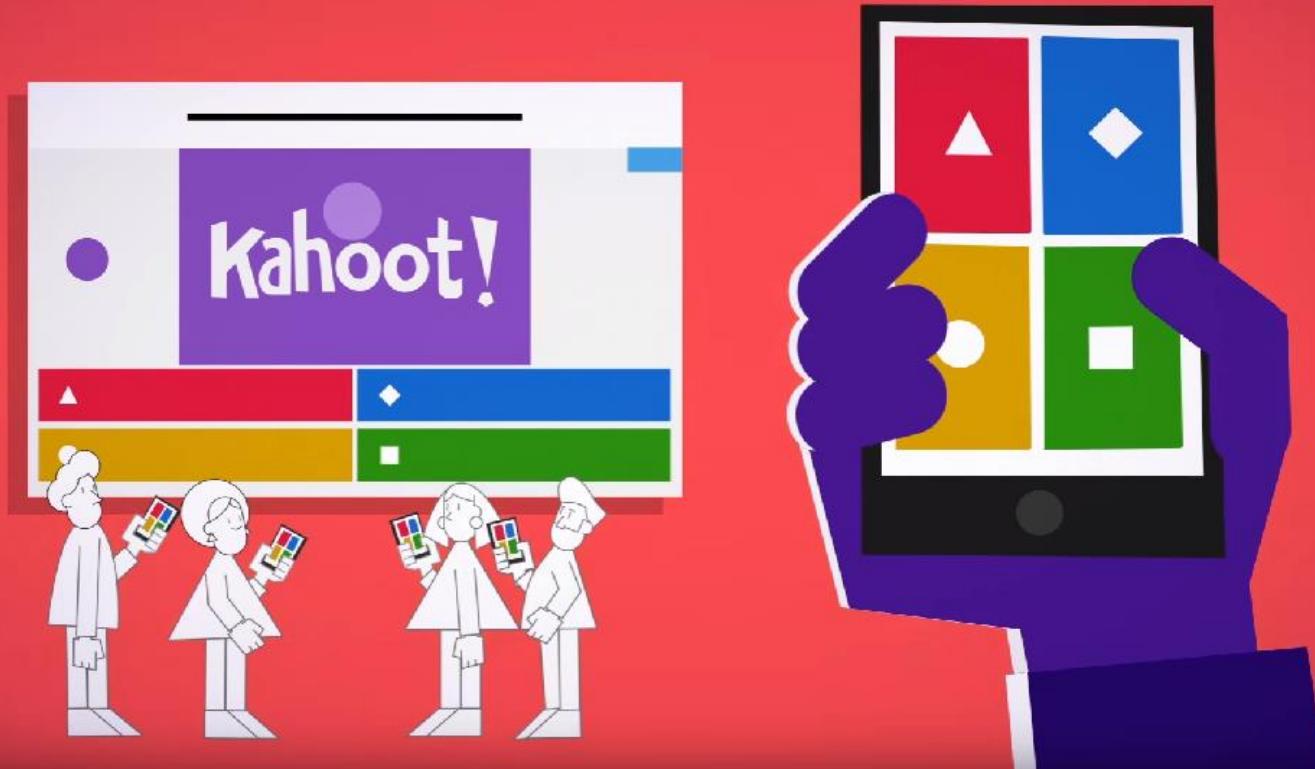
ISACA (2019)

COBIT 2019 Principle 6: End-to-End Governance System

- Governance should cover the enterprise **end-to-end**
 - focusing not only on the IT function
 - but on **all I&T processing the enterprise puts in place to achieve its goals**, regardless where the processing is in the enterprise.
- COBIT emphasizes an enterprise-wide view of governance of I&T
 - I&T are pervasive in enterprises
 - **neither possible nor good practice to separate** business and IT-related activities.
 - The governance and management of enterprise I&T should be
 - implemented as an **integral part of enterprise governance**,
 - covering the full **end-to-end business and IT functional areas** of responsibility.

Quiz Time!

Go to kahoot.it



Core Literature: Krcmar, Informationsmanagement (2015)

1. Einleitung (pp.1-8)
2. Begriffe und Definitionen (pp.11-26)
3. Modellierung (pp. 31-78)
4. Aufgabe des Informationsmanagements: Informationsmanagement (pp. 85-109)
5. Aufgabe des Informationsmanagements: Management der Informationswirtschaft (pp. 113-165)
6. Aufgabe des Informationsmanagements: Management der Informationssysteme (pp. 173-302)
7. Aufgabe des Informationsmanagements: Management der Informations- und Kommunikationstechnik (pp. 315-385)
8. Führungsaufgaben des Informationsmanagements
 - 8.2 IT-Governance (pp. 444-471)
 - 8.3.2 Ziele und Aufgaben des IT Controllings (pp.497-515)
9. Referenzmodelle des Informationsmanagements (pp. 601-630)
10. Einsatzfelder und Herausforderungen des Informationsmanagements (pp. 633-753)
11. Fallstudie „Rockhaus AG“ (pp. 767-783)

Literature

Additional Reading

- **Gadatsch, A., & Mayer, E. (2014).** Masterkurs IT-Controlling (5 ed.). Wiesbaden: Springer Fachmedien.
- **ISACA (2019).** COBIT 2019 Framework.
- **Weill, P., & Ross, J. W. (2004).** IT Governance: How Top Performers Manage IT Decision Rights for Superior Results. Boston, USA: Harvard Business Press

References

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Information Management and Knowledge Management (IMKM)

Lecture 8 *IT Sourcing and IT Offshoring*

Technische Universität München

Chair for Information Systems

© Prof. Dr. H. Krcmar

Lecture Schedule

Information Systems Strategy

Business Value of IT

Business IT Alignment

IT-enabled Strategies

Guest Lecture: Digital Leadership and the CIO Role

Digital Platforms

Information Management

IT Controlling and IT Governance

IT Sourcing and IT Offshoring

IT Security, Privacy and Risk Management

Guest Lecture: Natural Language Processing for IM

Knowledge Management

Basics

Tools

Guest Lecture:
Applications

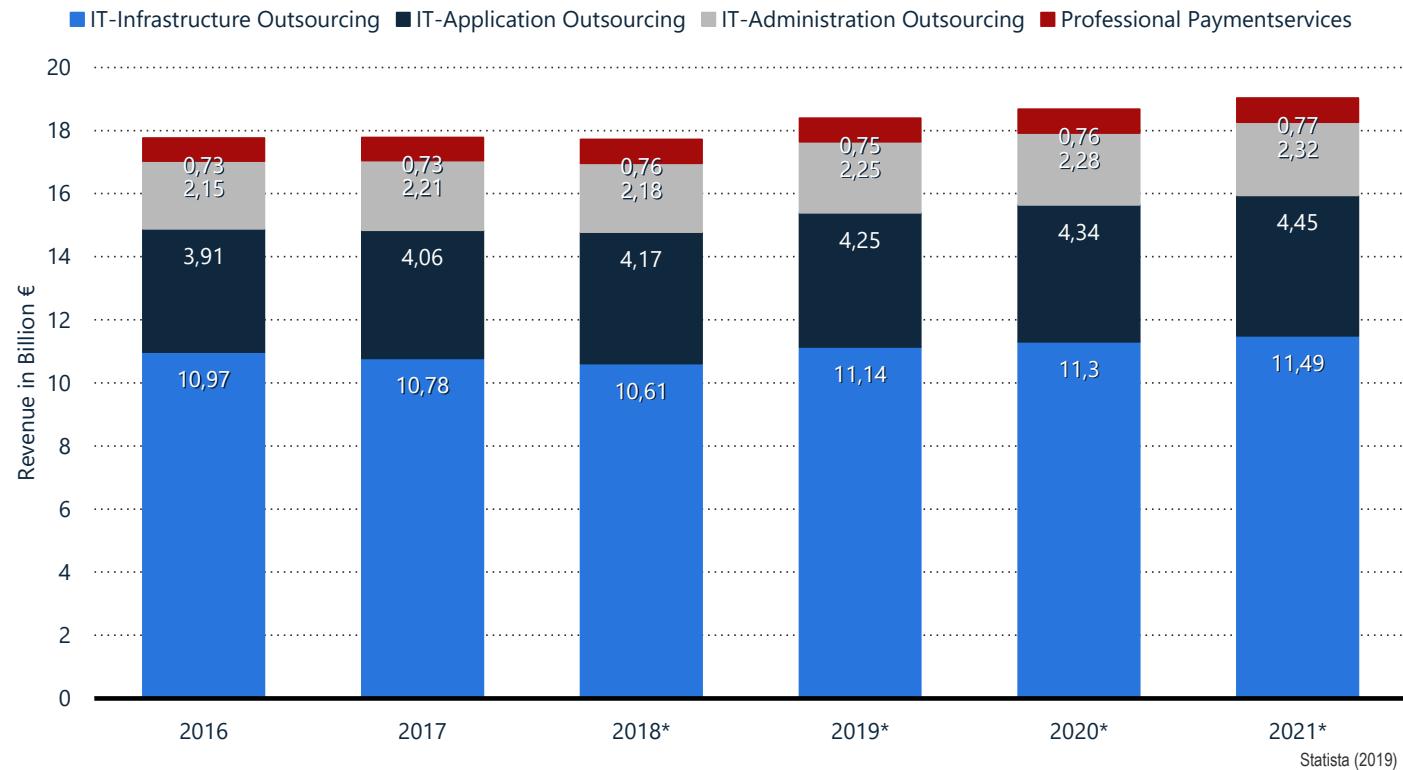


IMKM Lecture 8: IT Sourcing and IT Offshoring

Outline

1. Sourcing
 1. Overview & Definition
 2. Reasons & Risks
 3. Configurations
 4. Processes
 2. Special forms of Sourcing
 1. Cloud Computing
 2. Off-shoring Overview & Drivers
 3. Risks: Client Extra Costs
- ## Learning Objectives
- You can discuss reasons and risks of outsourcing from a client and vendor perspective.
 - You can differentiate outsourcing agreements building on outsourcing configurations.
 - You understand steps for outsourcing from a client and vendor perspective.
 - You can discuss cloud computing and its relation to outsourcing and understand different types of it.
 - You can discuss IT offshoring and its relation to outsourcing and understand drivers and risks for it.
 - You can understand and can interpret possible client extra costs in offshoring.

Revenue from IT outsourcing in Germany by segment until 2021



Why is there a market for Outsourcing?

***The reason that we want someone else to do the work for us is
that they are experts***

(vgl. He 2003)

Outsourcing – a working Definition

- Outsourcing is a composition of the words **outside**, **resource** and **using**.
- That means that execution of certain in-house tasks are completely transferred
 - to one or several external companies
 - for a certain period of time
 - based on the contractual service agreements (Krcmar 2015: 428)
- In the context of IT, it means that single IT-tasks or the whole IT-tasks are given to another company.
- It is a question of **make** or **buy**
 - Whether to do everything internally or hire the services of specialists?

Reasons for Outsourcing – Client Perspective

Cost

- improved cost transparency,
e.g., pay per use
- cost reduction

Personnel

- Avoid the lack of qualified IT-employees
- reduction of dependency on single employees

Risks

- transfer risks to the outsourcing vendor
- shift of risks from complexity in application and technology dynamics

Concentration

- IT focus on business value
- IT focus on strategic information systems

Finances

- from fixed to variable cost
→ increased liquidity
- avoid high investments

Knowledge

- access to specialised knowledge & novel technology
- more discipline in knowledge conservation (documentation)

Reasons for Outsourcing – Vendor Perspective

Size of the operations brings **economies of scale** by enabling them to maintain **expertise** in technologies beyond that even significant sized companies can justify.

- Higher quality services can be provided at a lower cost.

Risks of Outsourcing – Client Perspective

Cost

- Switching cost
- Increased coordination and communication cost
- Expected cost reduction does not occur
- Lack of transparency and impossible control of vendor's prices

Personnel

- Loss of key employees & knowledge
- Loss of motivation for the remaining IT-employees
- Personnel related legal issues

Knowledge

- know-how transfer and the competitive advantage to competitors involved
- increasing outsourcing activities inevitably result in loss of IT-competence and know-how

Technology

- fixed commitment to the outsourcing-vendor's technology
- danger of too much standardization

Privacy

- maintaining privacy of confidential data dependent on vendor

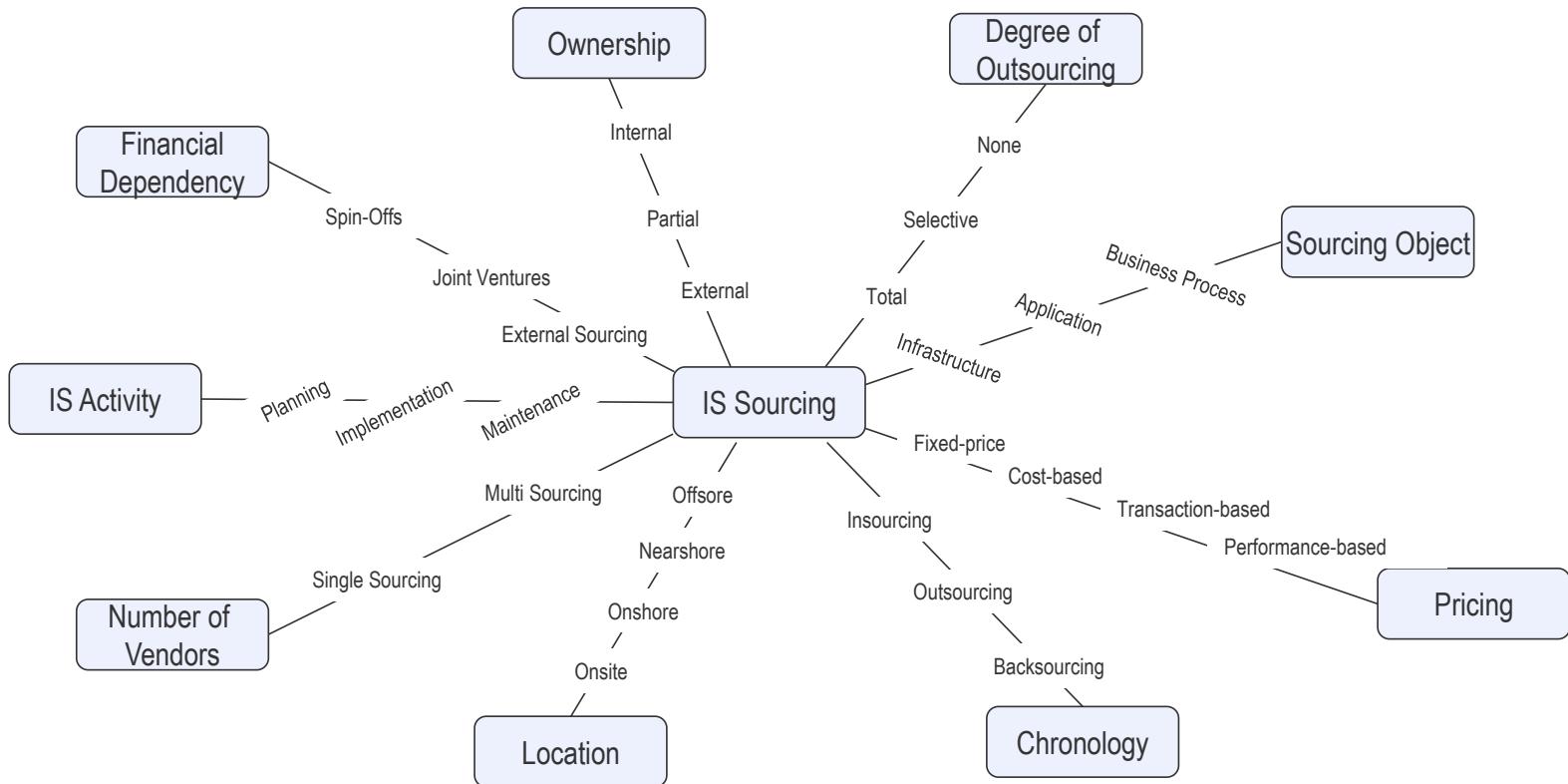
Return to the own IT

- might not be possible because of long-term commitment to outsourcing contracts
- rebuilding of know-how
- cost for rebuilding own IT-department
- nearly impossible to return to an own IT-department after some years

Outsourcing Configurations

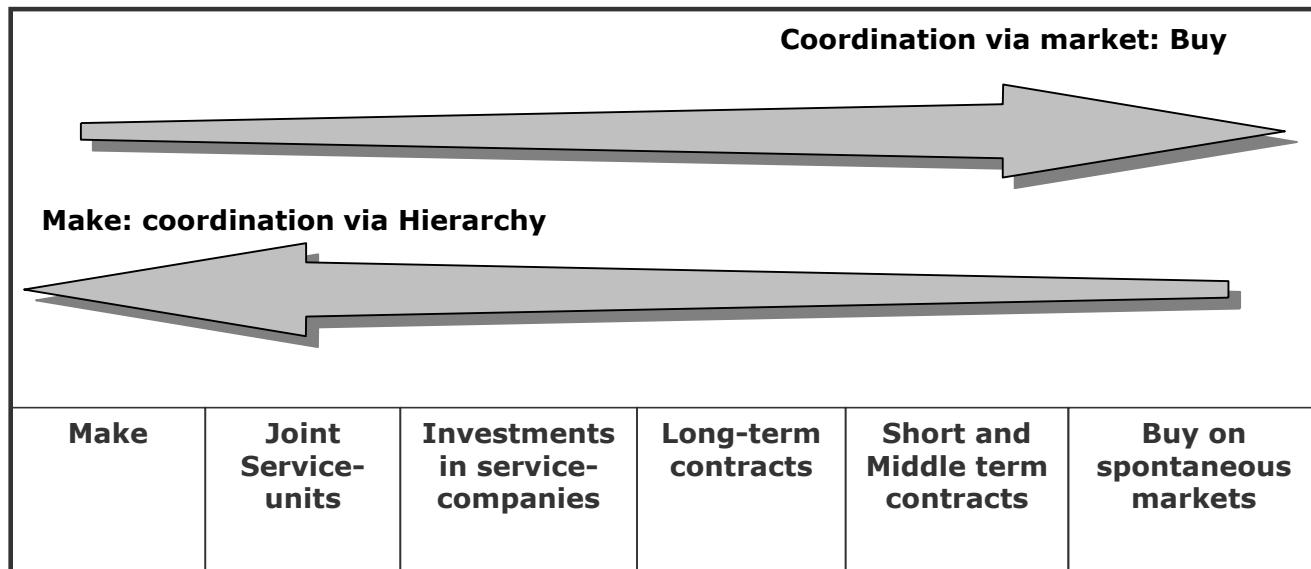
What are core decisions a company needs to take when outsourcing their IT Services?

Outsourcing Configuration



Leimeister (2009); von Jouanne-Diedrich (2007)

Financial Dependency Institutional Continuum



Adapted from Picot & Maier (1992)

Degree of Outsourcing, Ownership, and Financial Dependency

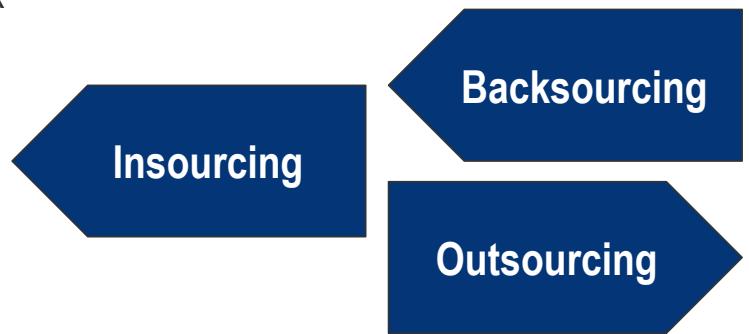
Types of Sourcing Arrangements

Degree of outsourcing	Ownership		
	<i>Internal</i>	<i>Partial</i>	<i>External</i>
Total	Spin-offs (fully owned subsidiary)	Joint-Venture	Traditional Outsourcing
Selective			Selective Sourcing
None	Insourcing / Backsourcing	Facilities Sharing among multiple clients	N/A

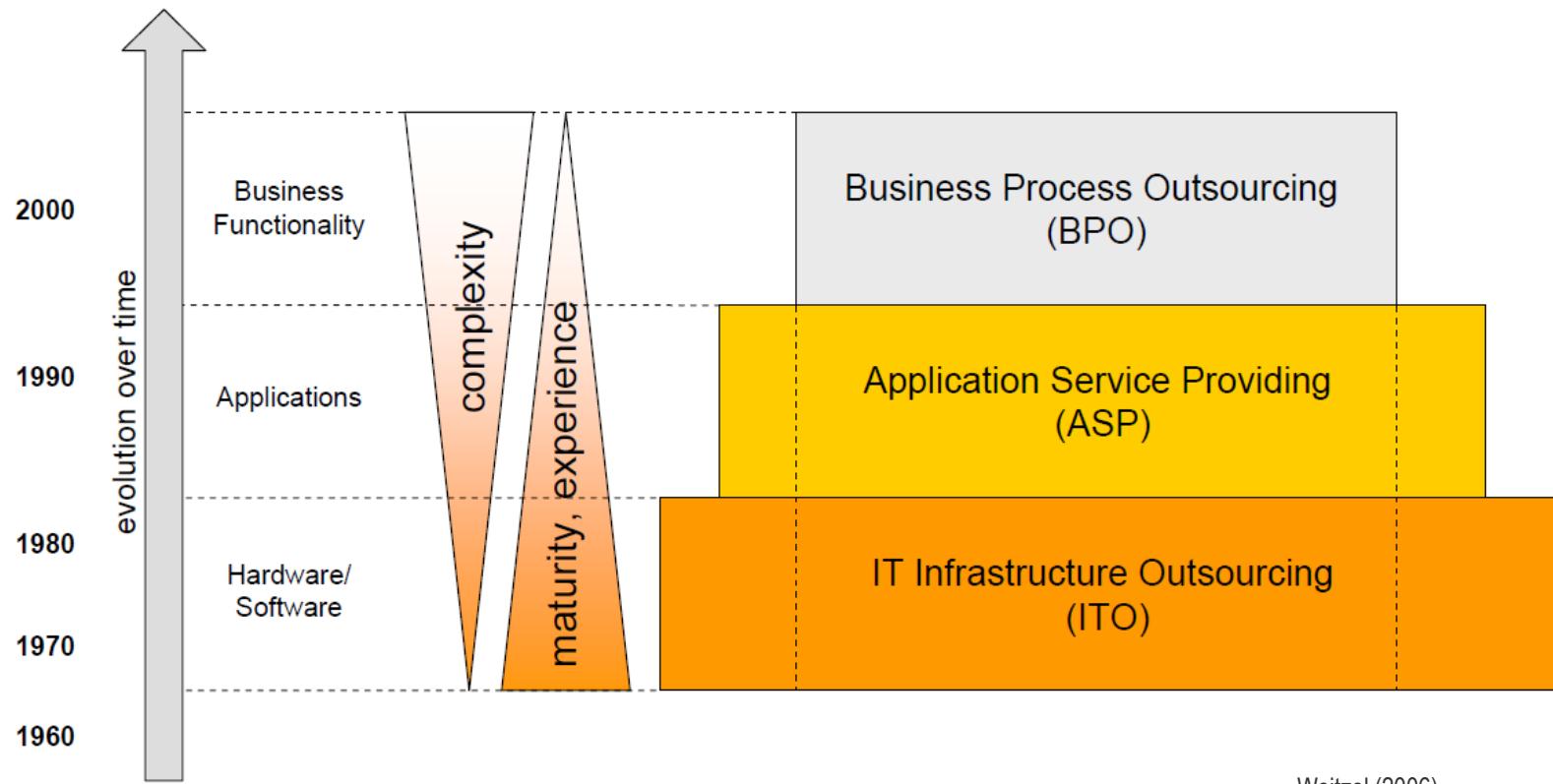
Dibbern et al. (2004)

Chronology

- **Backsourcing**
 - Bring previously outsourced jobs back to be performed internally
- **Insourcing**
 - Assign a project/ found a fully owned subsidiary within a company rather hiring a third party
- **Outsourcing**
 - Individual internal tasks are handed over to one or more other companies for a defined period of time on the basis of a contractual agreement



Sourcing Object Outsourcing Types



Sourcing Object

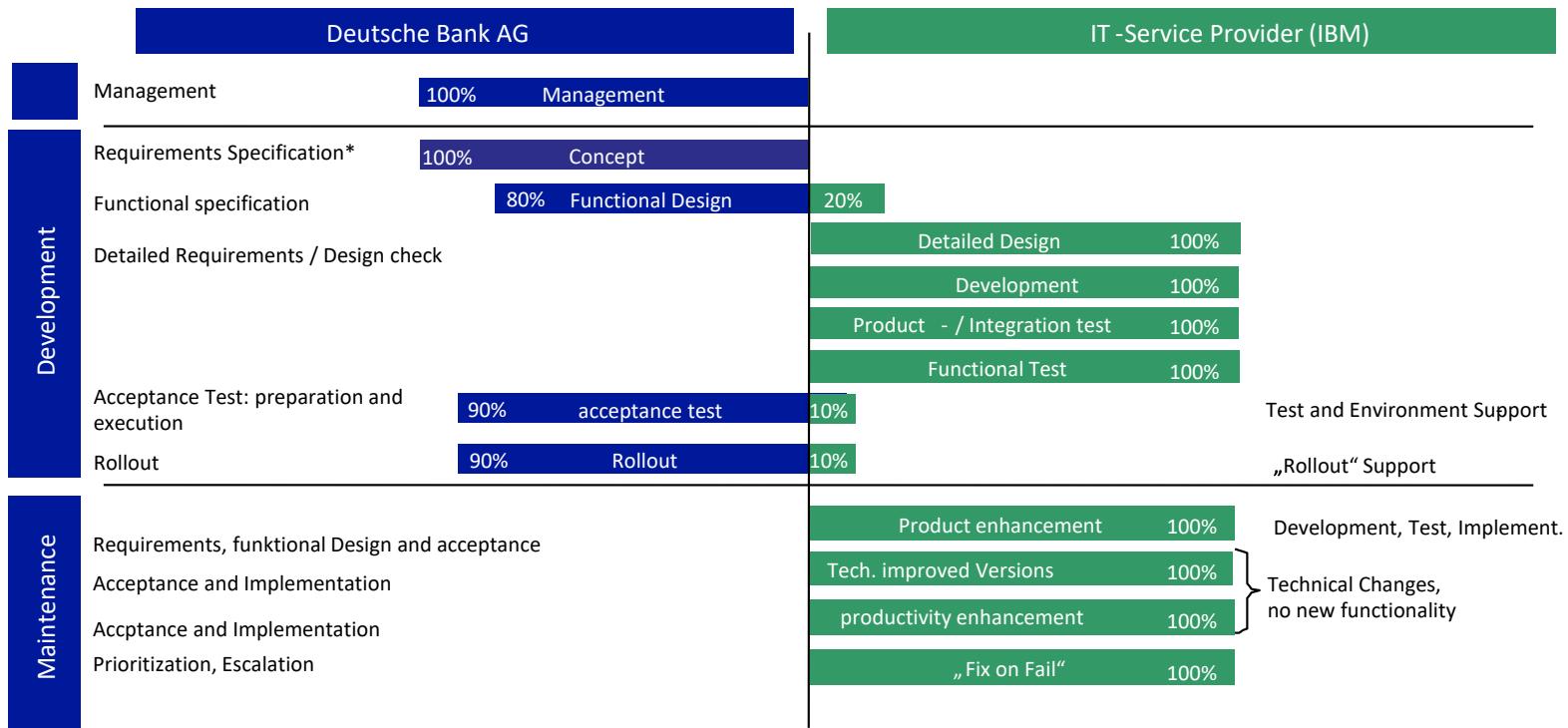
Core Competencies to retain in your Company

- Development of **strategy** and **architecture**
- Establishment of **standards** for your own organization
- Capability to **evaluate outsourcing options**
- **Repository** of all installed applications and hardware
- **Career development** of your own employees
- **Consultancy** of your own organization on cost/benefit, strengths and weaknesses, risks and potential of IT (in the sense of: internal marketing and training)
- **Evaluating the architecture fit** of new hardware/software
- Identifying and **development of the relationship** to the most important suppliers incl. the capability to enforce your own standards.
- **Monitoring** your old systems incl. planning for retirement and replacement

Applegate et al. (554-555)

Sourcing Object

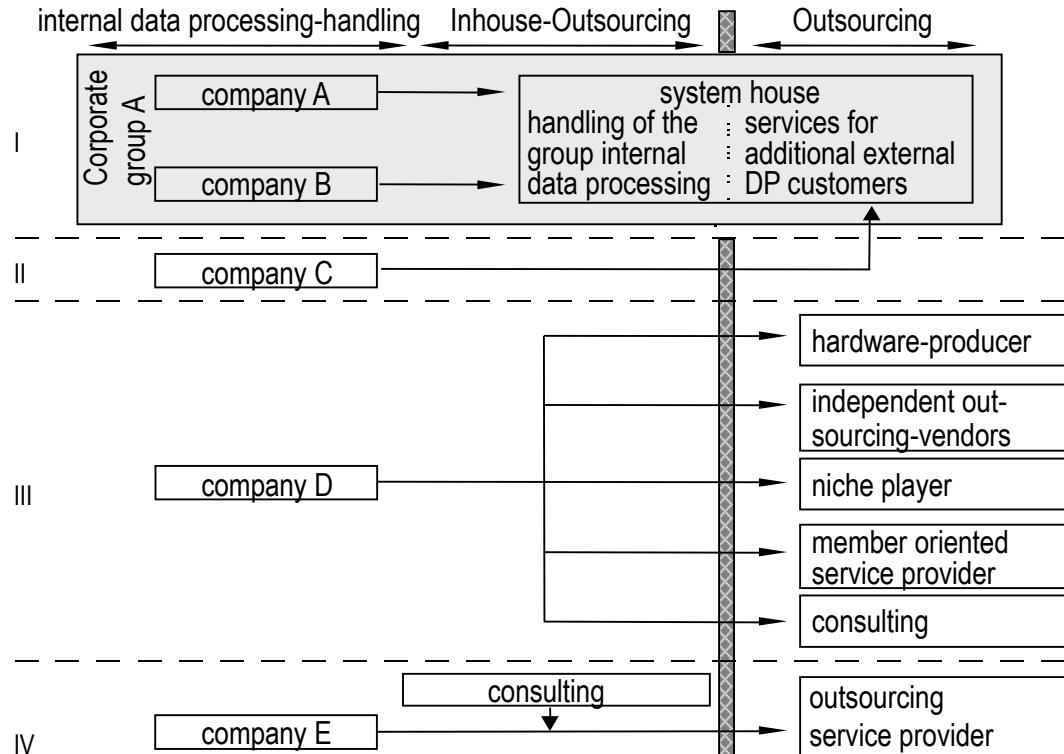
Example: Deutsche Bank & IBM



Menke-Südbeck (2003)

Vendor Configuration

Possible Customer-Vendor-Relationship in Outsourcing



Bongard (1994), p. 97

Pricing Models

Fixed-price

Service is priced with a flat charge (lump sum)

Example

2.000.000 € per year for running a call center

Pro

- Easy to budget and control costs

Contra

- Only feasible if costs are easy to forecast
- Higher costs (service provider needs to account for cost and demand variance)
- Risk for conflicts (ambiguity of what is included in the contract and what not)
- Additional services are charged separately

Cullen et al. (2005)



Pricing Models

Cost-based / Time and Material Pricing

Service Provider bills costs (time + material) + profit margin

Example

Service costs + 5 % profit margin

Service costs + 1.000.000 € profit

Pro

- Beneficial if demand varies
- Beneficial if costs for service delivery are difficult to forecast

Contra

- High costs for controlling to ensure that service provider works cost-efficient
- Important to know the costs of the service provider (information asymmetry)

Cullen et al. (2005)

Pricing Models

Transaction-based / Unit-based Pricing

Service fee per transaction or unit

Example

5 € per call to the Call Center

Pro

- Flexibility regarding demand variance
- Possibility for volume discounts
- Cost transparency and accountability (by user / department / SBU)

Contra

- Need for demand forecast and management to manage costs
- Potentially infinite resource availability (high availability costs)

Cullen et al. (2005)

Pricing Models

Performance-based Pricing

Pricing is based on a pre agreed business outcome.

Normally a fixed + a variable component

Example

5.000.000 € + 30 % of cost savings compared to status quo

Pro

- Encourages collaboration and creative problem-solving
- Affords vendor greater freedom to determine how best to achieve the results

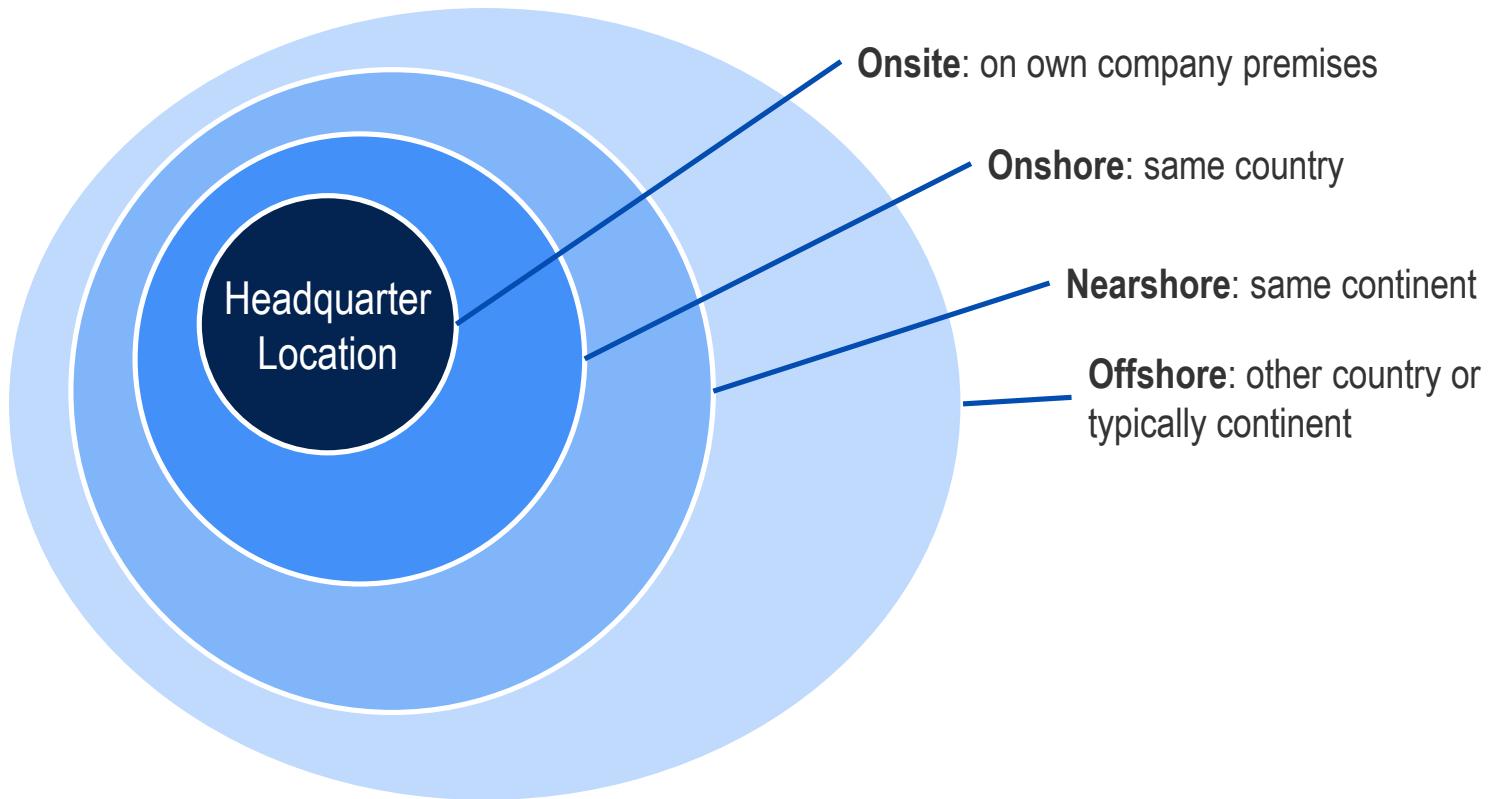
Contra

- Hard to determine performance (influence of external factors)
- Hard to find service vendors for high objectives / efficient IT services
- Potentially high downside risk of over-ambitious solutions → need for risk-sharing

Cullen et al. (2005)

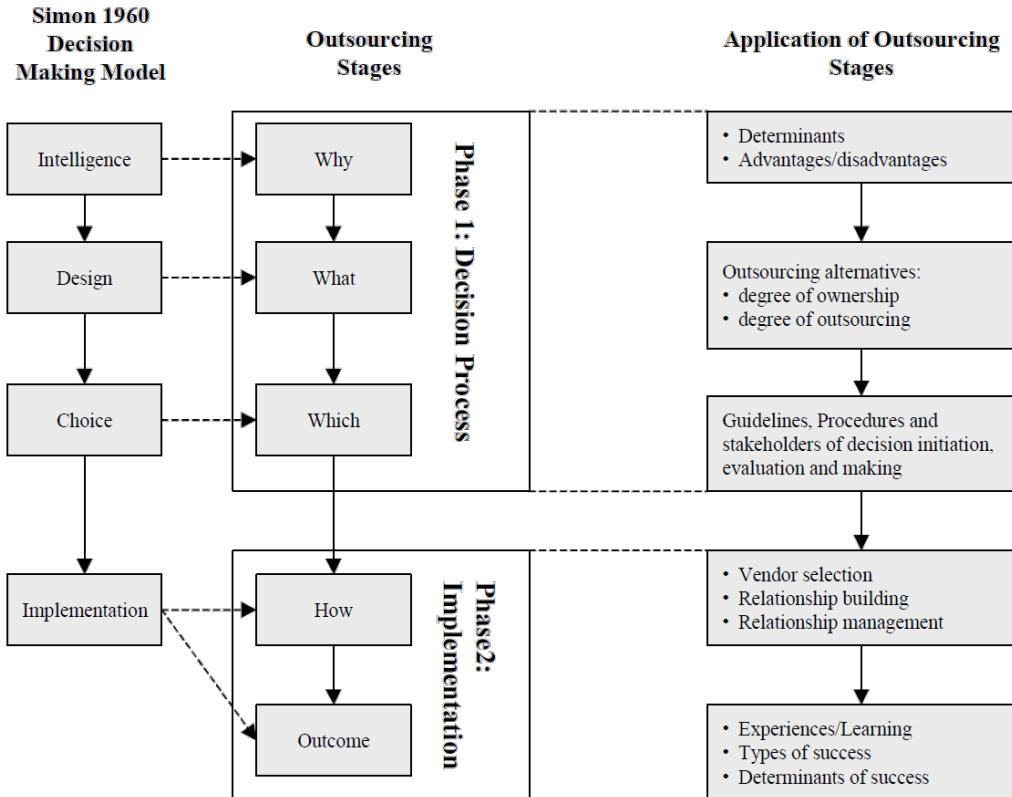


Outsourcing Location



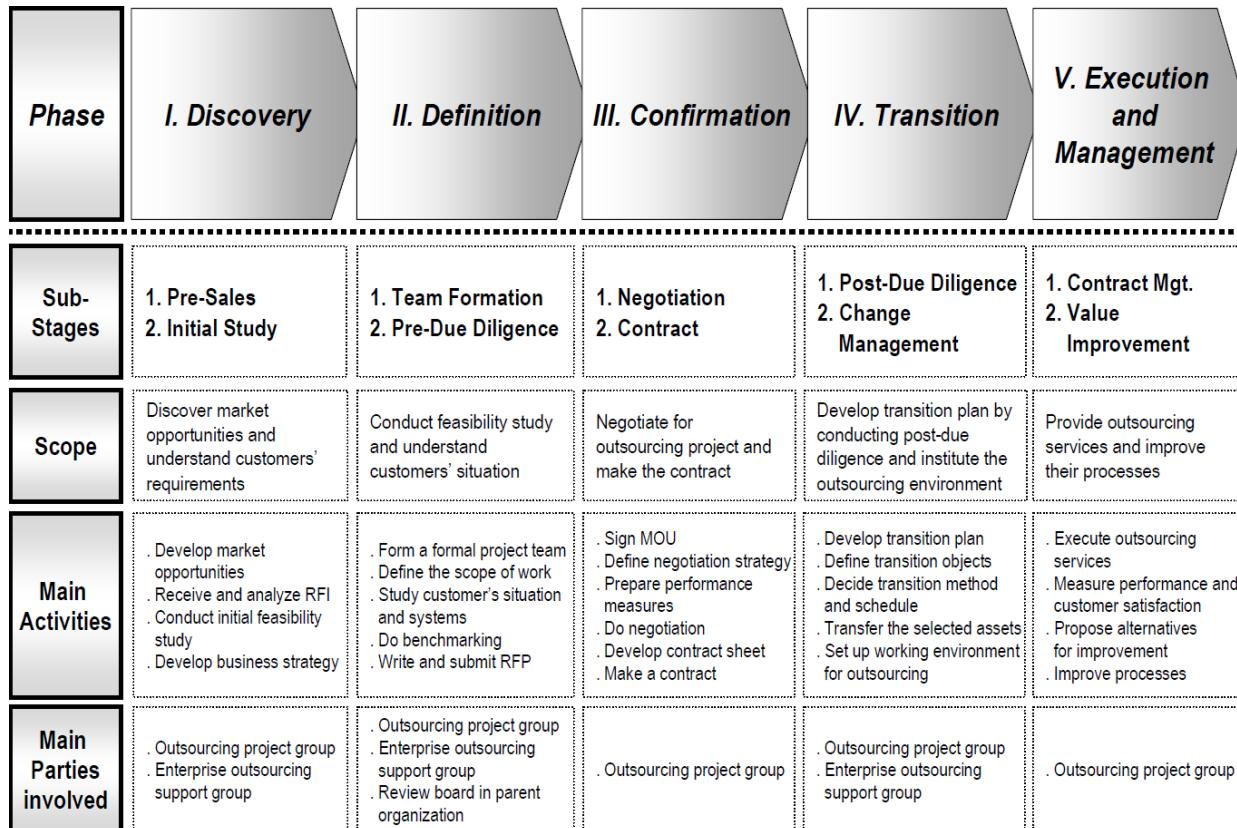
Krcmar (2015), p. 435

Stage Model of IS Outsourcing – Client Perspective



Dibbern et al. (2004)

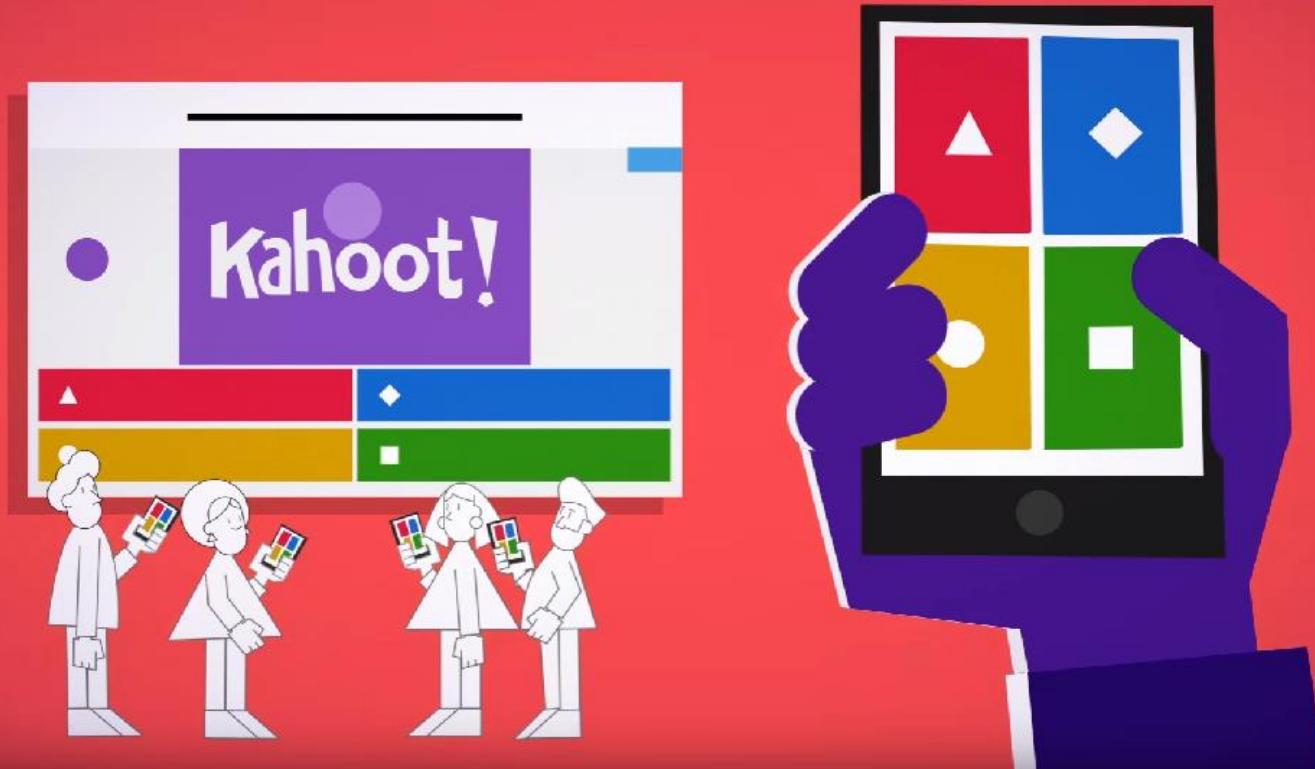
Vendor's Outsourcing Process Model



Lee (2008)

Quiz Time!

Go to kahoot.it



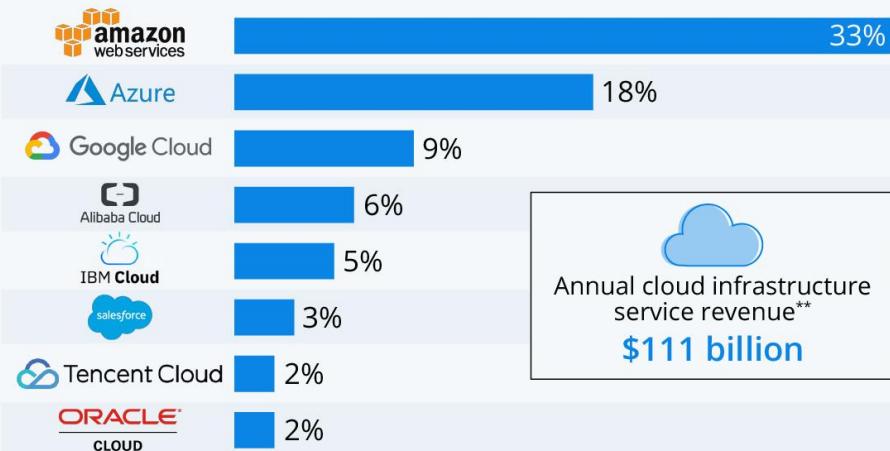
IMKM Lecture 8: IT Sourcing and IT Offshoring

Outline

1. Sourcing
 1. Overview & Definition
 2. Reasons & Risks
 3. Configurations
 4. Processes
 2. Special forms of Sourcing
 1. Cloud Computing
 2. Off-shoring Overview & Drivers
 3. Risks: Client Extra Costs
- ## Learning Objectives
- You can discuss reasons and risks of outsourcing from a client and vendor perspective.
 - You can differentiate outsourcing agreements building on outsourcing configurations.
 - You understand steps for outsourcing from a client and vendor perspective.
 - You can discuss cloud computing and its relation to outsourcing and understand different types of it.
 - You can discuss IT offshoring and its relation to outsourcing and understand drivers and risks for it.
 - You can understand and can interpret possible client extra costs in offshoring.

Amazon Leads \$100 Billion Cloud Market

Worldwide market share of leading cloud infrastructure service providers in Q2 2020*



* includes platform as a service (PaaS) and infrastructure as a service (IaaS)
as well as hosted private cloud services

** 12 months ended June 30, 2020

Source: Synergy Research Group



statista

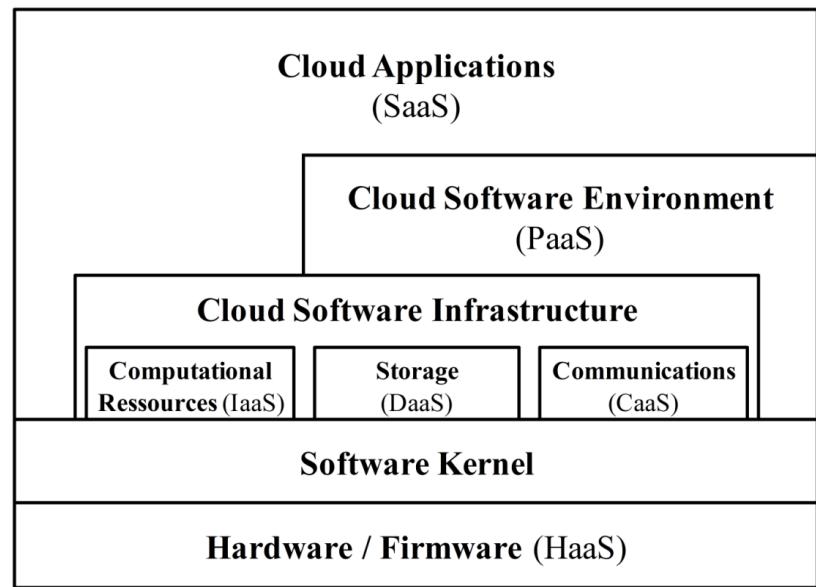
Statista (2020)

Cloud Computing

Cloud Computing is an **IT deployment model**,

- based on virtualization,
- where resources in the form of infrastructure, applications and data are deployed via the internet as a **distributed service**
- through **one or several service providers**.
- These services are **scalable on demand** and
- can be priced on a **pay-per-use basis**.

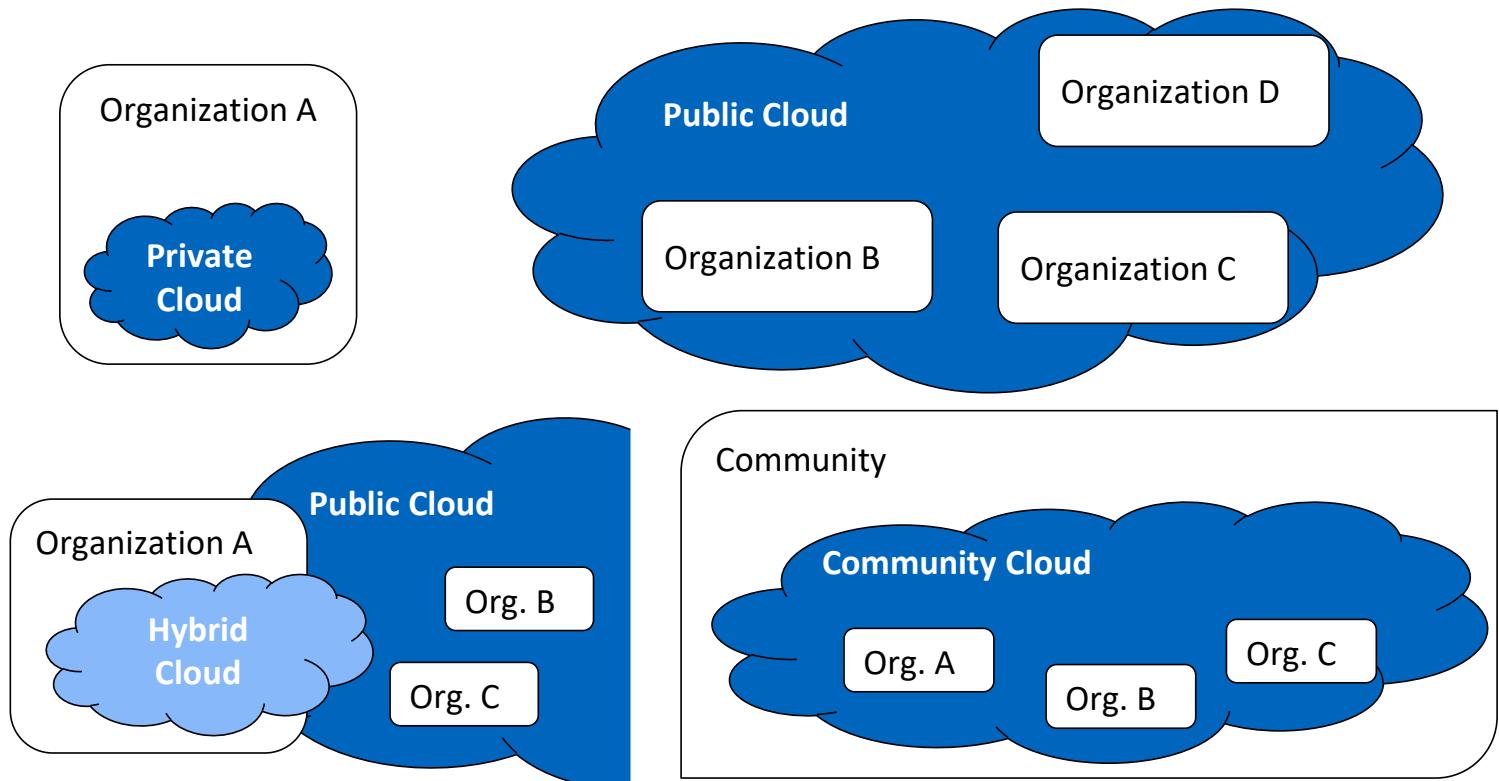
Böhm et al. (2011)



Youseff et al. (2008)

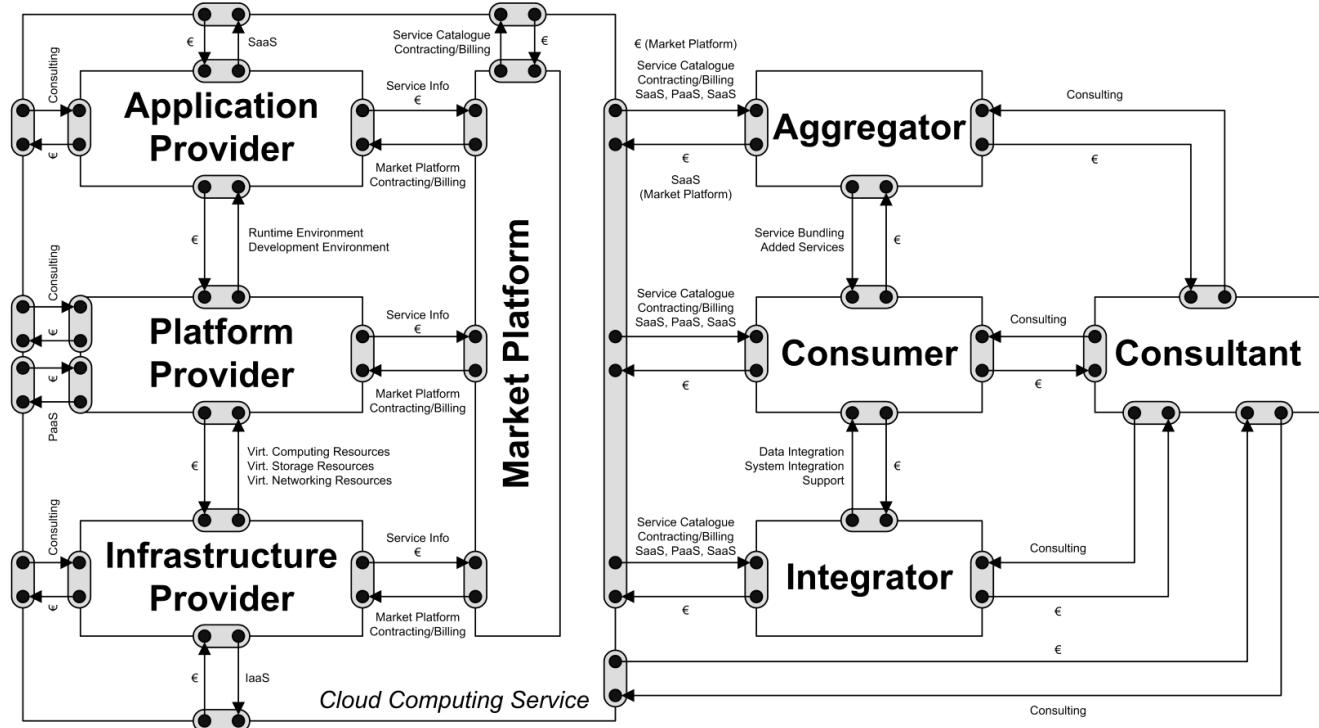


Types of Cloud Computing



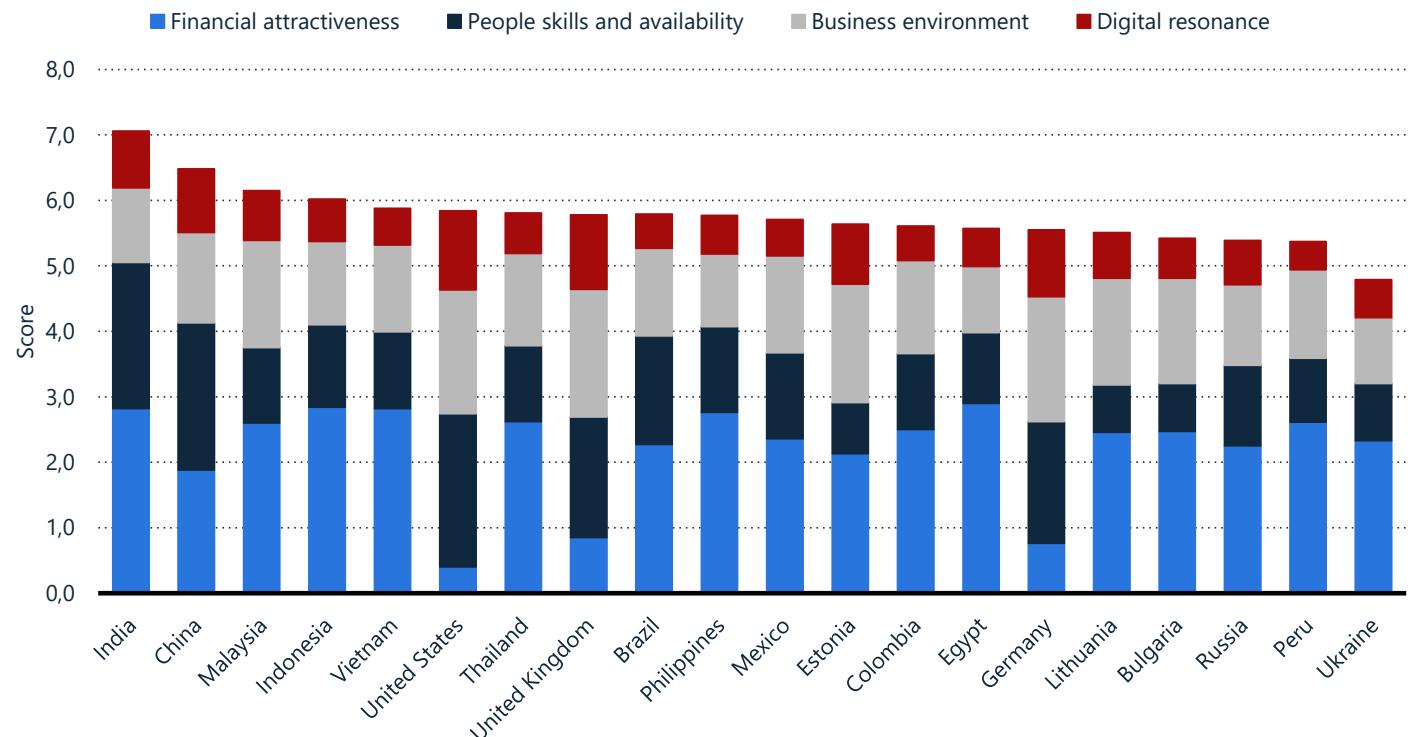
Armbrust et. Al (2009); Briscoe & Marinos (2009)

Cloud Computing can lead to Complex Outsourcing Relationships



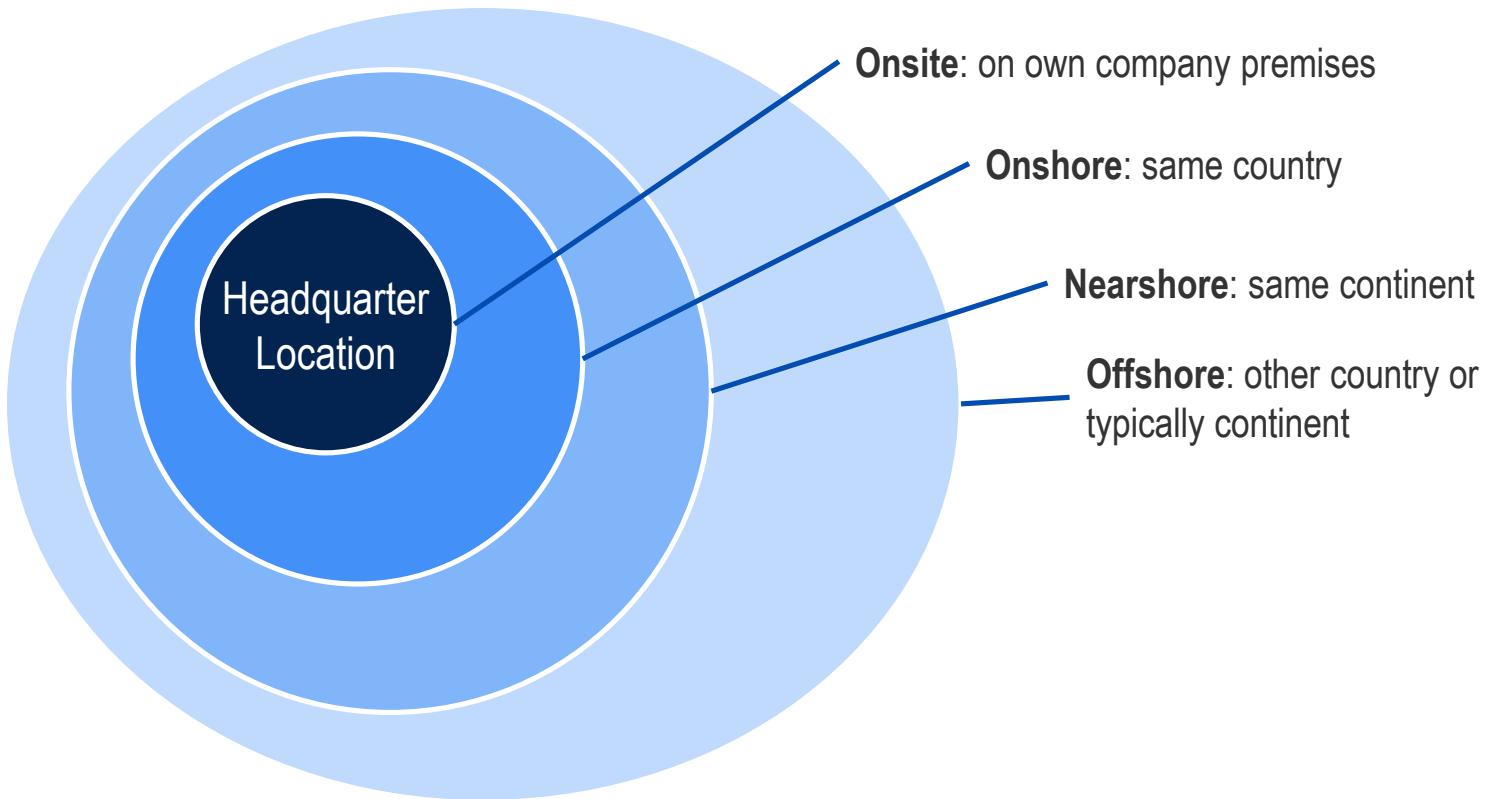
Böhm et al. (2010)

Location attractiveness for Offshoring



A. T. Kearney (2019)

Reminder: Outsourcing Location

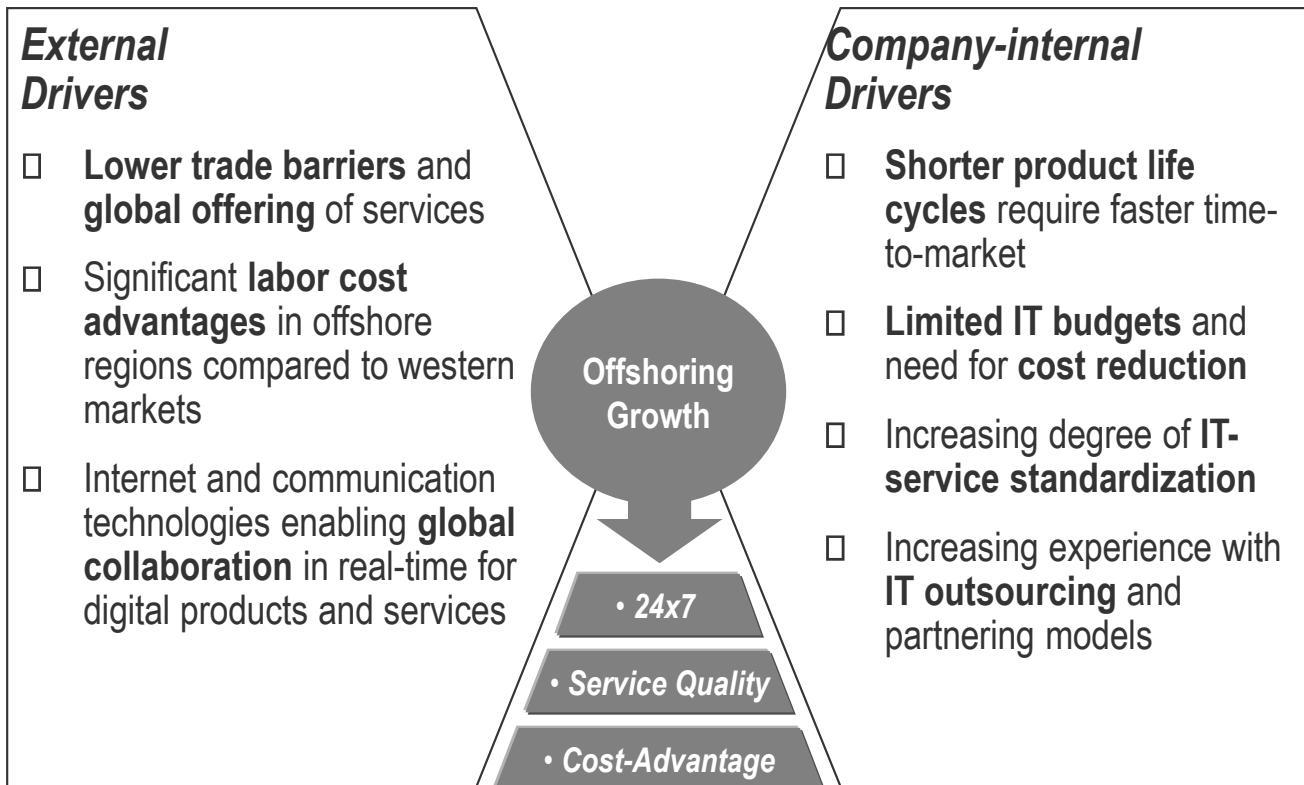


Krcmar (2015), p. 435

Offshoring as Special Form of Outsourcing

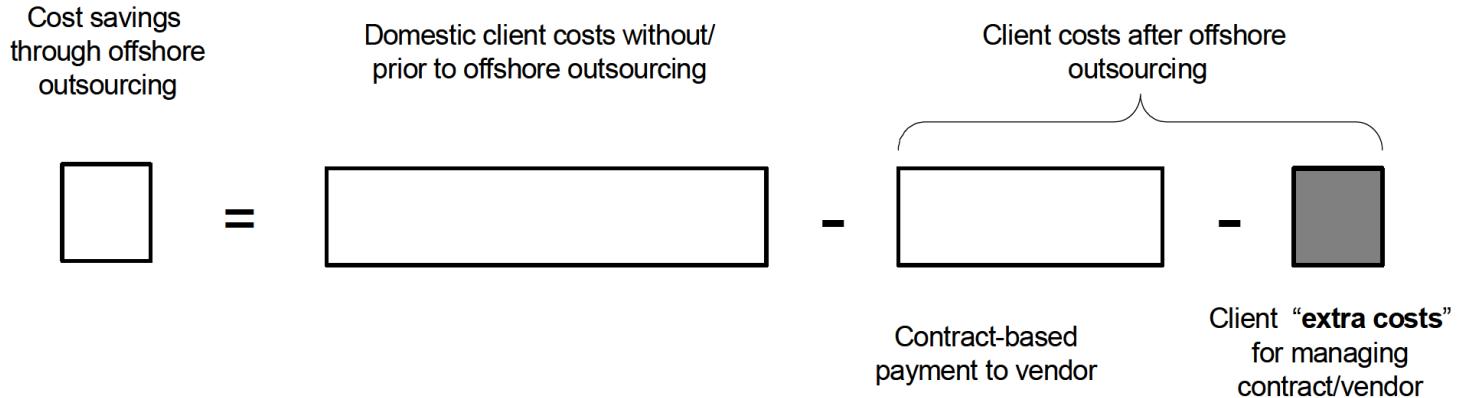
	Offshoring	Outsourcing
Definition	Offshoring means getting work done in a different country or typically continent .	Outsourcing refers to contracting work out to an external organization.
Risks and criticism	Offshoring is often criticized for transferring jobs to other countries. Other risks include geopolitical risk, language differences and poor communication etc.	Risks of outsourcing include misaligned interests of clients and vendors, increased reliance on third parties, lack of in-house knowledge of critical (though not necessarily core) business operations etc.
Benefits	Benefits of offshoring are usually lower costs , better availability of skilled people , and getting work done faster through a global talent pool.	Usually companies outsource to take advantage of specialized skills , cost efficiencies and labor flexibility .

Drivers for Offshoring



A.T. Kearney

Risks of Offshoring: Client Extra Costs



		Degree of Client-Specific Knowledge		
		High	Medium	Low
Level of Absorptive Capacity of Vendor	High	Medium level of extra costs	Low to medium level of extra costs	Low level of extra costs
	Medium	Medium to high level of extra costs	Medium level of extra costs	Low-medium level of extra costs
	Low	High level of extra costs	Medium to high level of extra costs	Medium level of extra costs

Dibbern et al. (2008)

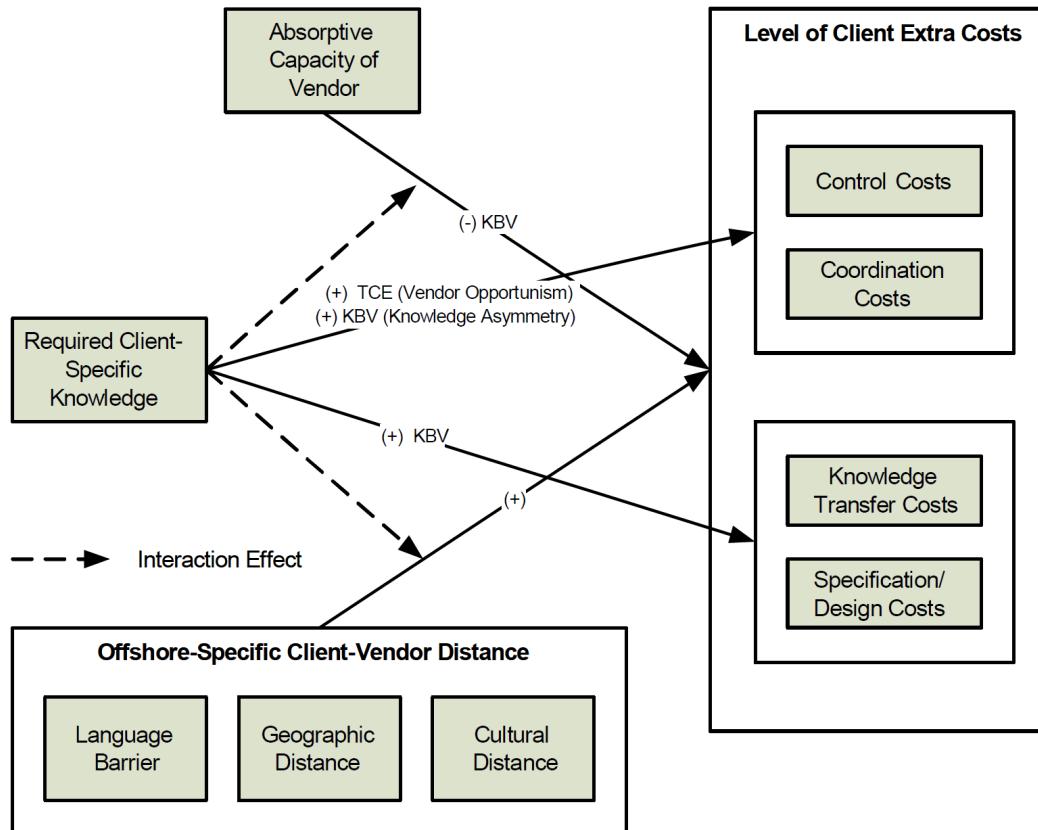
Risks of Offshoring: Client Extra Costs (2)

Table 1. Definition of Extra Cost Categories

Cost Category	Definition	Source
Specification costs	Client costs associated with the process of explaining and defining what services are required from the system and identifying the constraints on systems operation and development.	Based on Sommerville (2004, p. 75)
Design costs	Client costs associated with the “description of the structure of the software to be implemented, the data which is part of the system, the interfaces between the system components, and, sometimes, algorithms used.”	Sommerville (2004, p. 76)
Knowledge transfer costs	Costs associated with the communication of knowledge from the client organization so that it is learned and applied by the offshore vendor.	Based on Ko et al. (2005, p. 62)
Coordination costs	Costs for integrating and linking together client and vendor resources to accomplish a collective set of tasks.	Based on Van de Ven et al. (1976, p. 322)
Control costs	Costs for ensuring that the vendor acts and performs in a manner that is consistent with achieving the desired objectives of the client.	Based on Choudhury and Sabherwal (2003, p. 292)

Dibbern et al. (2008)

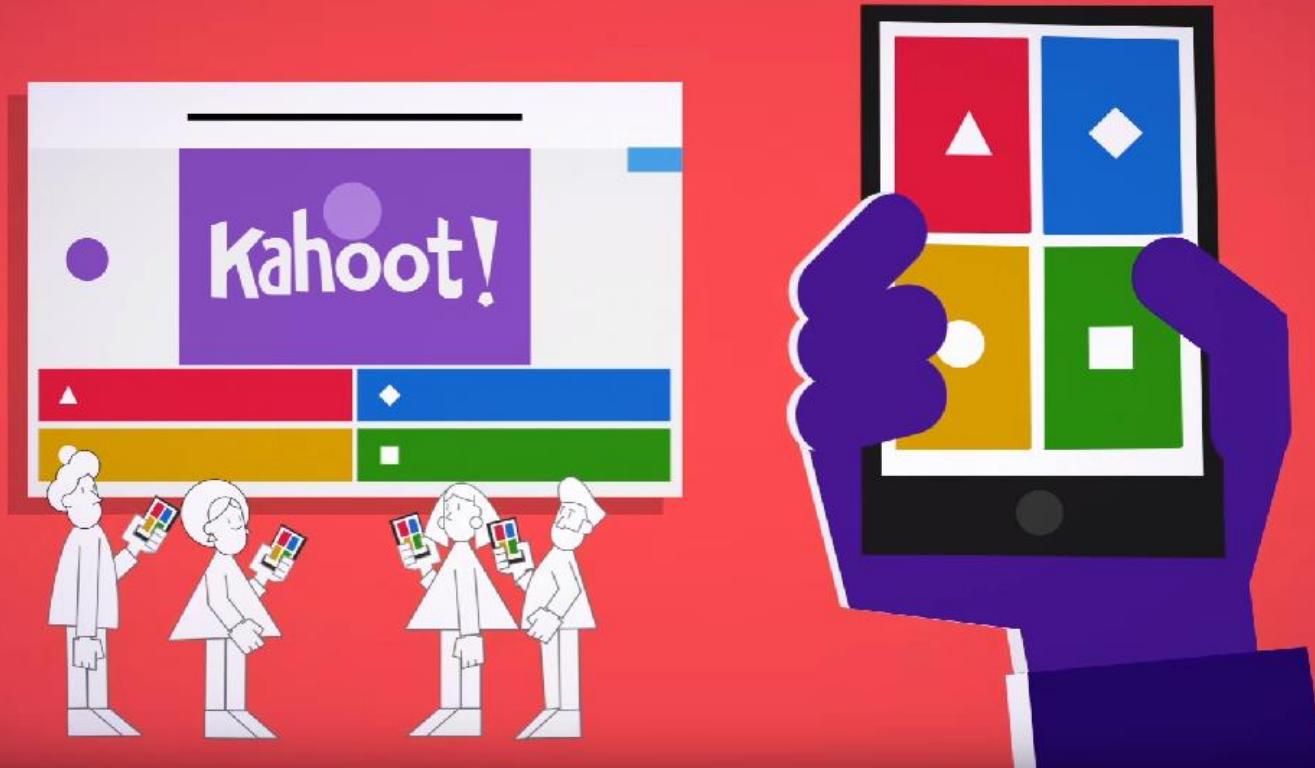
Risks of Offshoring: Client Extra Costs (3)



Dibbern et al. (2008)

Quiz Time!

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Core Literature: Krcmar, Informationsmanagement (2015)

1. Einleitung (pp.1-8)
2. Begriffe und Definitionen (pp.11-26)
3. Modellierung (pp. 31-78)
4. Aufgabe des Informationsmanagements: Informationsmanagement (pp. 85-109)
5. Aufgabe des Informationsmanagements: Management der Informationswirtschaft (pp. 113-165)
6. Aufgabe des Informationsmanagements: Management der Informationssysteme (pp. 173-302)
7. Aufgabe des Informationsmanagements: Management der Informations- und Kommunikationstechnik (pp. 315-385)
8. Führungsaufgaben des Informationsmanagements (pp. 393-578)
 8.1.3 Leistungstiefengestaltung (IT-Sourcing) (pp. 427-442)
9. Referenzmodelle des Informationsmanagements (pp. 601-630)
10. Einsatzfelder und Herausforderungen des Informationsmanagements (pp. 633-753)
11. Fallstudie „Rockhaus AG“ (pp. 767-783)

Literature

Additional Reading

- **Dibbern, J.; Goles, T.; Hirschheim, R.; Jayatilaka, B. (2004):** Information Systems Outsourcing: A Survey and Analysis of the Literature. In: The Data Base for Advances in Information Systems, Vol. 35 (2004), No. 4, pp. 6-103.
- **Dibbern, J.; Winkler, J.; Heinzl, A. (2008):** Explaining variations in client extra costs between software projects offshored to India. In: MIS quarterly, Vol. 32 (2008) No. 2, pp. 333-366.
- **Kaiser, K. M.; Hawk, S. (2005):** Evolution of Offshore Software Development: From Outsourcing to Cosourcing. In: MIS Quarterly Executive, Vol. 3 (2005), No. 3, pp. 69-81.
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- Dibbern, J., Winkler, J., & Heinzl, A. (2008). Explaining Variations in Client Extra Costs between Software Projects Offshored to India. *MIS Quarterly*, 32(2), 333-366.

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- Statista (2020). Amazon Leads \$100 Billion Cloud Market [Digital image]. Retrieved December 18, 2020, from <https://www-statista-com.eaccess.ub.tum.de/chart/18819/worldwide-market-share-of-leading-cloud-infrastructure-service-providers/>
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Information Management and Knowledge Management (IMKM)

Lecture 9

Information Security, Privacy and Risk Management

TUM

Chair for Information Systems

© Prof. Dr. H. Krcmar

Lecture Schedule

Information Systems Strategy

Business Value of IT

Business IT Alignment

IT-enabled Strategies

Guest Lecture: Digital Leadership and the CIO Role

Digital Platforms

Information Management

IT Controlling and IT Governance

IT Sourcing and IT Offshoring

IT Security, Privacy and Risk Management

Guest Lecture: Natural Language Processing for IM

Knowledge Management

Basics

Tools

Guest Lecture:
Applications

IMKM Lecture 9: Information Security, Privacy and Risk Management

Outline

1. Information Security

2. Privacy

3. Risk Management

1. Fundamentals

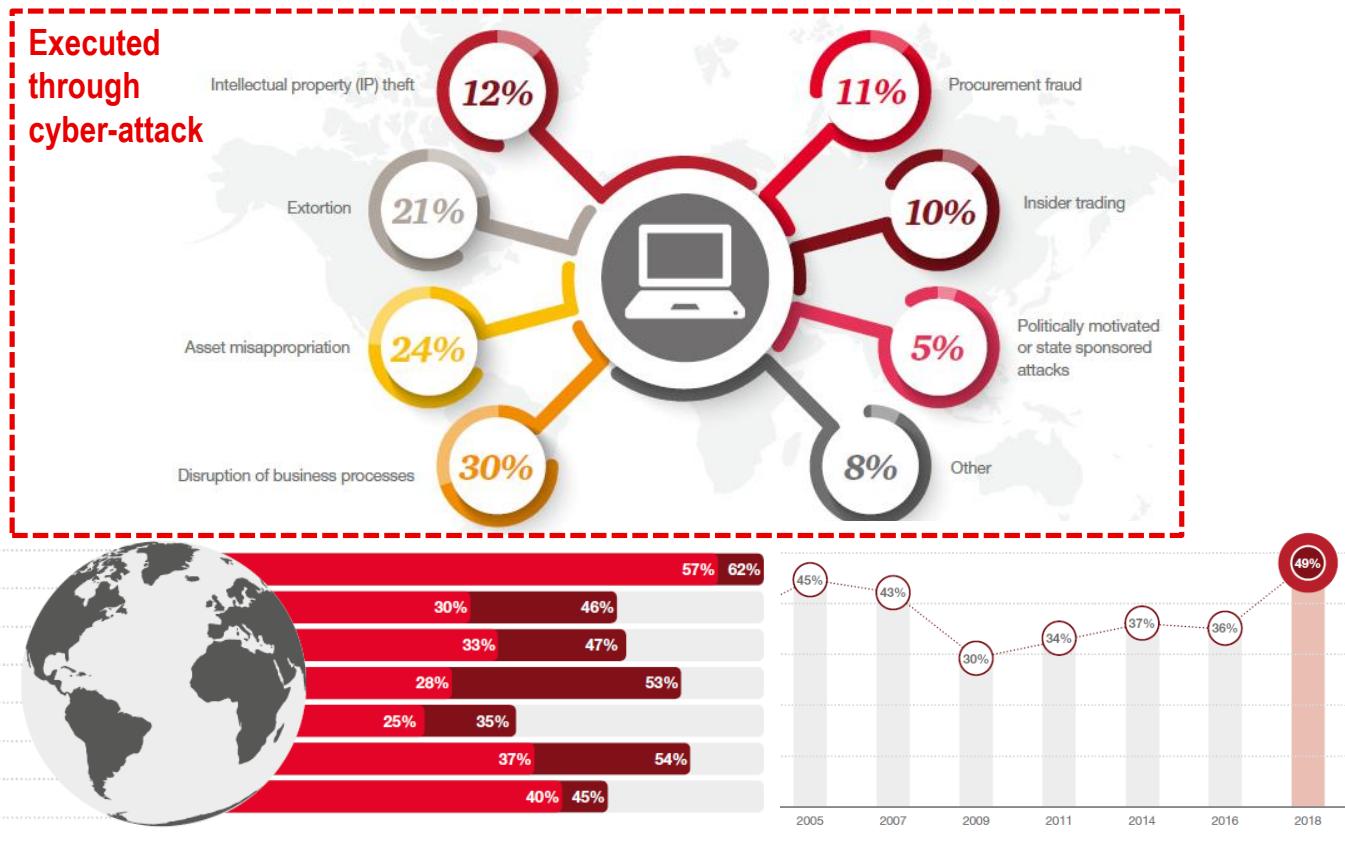
2. Risk Management Process

3. IT Projects

Learning Objectives

- You understand information security.
- You understand the IT security objectives and can distinguish them.
- You understand privacy and can discuss the key changes of the GDPR.
- You understand and can discuss risk, its categories, and its two strategies.
- You can apply the risk management process and know examples for its steps.
- You understand and can apply the three characteristics of IT project risks.

Economic Crime – A Worldwide Phenomenon



Foundations

- **Security** is the absence of unbearable risks (DIN 2002)
- **Risk** is the **probability** of an adverse future event multiplied by its **magnitude**
- **Risk** is the probability that a particular adverse event occurs during a stated **period of time**, or results from a particular challenge.

The Royal Society (1983)

Information Security

- The **information** that companies collect, store, manage and transfer is an organizational **asset**. It adds value to business and consequently needs to be suitably **protected**.

Information security is the practice of defending information from unauthorized access, use, disclosure, disruption, modification, perusal, inspection, recording or destruction. It is a general term that can be used regardless of the form the data may take (e.g. electronic, physical). [1]

- Today this information is often held electronically, and transmitted using electronic means.

Growing **dependence on information systems**, shared networks and distributed services like cloud computing means organizations are **now even more vulnerable to security threats**.

[1] 44 U.S. Code § 3542

IT Security Objectives

higher services



basic services



Eckert (2009)



IT Security Objectives

basic services

 Confidentiality The property that information is not made available or **disclosed to unauthorized individuals**, entities, or processes

 Data Integrity The property that data has not been **altered** or destroyed in an **unauthorized** manner

 Authentication The process of **verification** of an **identity**

 Availability The property of a **reliable access** at the right time on information and information systems.

 Data authenticity The property of **data** being genuine and being able to be **verified and trusted**; confidence in the validity of data itself and its authorship

 Non-repudiation Way of guaranteeing that the **sender** of message **cannot** later **deny** having sent that message

 Access control Process of **granting authorized entities** the right to use information, while preventing access to non-authorized entities

 Accountability The property of being able to **trace activities** on a system to individuals who may then be held **responsible** for their actions

Eckert (2009); BSI 2018, ISO/IEC 2018; Rao & Nayak 2014

Methods to achieve Basic Security Service Objectives

basic services



Confidentiality

Encryption of stored and transmitted data

Access control

Notifications in case of data breach



Data Integrity

Hash-Functions, Backups

Access Control, Email Signatures, Transmission Certificates

Validating Inputs, Non-Repudiation



Authentication

User's Access **Credentials** (e.g., passwords, fingerprint, chip cards)

Certificates



Availability

Data/Server Replication, **Redundancy**

Load Balancing

SLAs with external/internal Providers

Methods to achieve Higher Security Service Objectives

higher services



Data authenticity

Certificates for the website of the class schedule
Keyed-Hash Message Authentication Code (HMAC)



Non-repudiation

Message Authentication Codes and Digital Signatures
Auditing and **Logging** (e.g. Time-stamp and verify registrations)



Access control

Definition of roles, attributes or **rules**



Accountability

Auditing and **Logging**
Cross-department collaboration
Cybersecurity Awareness **Training** on e.g. legal standards

IMKM Lecture 10: Information Security, Privacy and Risk Management

Outline

1. Information Security

2. Privacy

3. Risk Management

1. Fundamentals

2. Risk Management Process

3. IT Projects

Learning Objectives

- You understand information security.
- You understand the IT security objectives and can distinguish them.
- You understand privacy and can discuss the key changes of the GDPR.
- You understand and can discuss risk, its categories, and its two strategies.
- You can apply the risk management process and know examples for its steps.
- You understand and can apply the three characteristics of IT project risks.

Privacy

Privacy is best understood through a notion of “**contextual integrity**”, where it is not the sharing of information in general a problem, rather it is the **sharing of information outside of socially agreed contextual boundaries.** [1]

Distinction can be made between [2]

- (1) **Decision** privacy: *Privacy about person's **decisions** and choices about his private actions. It protects, for example, persons from external **interference** with decisions.*
- (2) **Information** privacy: *the ability of a person to control, edit, manage and delete **information about themselves** and to decide how and to what extent such information is communicated to others.*

Example: What if your Fitbit knew exactly what to say on a particular day to motivate you to get off the couch and run a 5K? → It could influence your decisions

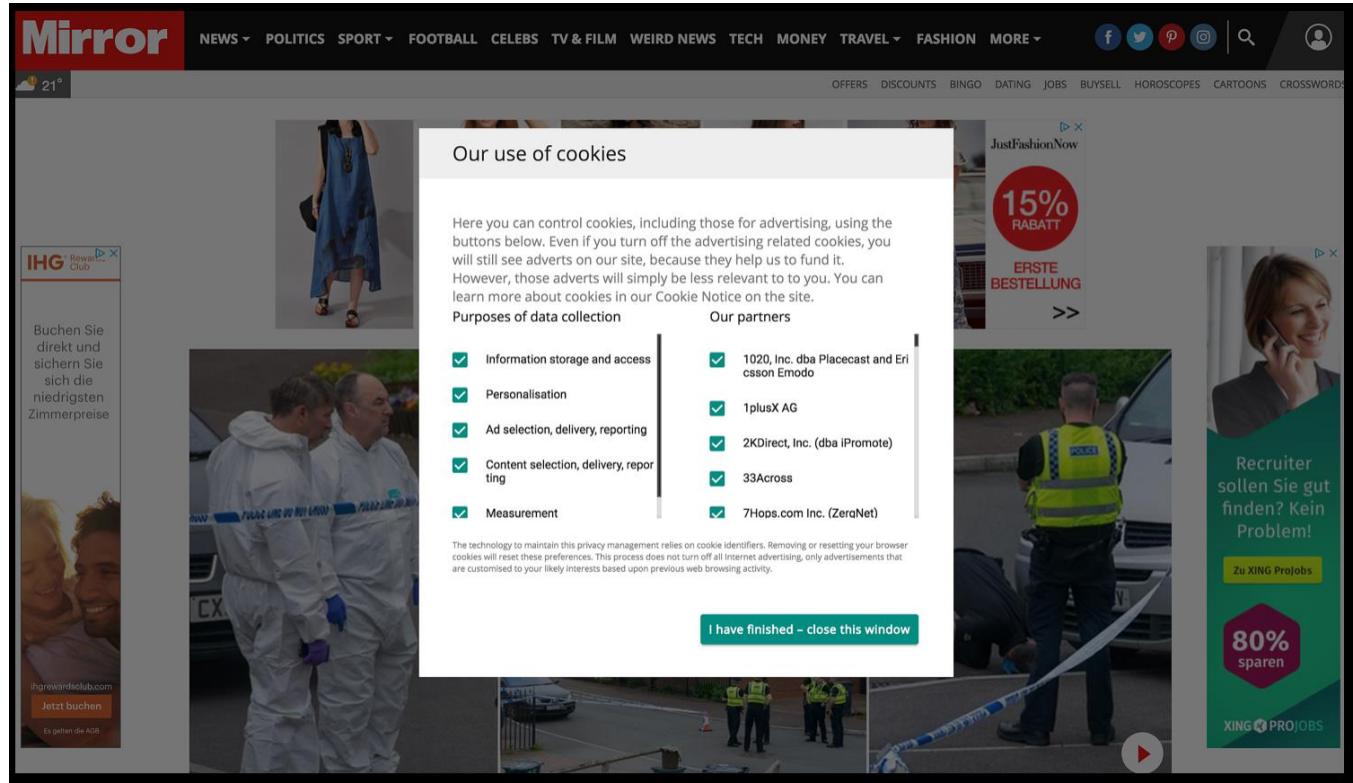
[1] Nissenbaum (2004) [2] DeCew (1997)

Impacts and issues by certain threads

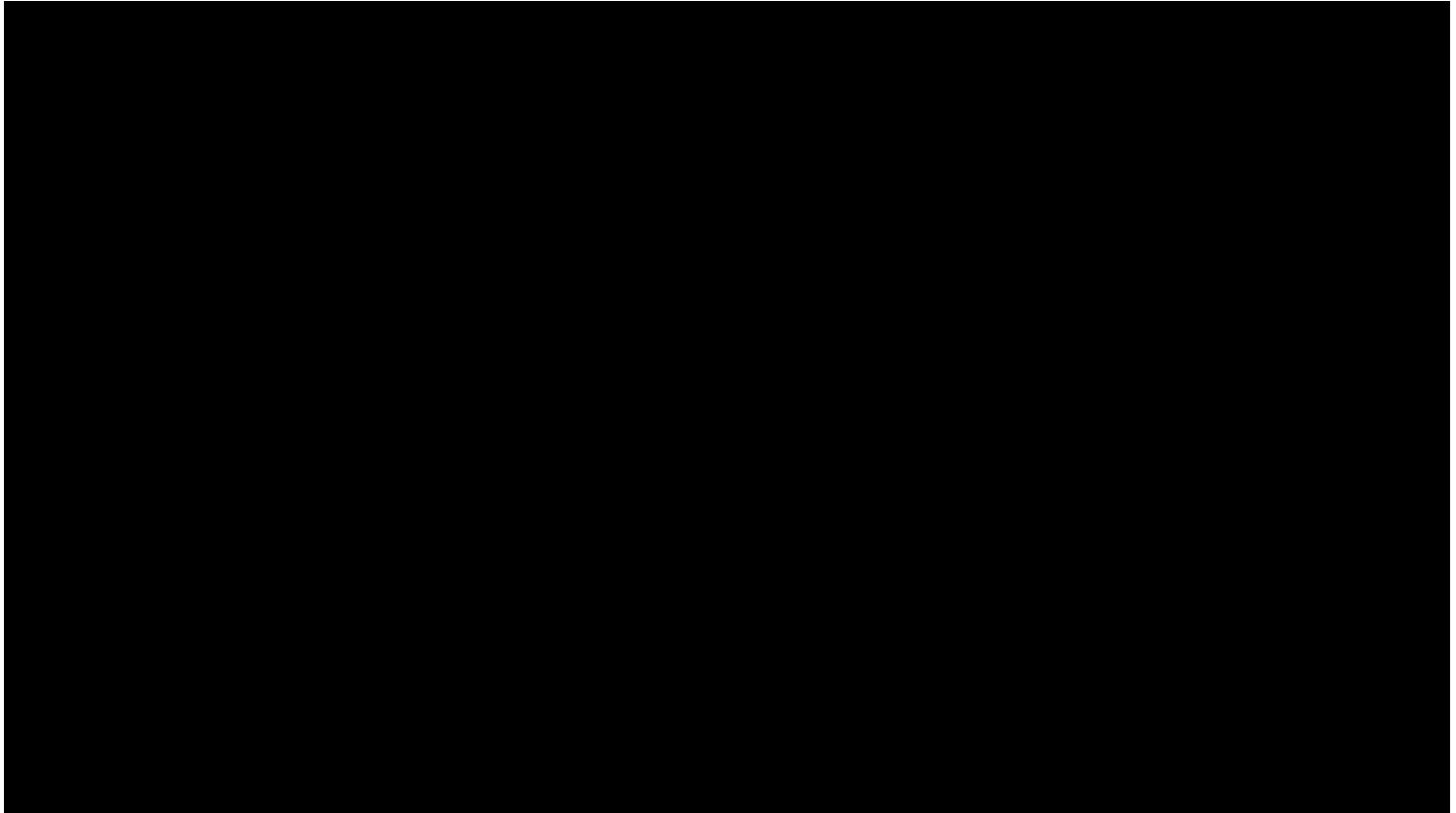
As data can be stored and processed in the “Exabyte” level and more connectivity and interaction is possible, information is ubiquitous. This triggers different threats

Internet	Big Data	Social Media	Internet of Things
<ul style="list-style-type: none">• Use of cookies to store online behavior• Cloud Computing<ul style="list-style-type: none">– Access to data and usage statistics by vendors– Ambiguities regarding legal issues (applicability of laws, demand for data access)	<ul style="list-style-type: none">• Used to profile users, identify patterns and predict interests and behavior• Potential to result in future discrimination and inequalities	<ul style="list-style-type: none">• Steering users' behavior of sharing• E.g., through 'Like' button• "Fake" news versus user-generated content• Privacy features only as built-in 'add-ons' rather than 'by design'• Exchange personal data for the benefits of using services	<ul style="list-style-type: none">• Automatic adaptation of the environment to the user• Usage of explicit preferences and implicit observations• User autonomy is a central theme in considering the privacy implications of such devices.

What is GDPR?



What is GDPR?



EU General Data Protection Regulation (GDPR)

- Applied EU-wide since 25 May 2018 in national data protection laws (e.g. the BDSG)
- Aims at giving control over personal data back to all EU citizens

Key Changes

1. Increased Territorial Scope (extra-territorial applicability)
 2. Penalties
 3. Consent
 4. Breach Notification
 5. Right to Access
 6. Right to be Forgotten
 7. Data Portability
 8. Privacy by Design
 9. Data Protection Officers
- Examples
- Social media data
 - Search engine usage data
 - Health data
 - Genome data
 - Personal mobility data

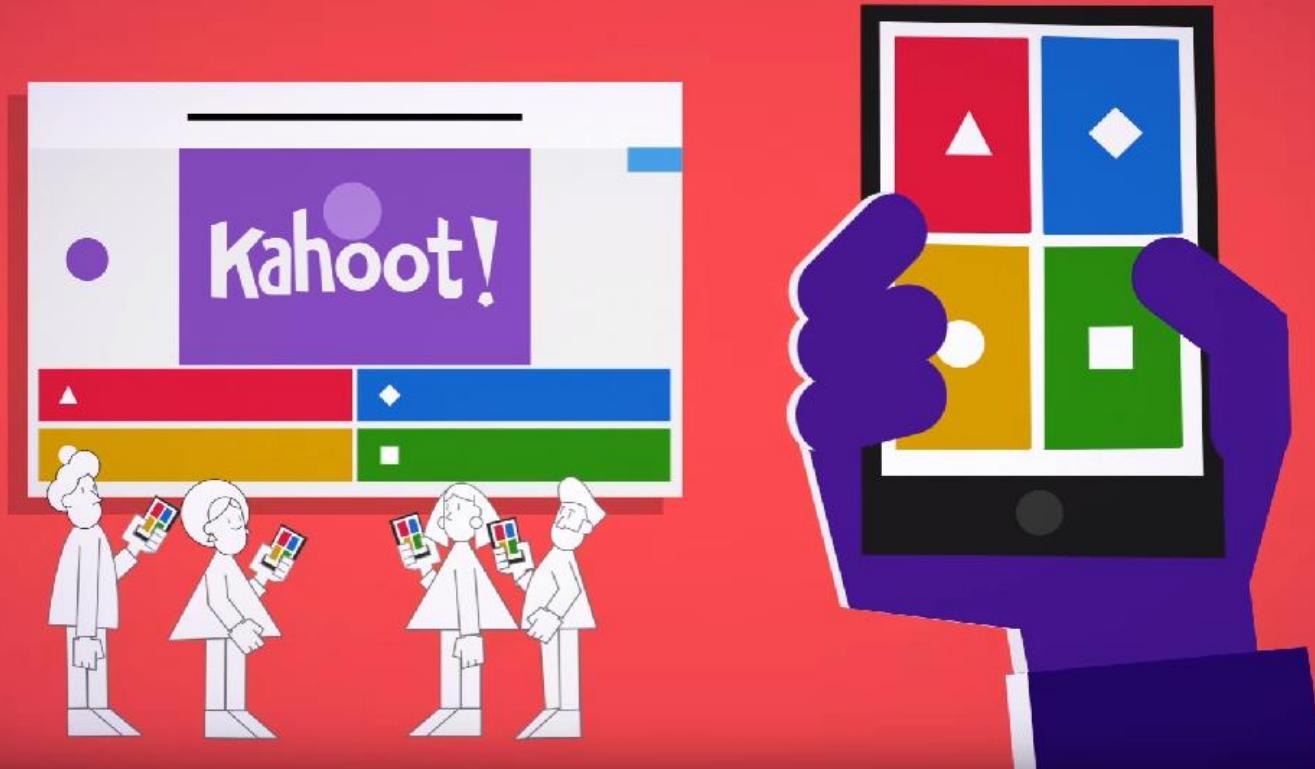
www.eugdpr.org

Data Protection Law in Germany

- EU General Data Protection Regulation (GDPR) implemented in the
- Federal Data Protection Law (Bundesdatenschutzgesetz, BDSG)
- State specific Data Protection Laws (e.g. BayDSG)
- Area specific regulations:
 - Code of Social Law
 - Telecommunications Act
 - Telemedia Act
 - ...

Quiz Time!

Go to kahoot.it



IMKM Lecture 10: Information Security, Privacy and Risk Management

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Risk Management

„When anyone asks me how I can best describe my experiences of nearly forty years at sea, I merely say uneventful. I have never been in an accident of any sort worth speaking about I never saw a wreck and have never been wrecked, nor was I ever in any predicament that threatened to end in disaster of any sort.“

Edward J. Smith, Captain of the Titanic about his experience as captain before Titanic's maiden voyage



The Issue of Risk

- Risk is neither good or bad – it is just a fact
- Some projects involve more risks than others
- Organizations should be prepared to invest in **high risk projects** only when the return is high BUT don't place all your assets in high risk projects

But:

What is an **IT risk**?

How can we become the **trusted advisor** on choosing the **IT risks worth taking**?



Image: www.mypharmacare.ca

What is an IT risk?

- **Risk** is the probability of an adverse future event multiplied by its magnitude.
- Risk Exposure
 $RE = p_{\text{adverse future event}} * \text{magnitude of adverse future event}$
- **Security** is the absence of unbearable risks (DIN 2002)
- Risk Reduction Leverage
 $RRL = (RE_{\text{before}} - RE_{\text{after}}) / \text{cost of intervention}$

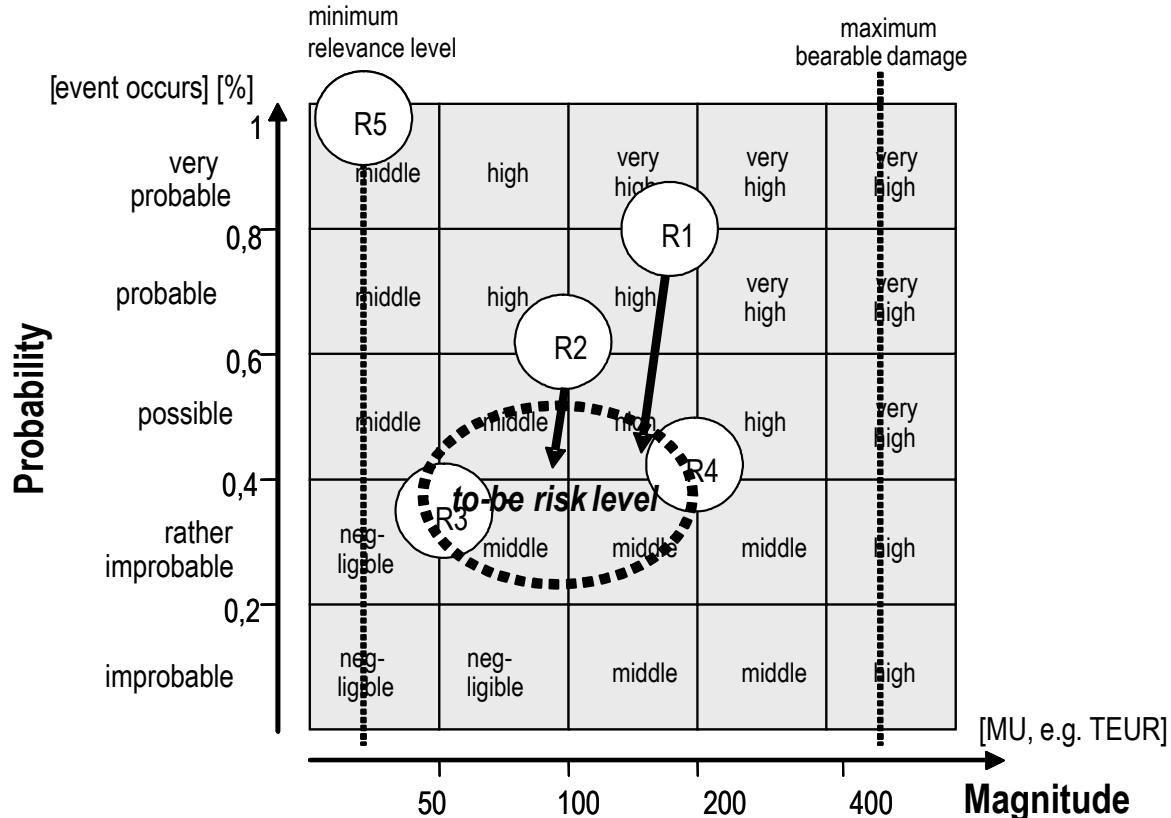
Risk Categorization

- **Known risks**
 - Those risks that can be uncovered after careful evaluation of the project plan, the business and technical environment in which the project is being developed, and other reliable information sources (e.g., unrealistic delivery date)
- **Predictable risks**
 - Those risks that are extrapolated from past project experience (e.g., past turnover)
- **Unpredictable risks**
 - Those risks that can and do occur, but are extremely difficult to identify in advance (e.g., zero-day attack)

Reactive vs. Proactive Risk Strategies

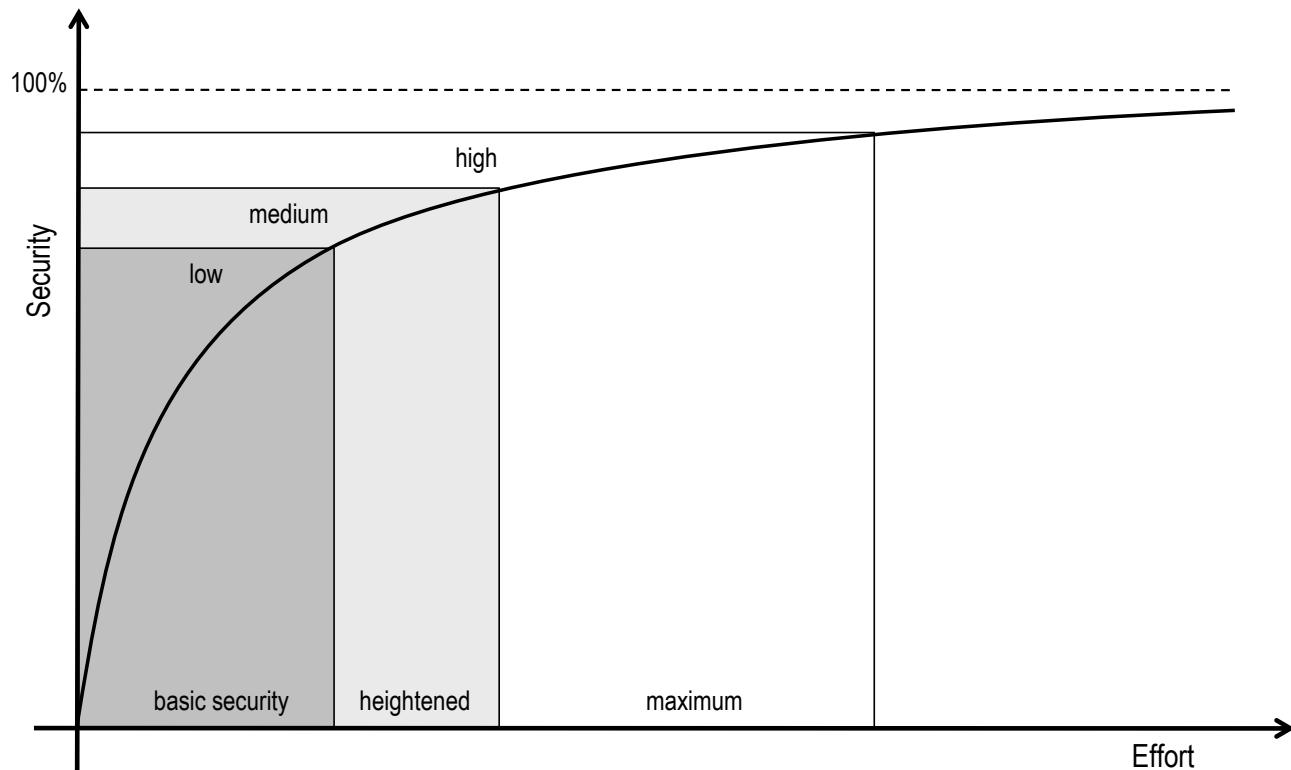
- **Reactive** risk strategies
 - "Don't worry, I'll think of something"
 - The majority of software teams and managers rely on this approach
 - Nothing is done about risks until something goes wrong
 - The team then flies into action in an attempt to correct the problem rapidly (**fire fighting**)
 - **Crisis management** is the choice of management techniques
- **Proactive** risk strategies
 - Steps for risk management are followed
 - Primary objective:
 - **avoid risk** and
 - have a **contingency plan** in place to handle unavoidable risks in a controlled and effective manner

What is the right balance?

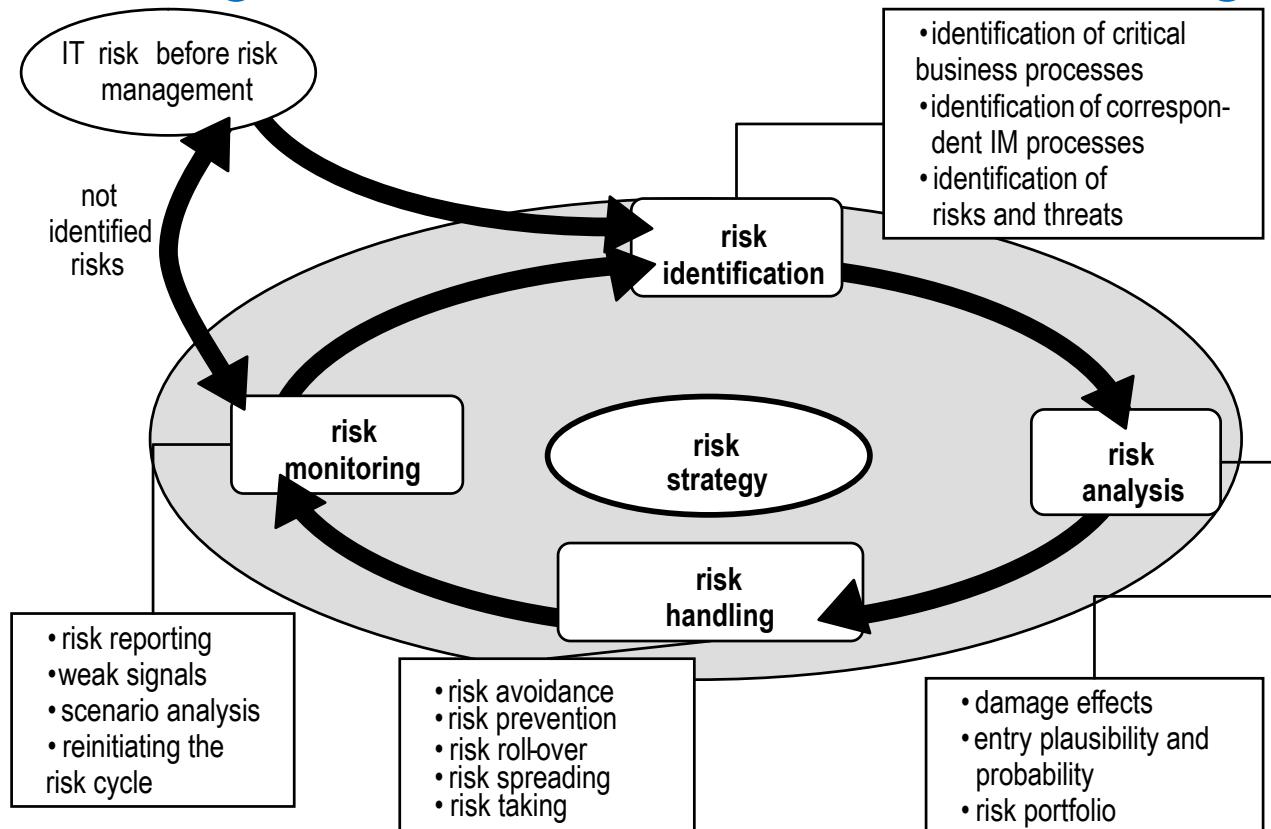


Source: Adapted from Junginger (2004, p. 281)

Risk Management for Security: Pareto at work...



Risk Management Process within Information Mgt



Krcmar (2015), p. 532

Risk Identification: Objectives and Tools

Risk Identification...

- ...transfers uncertainties in a set of clearly defined risks
- ...makes use of tools such as
 - expert interviews
 - brainstorming
 - analogies
 - **risk registers**

Example for Risk Identification: Risk Registers

Table 2. Full list of risk factors

1. Organization	1.1 Lack of top management commitment to the project 1.2 Change in ownership or senior management during the process of development 1.3 Mismatch between organization culture and required business process changes needed for new system 1.4 Resources shifted away from the project because of changes in organizational priorities 1.5 Projects started for political reasons that carry no clear business value 1.6 Failure to get project plan approval from all parties 1.7 Project implementation has major effect on organizational structure 1.8 Project implementation has major effect on business process
2. Requirement	2.1 Incorrect system requirements 2.2 Continually changing scope or system 2.3 Unclear/misunderstood requirements 2.4 New and/or unfamiliar subject matter requirements definition 2.5 Users and developers ignore business requirements 2.6 Conflicting in defining system requirements 2.7 Users lack understanding of system requirements 2.8 Undefined project success criteria 2.9 Difficulty in defining the inputs and outputs 2.10 System requirements not adequately specified
3. User	3.1 Lack of cooperation and responsibility 3.2 Users unrealistic expectations 3.3 Excessive use of outside consultants 3.4 Users resistant to change 3.5 Users with negative attitudes toward change 3.6 Lack of adequate user participation 3.7 Conflicts between users and development team 3.8 Conflict between user departments 3.9 Underfunding of maintenance by the user
4. Technology	4.1 Project involves new technology and/or systems 4.2 Lack of effective development methodology 4.3 Large number of links to other systems 4.4 High level of technical complexity 4.5 Immature technology
5. Team	5.1 Lack of commitment to the project among development team members 5.2 Conflicts between team members in terms of characters, attitudes and conceptions 5.3 Frequent turnover within the project team and shortfalls 5.4 Team members not familiar with the task being automated 5.5 Team members lack skills required by the project 5.6 Inadequately trained development team members
6. Planning and control	6.1 Project milestones not clearly defined 6.2 Lack of effective project management methodology 6.3 Poor project planning 6.4 Inexperienced project manager 6.5 Ineffective communications among different stakeholders 6.6 Inadequate estimation of required resources and budget 6.7 Inadequate estimation of project schedule 6.8 Poor control in tracking project 6.9 Not managing change properly 6.10 Improper definition of roles and responsibilities 6.11 Poor risk management 6.12 Choosing the wrong development strategy 6.13 Lack of control over consultants, vendors and subcontractors
7. Market and competition	7.1 Change of market needs that the expected benefits vanish 7.2 Competitors take unanticipated preemptive actions or simply respond by developing a better application 7.3 Unanticipated favorable or unfavorable reaction from regulatory bodies, customers, vendors and business partners that can affect the application 7.4 The application could become obsolete with the introduction of a new superior technology, service or product 7.5 External dependencies not met 7.6 Multi-vendor projects complicate dependencies: Integration of packages from multiple vendors hampered by incompatibilities and lack of cooperation between vendors

Liu et al. (2010)

Risk Analysis: Objectives and Tools

Risk Analysis...

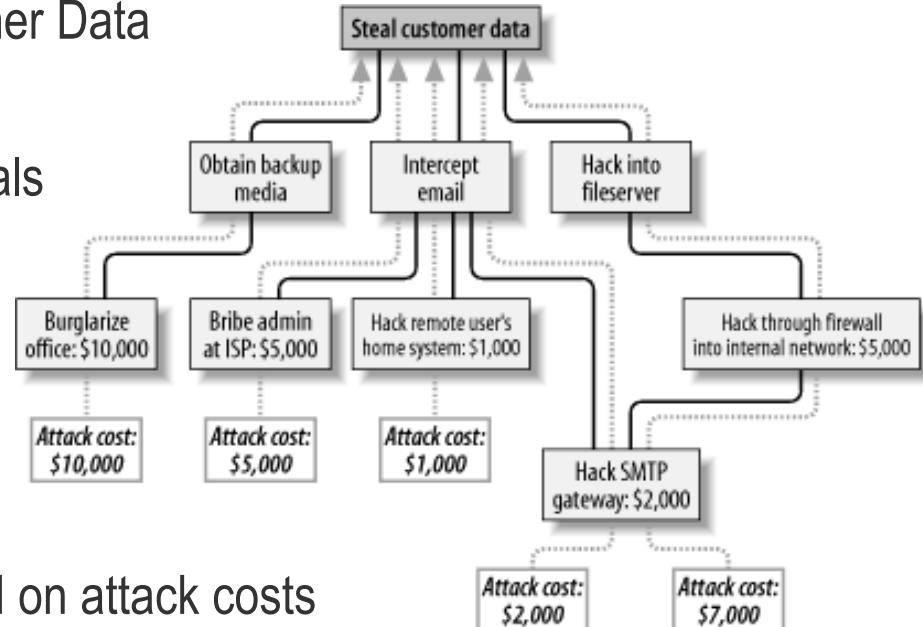
- ...assesses the identified risks regarding their
 - **probability** of occurrence and
 - (negative) **impact** on the organization/project
- ...makes use of tools such as
 - expert interviews
 - cause-and-effect analysis
 - decision trees
 - risk prioritization
 - Threat tree

Example for Risk Analysis: Threat Trees

Threat trees summarize potential threats in a top-down view.

- Example: Stealing Customer Data

- Leaves are threatened goals
- Division in sub-trees
 - AND or OR relations



Goal: find weakest link based on attack costs

Schneier (1999); Eckert (2009)

Risk Handling: Objectives and Tools

Risk Handling...

- ...evaluates, plans, and executes **strategies** for the analyzed risks
- ...makes use of tools such as
 - risk strategy lists
 - decision tables
 - decision trees
 - cause-and-effect analysis

Example for Risk Handling: Risk Strategy Lists with Best Practices

1. Avoiding Poor Estimating and/or Scheduling
2. Avoiding Ineffective Stakeholder Management
3. Avoiding Insufficient Risk Management
4. Avoiding Insufficient Planning
5. Avoiding Shortchanging Quality Assurance
6. Avoiding Weak Personnel and/or Team Issues
7. Avoiding Insufficient Project Sponsorship

Nelson (2007)

Risk Monitoring: Objectives and Tools

Risk Monitoring...

- ...tracks the evolution of risks over time
- ...makes use of tools such as
 - status reports
 - to-be analyses
 - risk visualizations

Example for Risk Monitoring: Visualizations to track the Volatility of Risks

C	Risks	Visualization	Temporal Characteristics		
1	Complex System Architecture Customer Financial Obligations Solution Uncertainties		Remain constant initially Gain importance towards project end		
2	Low Project Priority Implementation Partner Unknown Ongoing Escalation Events Unclear Critical Success Factors Unrealistic Budget		6 Core Development Dependencies Customer Inability to Undertake Project Functionality Gaps		Lose importance before project end Re-gain importance towards project end
3	Inexperienced Project Lead No Quality Assurance/Risk Management Post Go Live Approach Not Defined Risk Tolerance		7 Implementation and Dev. Interdependencies Incomplete Contract Requirements No Comparable Installations No Ramp-Up No Risk Sharing Agreements Production Downtime Impact Unclear Customer Objectives Unclear Governance Model		Peak just after project start Lose importance thereafter
4	Inadequate Technical Infrastructure Internal and External Decision Makers Hardware Partner Not Involved Weak Business Commitment		8 Customer Expectations Expected Performance Issues High Number of Interfaces Industry Specific Solutions No Change Management Approach Requirements Not Understood		Lose importance initially Re-gain importance towards project end
5	Development Methodology High Customer Visibility Undocumented Third Party Services		9 Complex Data Conversion High Impact on Processes Non-Conducive Political Environment Non-T&M Payment Terms Unclear Roles		Steadily lose importance

Table 3. Derived Risk Clusters

Hoerrmann et al. (2011)

Risk analysis in IT projects: Three characteristics that influence project risks

1. Size of project — in terms of workers/years of effort

- This is a simple but important risk dimension measurable in worker/years.
- The interpersonal communications task alone increases exponentially with the size of the team.

2. Degree of company-relative technology experience

- There is an education/familiarization cost associated with new or untried:
 - tools
 - concepts
 - hardware features
 - suppliers of hardware or software
 - communications standards
- Expect unexpected (unplanned) interface problems.

Applegate et al. (1999)

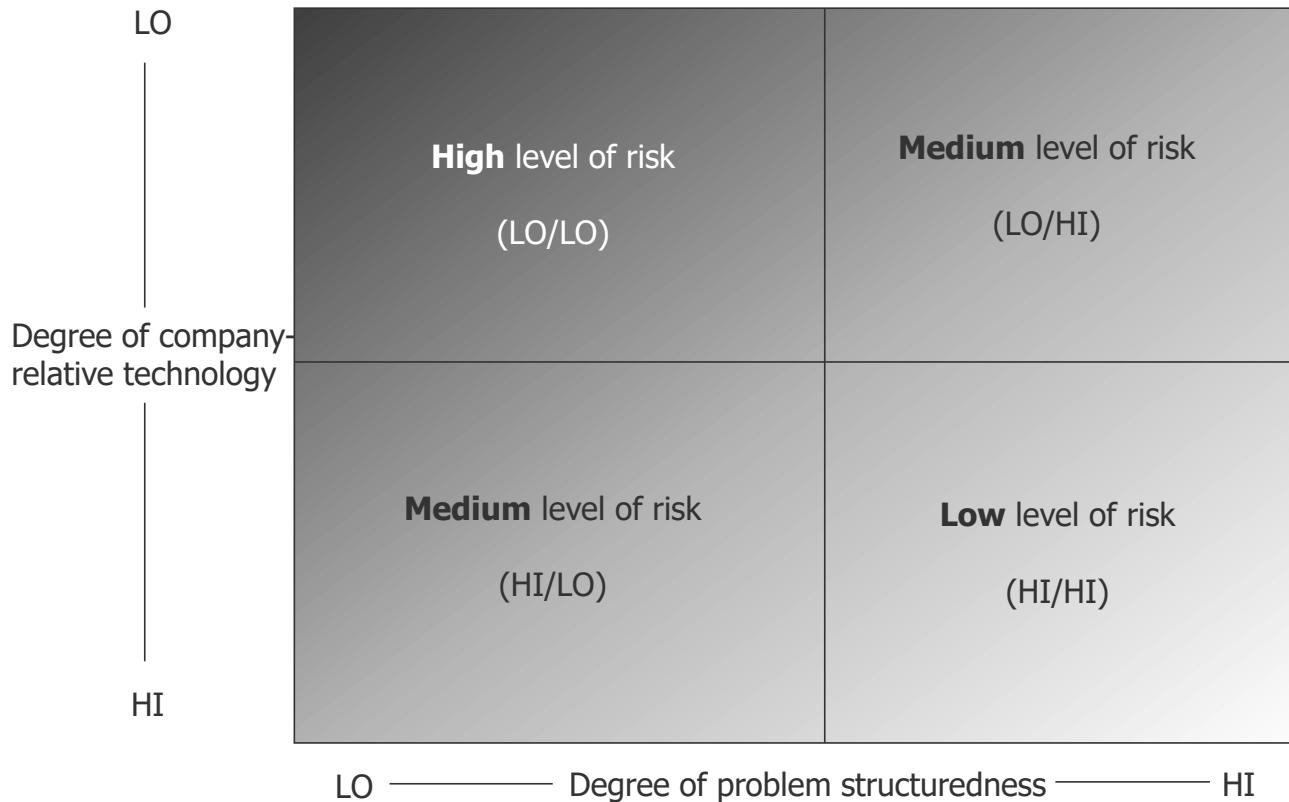
Risk analysis in IT projects: Three characteristics that influence project risks

3. Degree of inherent structure

- How well-defined are the project's outputs?
- How well does the implementation team understand what has been requested?
- Have they built a system like this before (plan to throw one away...)

Applegate et al. (1999)

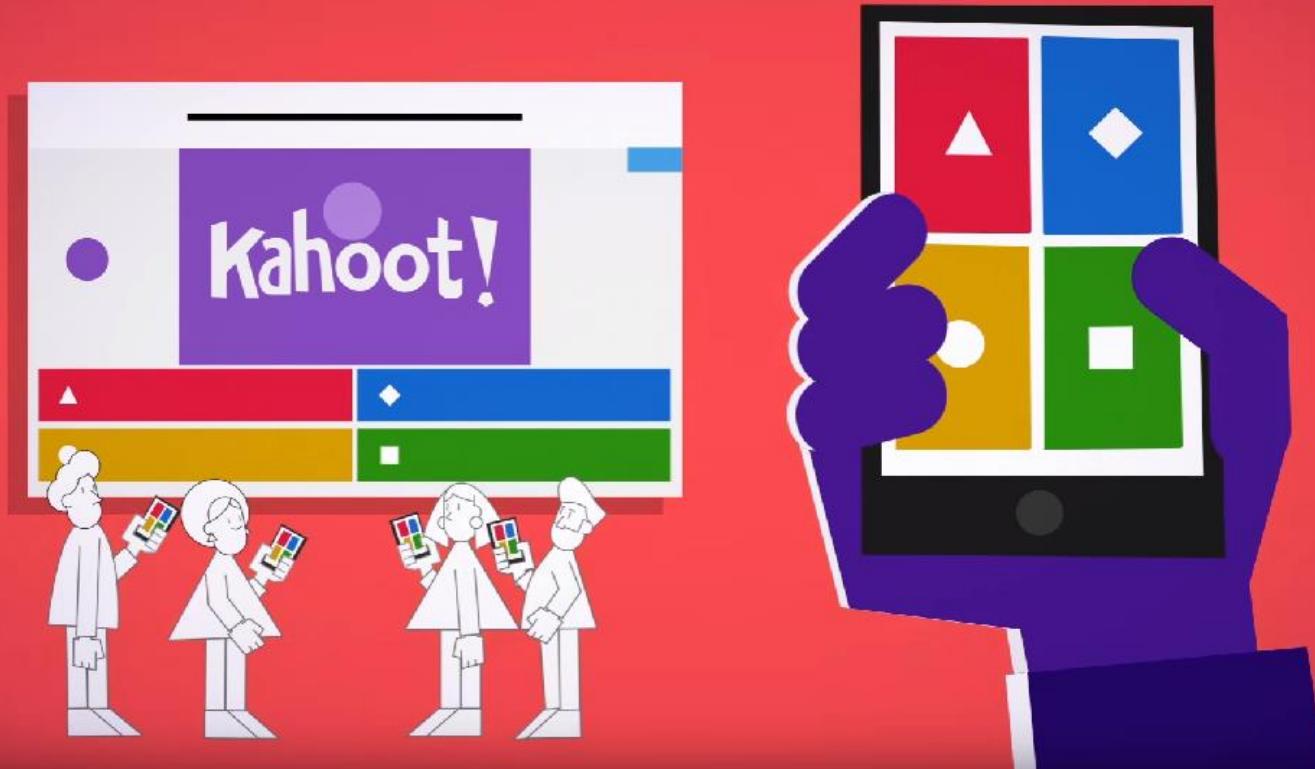
Risk analysis in IT projects: Understanding the Degree of IT Project Risk



Applegate et al. (1999)

Quiz Time!

Go to kahoot.it



Core Literature: Krcmar, Informationsmanagement (2015)

1. Einleitung (pp.1-8)
2. Begriffe und Definitionen (pp.11-26)
3. Modellierung (pp. 31-78)
4. Aufgabe des Informationsmanagements: Informationsmanagement (pp. 85-109)
5. Aufgabe des Informationsmanagements: Management der Informationswirtschaft (pp. 113-165)
6. Aufgabe des Informationsmanagements: Management der Informationssysteme (pp. 173-302)
7. Aufgabe des Informationsmanagements: Management der Informations- und Kommunikationstechnik (pp. 315-385)
8. Führungsaufgaben des Informationsmanagements
8.4 IT-Risikomanagement und Informationssicherheit (pp. 522-543)
9. Referenzmodelle des Informationsmanagements (pp. 601-630)
10. Einsatzfelder und Herausforderungen des Informationsmanagements (pp. 633-753)
11. Fallstudie „Rockhaus AG“ (pp. 767-783)



Information Management and Knowledge Management (IMKM)

Lecture 11

Basics and Tools of Knowledge Management

TUM

Chair for Information Systems

© Prof. Dr. H. Krcmar

Lecture Schedule

Information Systems Strategy

Business Value of IT

Business IT Alignment

IT-enabled Strategies

Guest Lecture: Digital Leadership and the CIO Role

Digital Platforms

Information Management

IT Controlling and IT Governance

IT Sourcing and IT Offshoring

IT Security, Privacy and Risk Management

Guest Lecture: Natural Language Processing for IM

Knowledge Management

Basics

Tools

Guest Lecture:
Applications



IMKM Lecture 11: Basics and Tools of Knowledge Management

Outline

1. Knowledge Management
 1. Recap: Definition of Knowledge
 2. Recap: Types of Knowledge
 3. Definition of Knowledge Management
 4. Knowledge Management & Strategy
 5. Knowledge Management Strategies
2. Core Processes of Knowledge Management
 1. Knowledge Objectives
 2. Knowledge Identification
 3. Knowledge Acquisition
 4. Knowledge Development

Learning Objectives

- You understand and know basic terms of knowledge management and you can distinguish them.
- You understand how knowledge management relate to strategy.
- You can explain different types of knowledge, how they can be converted, and how this scales in organizations.
- You know the core process of knowledge management and can give examples for each step.

Importance of Knowledge Management

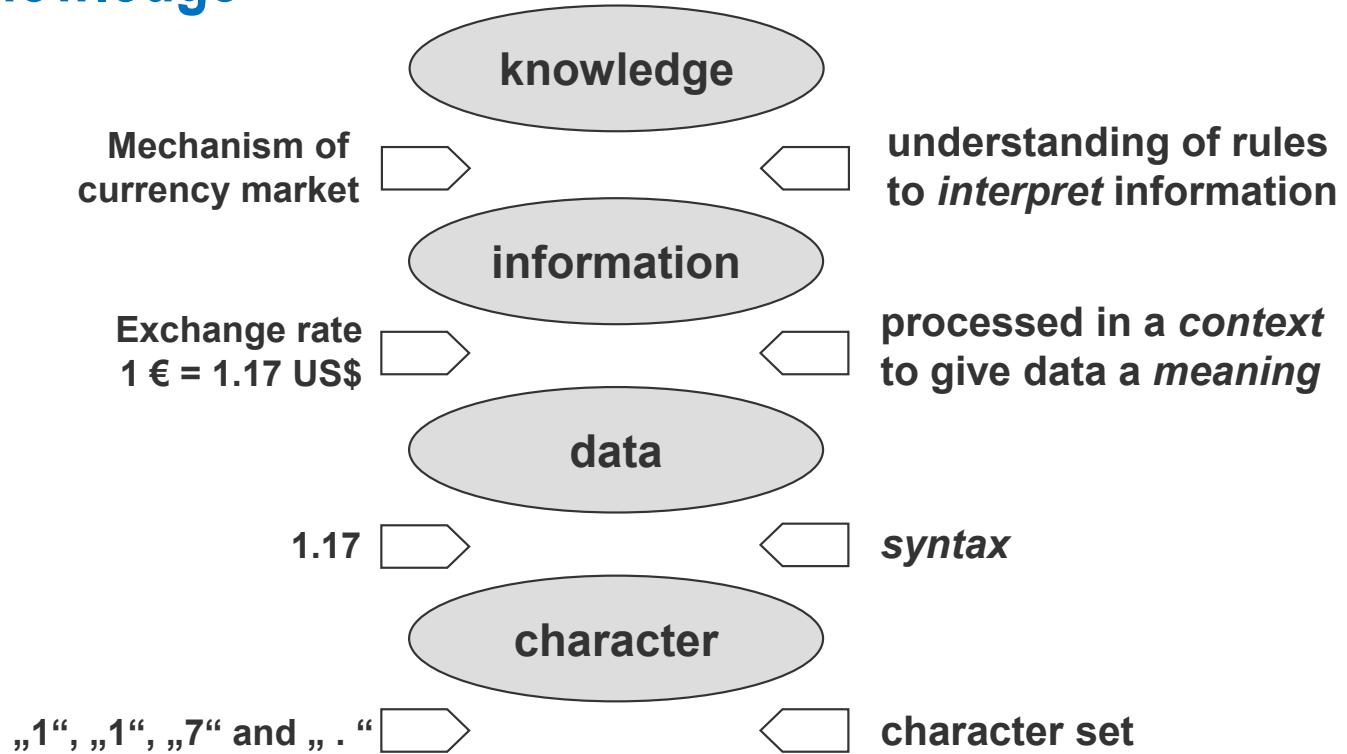
„In an economy where the only certainty is uncertainty, the one sure source of lasting competitive advantage is knowledge.“

Nonaka (1991)

Knowledge economy (Drucker, 1969): Organizational performance is dependent on the production, diffusion, and use of knowledge.

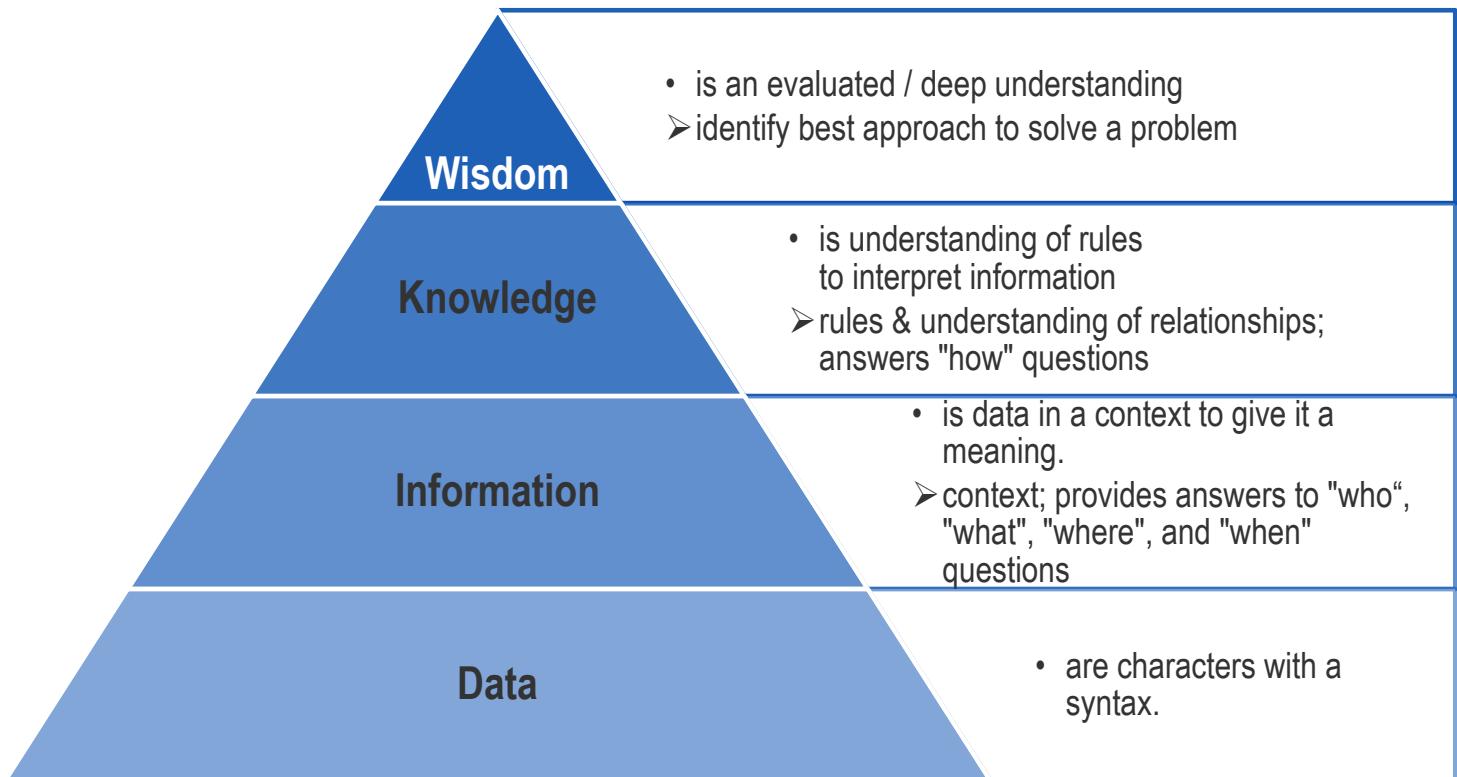
Knowledge-based theory of the firm (Grant, 1996): Knowledge is the major source of competitive advantage of a firm.

Recap: Character – Data – Information – Knowledge



Krcmar, Informationsmanagement (2015), p. 12

Data – Information – Knowledge – Wisdom



Ackoff (1989)

Recap: Knowledge

- Knowledge is the **understanding of rules needed to interpret** information
- Knowledge is the appropriate **collection** of information, such that its intent is to be useful
- Characteristics of knowledge:
 - Using knowledge does not consume it
 - Transferring knowledge does not result in losing it
 - Knowledge is abundant, but the ability to use it is scarce
 - Much of an organization's valuable knowledge walks out of the door at the end of the day.

Knowledge – Detailed Definition

Knowledge

- is a fluid mix of framed **experience, values, contextual information, and expert insight**
- that provides a **framework** for evaluating and incorporating **new experiences and information**.
- It originates and is applied in the **mind** of knowers.
- In organizations,
 - it often becomes embedded not only in **documents** or repositories
 - but also in organizational **routines, processes, practices, and norms**.

Davenport & Prusak (1983)

Recap: Types of Knowledge

“Embodyed knowledge is embodied knowledge. But with reflection or careful observation, patterns of tacit knowledge can be experienced, expressed and described.”

Senge (2006)



Explicit Knowledge

knowledge that is set out in tangible form (physical)
e.g. policies, goals, strategies, papers, reports
Codified / Leaky knowledge

Tacit Knowledge

knowledge that would be extremely difficult (operationally) to make explicit (*implied*)
Subjective, cognitive, experiential learning
Highly personalized
Difficult to formalize
Sticky knowledge

Recap: What is Knowledge Management?

*“KM is understanding the organization’s information flows and implementing **learning practices** which make explicit the key aspects of its knowledge base” (Broadbent, 1997, 8-9)*

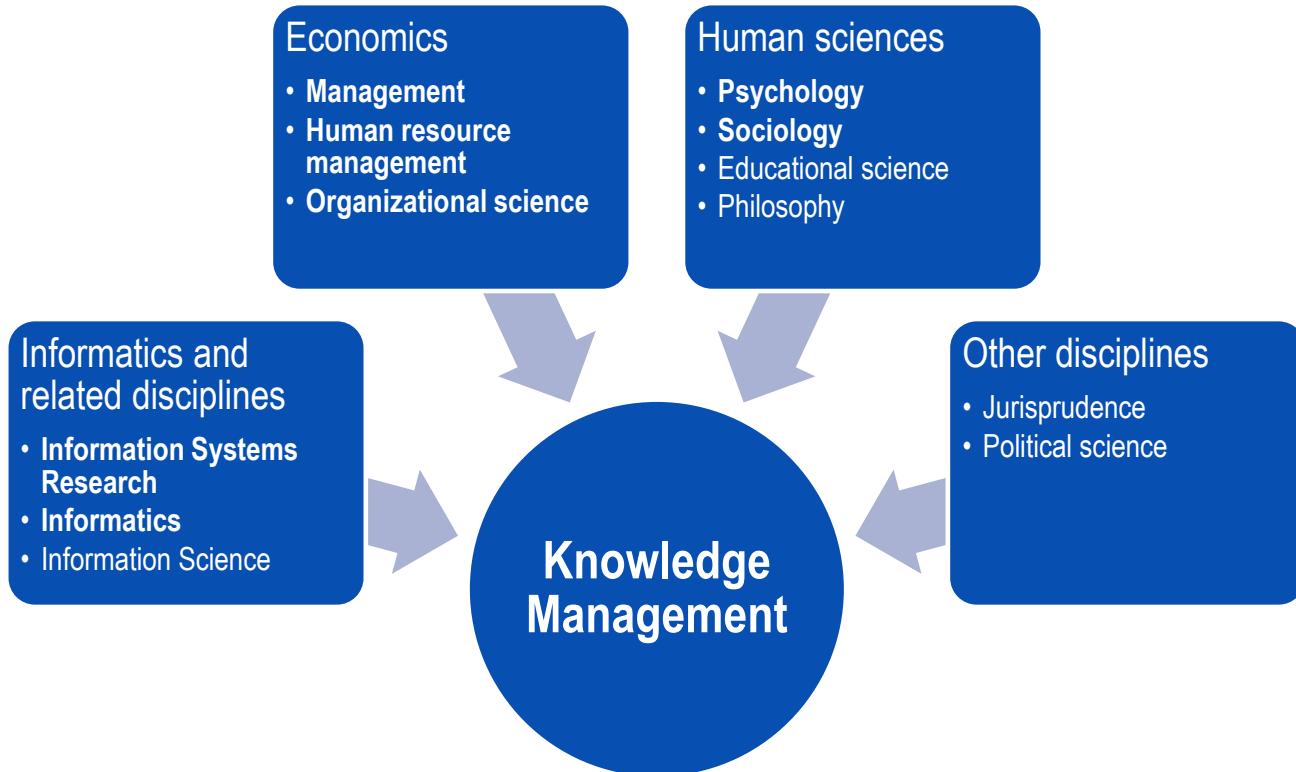
*“KM is a collaborative and integrated approach to the creation, capture, organization, access, and use of an **enterprise’s intellectual assets**” (Brooking, 1999, 154)*

*“KM is the capability to create, enhance, and share **intellectual capital** across the organization”
(Lank, 1997)*

*“KM comprises the development, discussion, and testing of theories, methods, and tools that enable a more systematic approach with **knowledge as a resource**”
(Bellmann, et al. 2002, cited in Krcmar, 2015, 660)*

- **Knowledge Management deals with all kinds of knowledge, information management with some forms of explicit knowledge.**

Reference Disciplines of Knowledge Management



Objectives of Knowledge Management

Knowledge Management helps us to know what we know

Knowledge Management

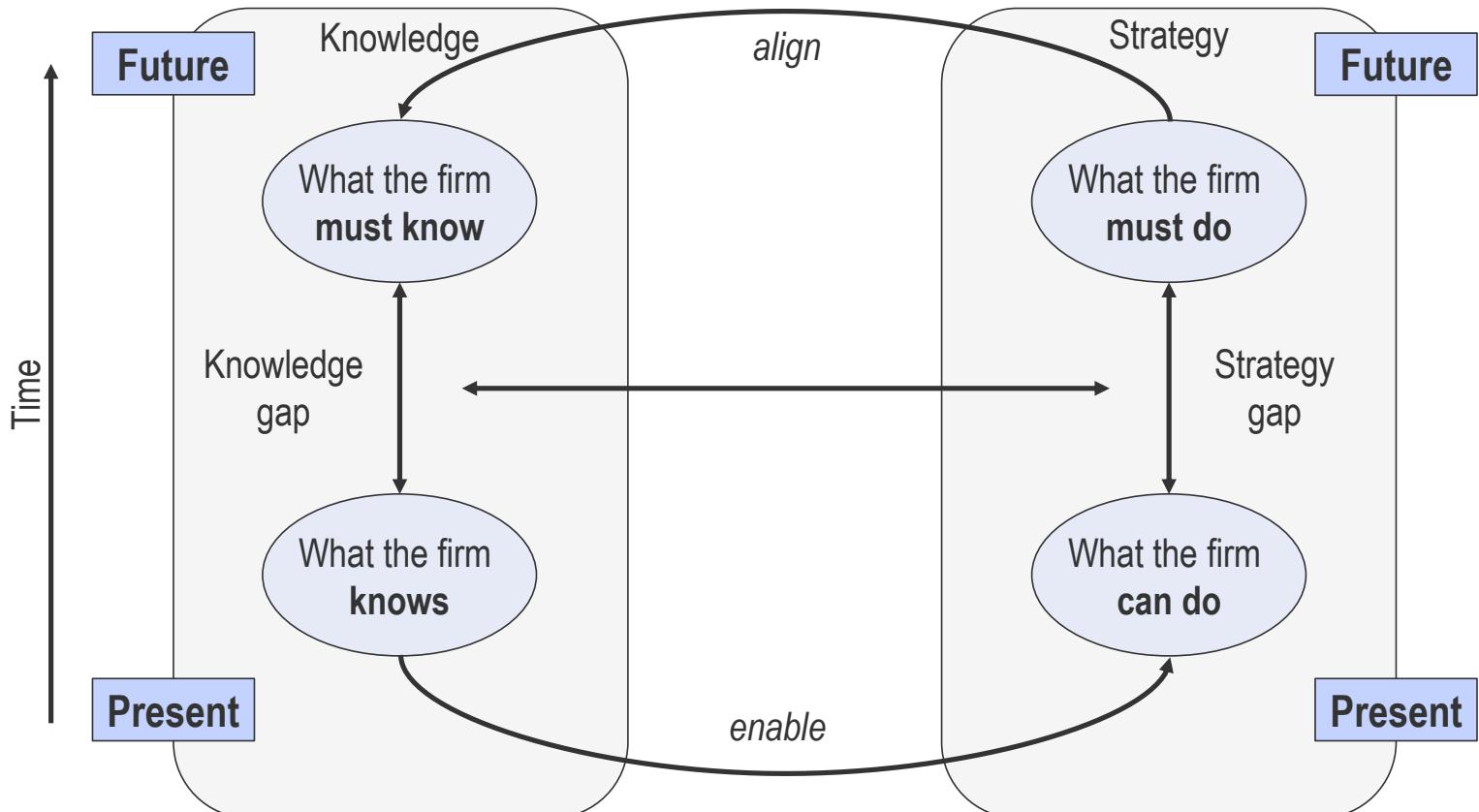
Identifying, capturing, evaluating, retrieving, and sharing all of an enterprise's information assets.

Knowledge Sharing

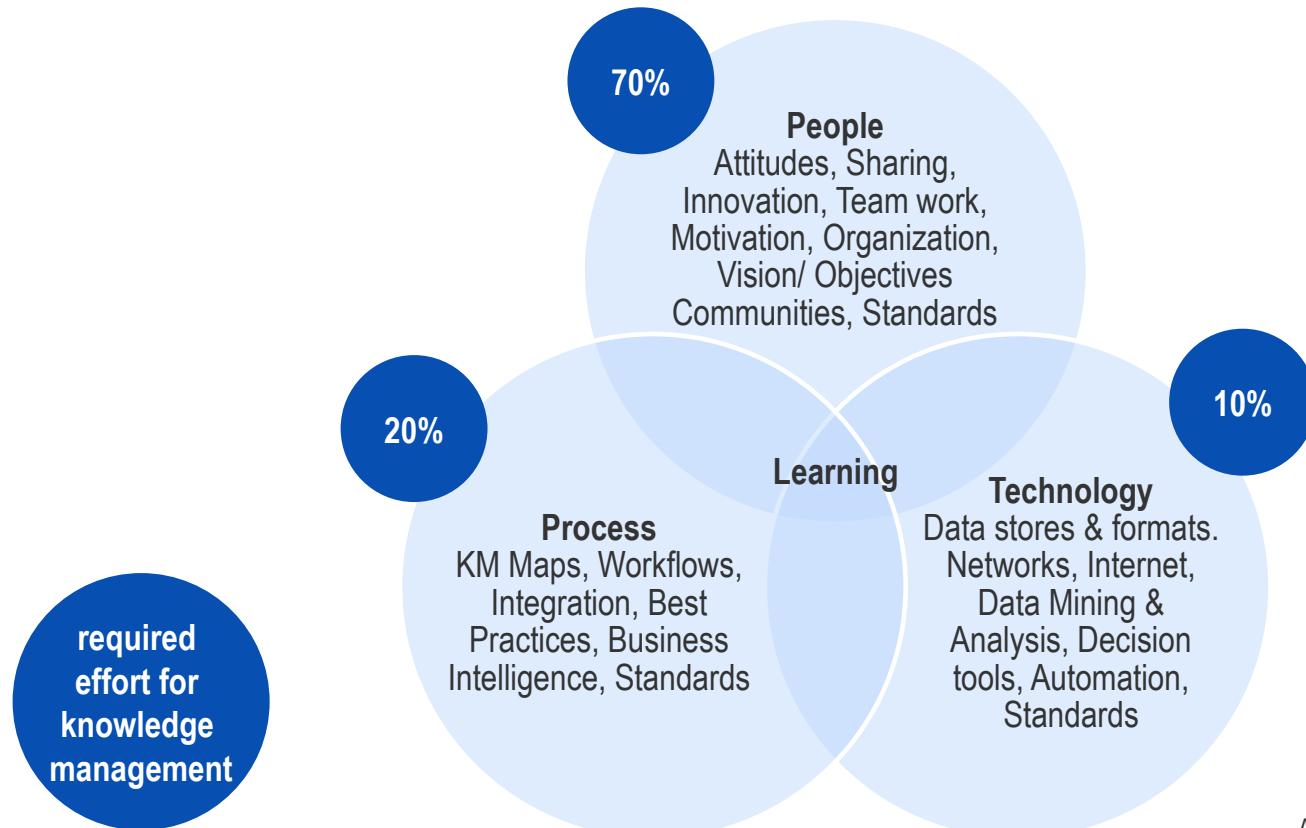
Focus on the individual providing knowledge to other individuals.

→ Fundamentally a social process, not (only) a question of „management“!

Alignment of Knowledge and Strategy

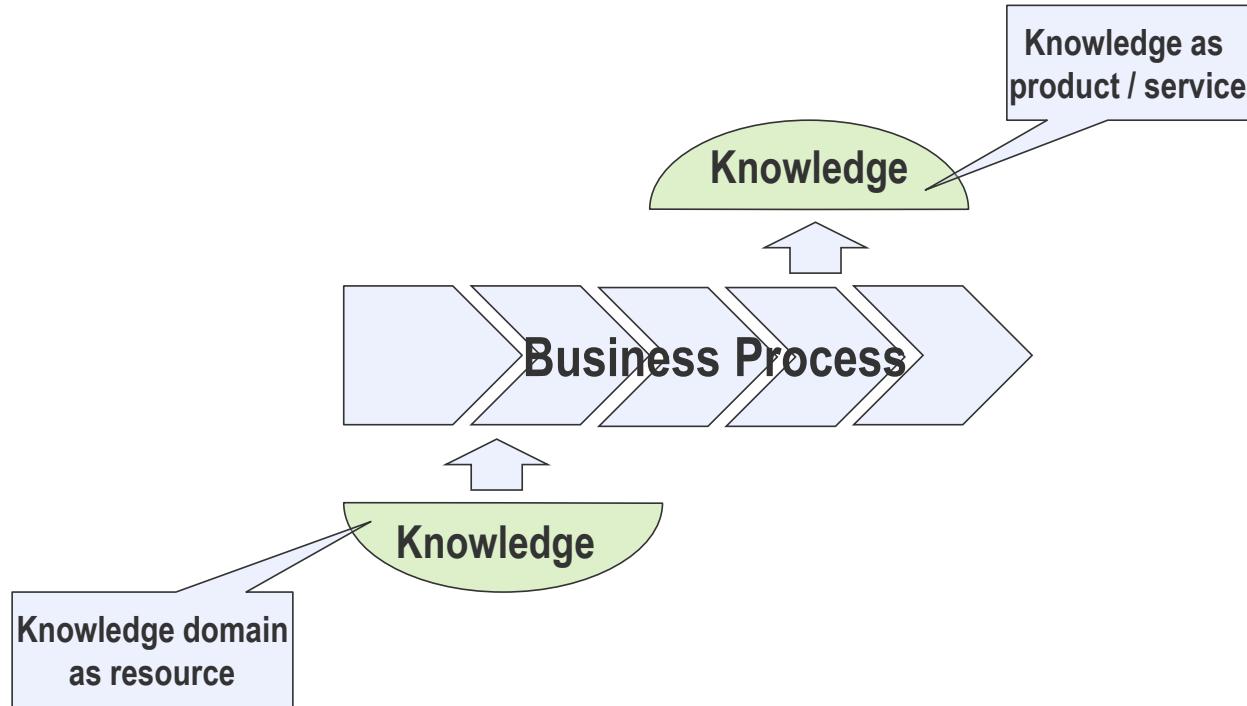


What to manage in knowledge management



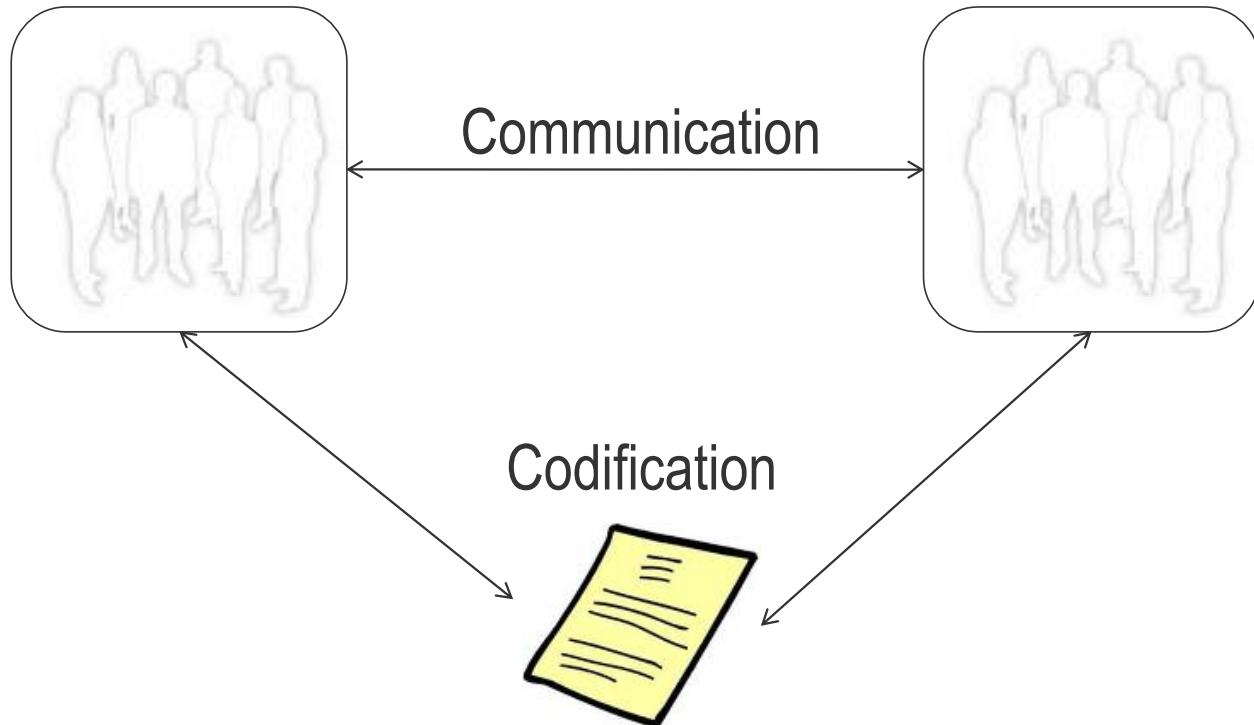
Adapted from Bhatt (2000)

Business Process as Area of Application and Context

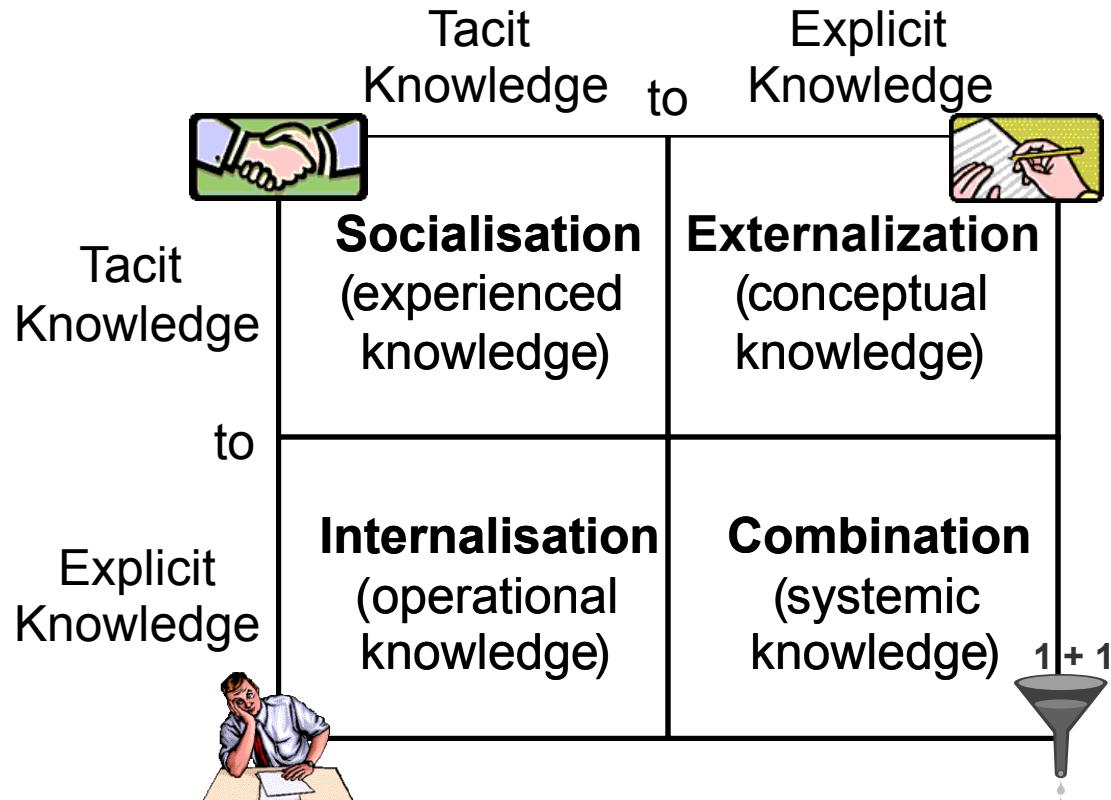


Heisig (2005)

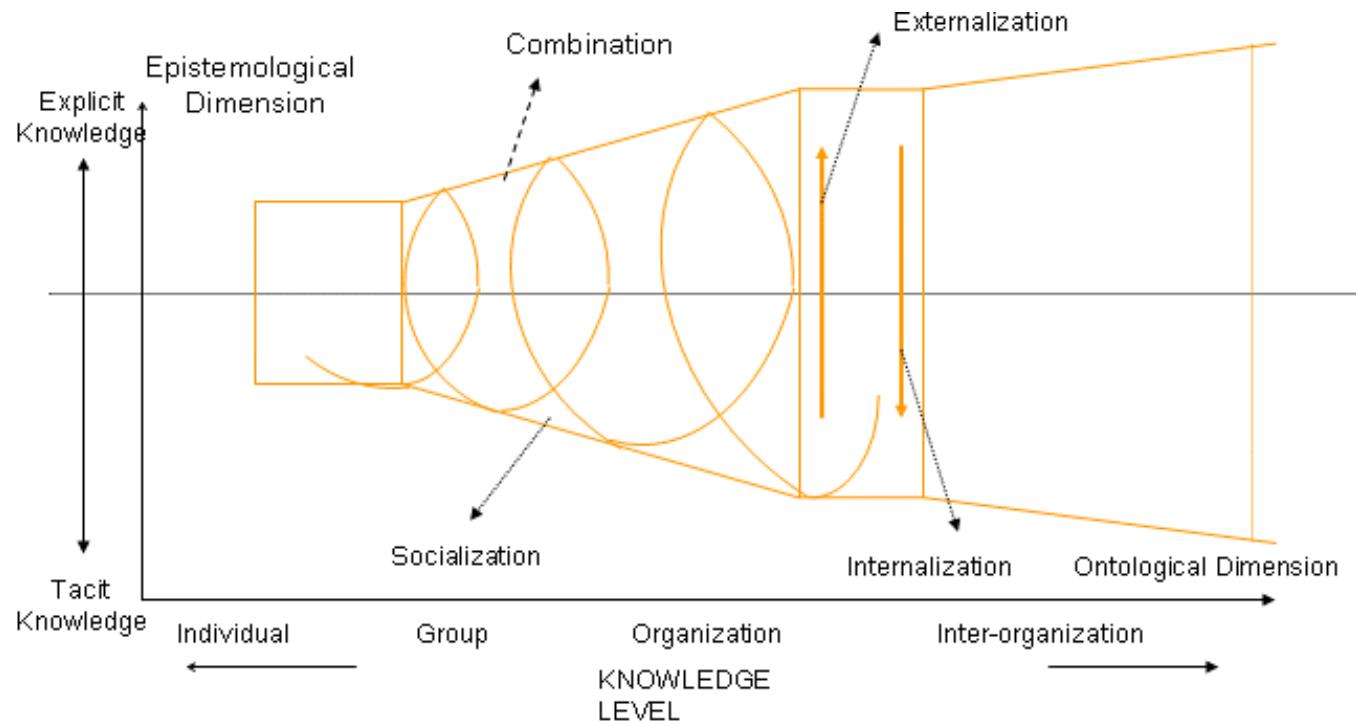
Strategies for Knowledge Management: Communication and Codification



Four Types of Knowledge Conversion



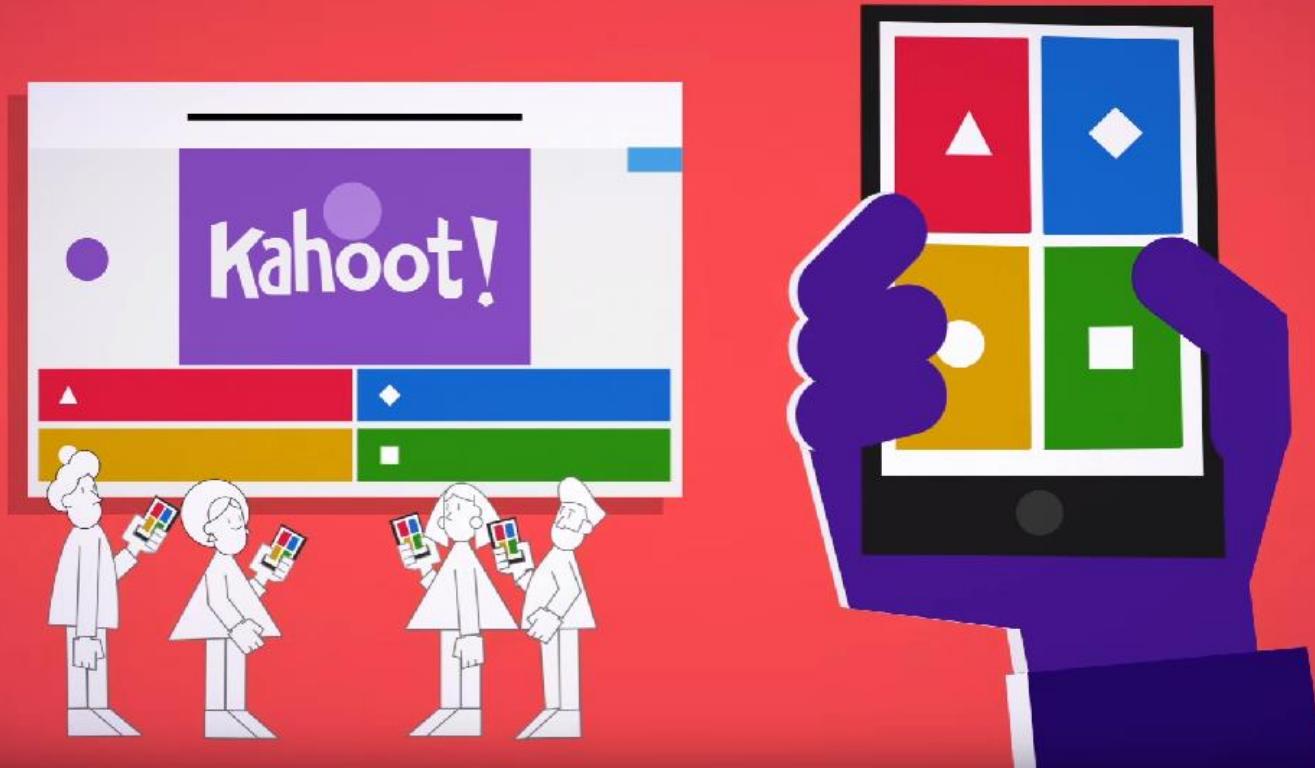
Spiral of Organizational Knowledge Creation



Nonaka (1994)

Quiz Time!

Go to kahoot.it



IMKM Lecture 11: Basics and Tools of Knowledge Management

Outline

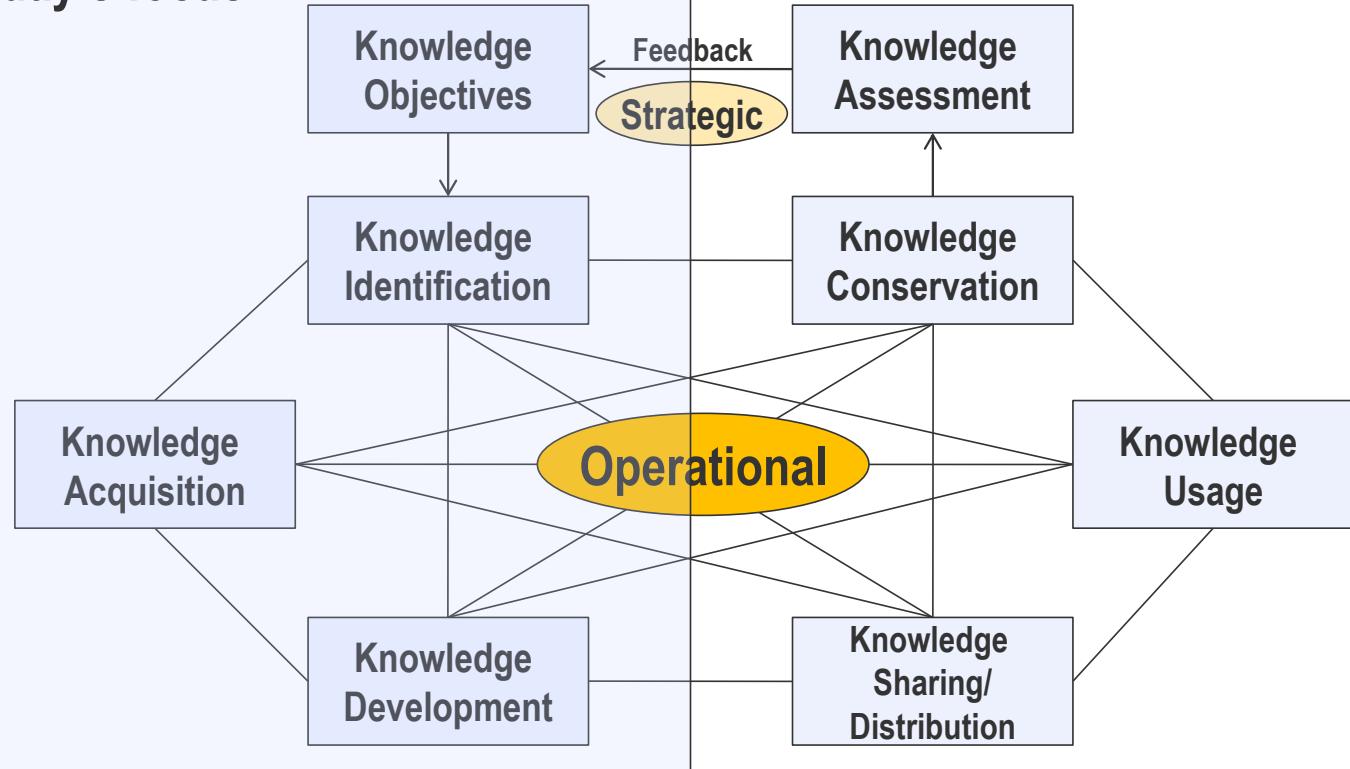
1. Knowledge Management
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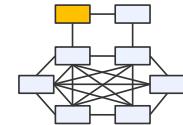
Core Processes of Knowledge Management

Today's focus



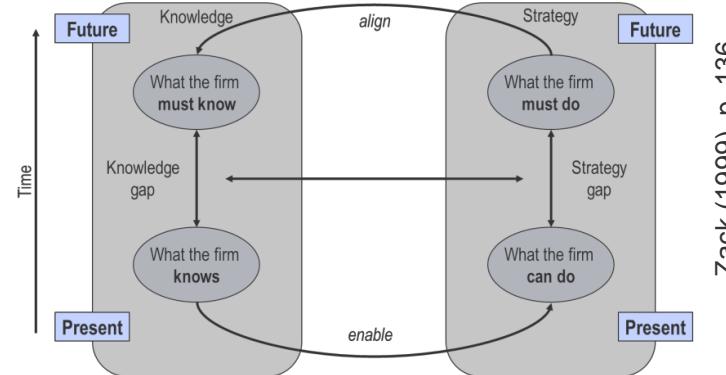
Adapted from Probst et al. (2010)

Knowledge Objectives



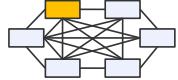
*“What kind of knowledge is **important** today as well as in the **future** to have a knowledge-based competitive advantage?”*

*“Where in the organization is what kind of know-how or knowledge **needed**? ”*



- Strategic planning of organizational knowledge base
- **Knowledge goals** (St. Gallen Management Model)
 - **Normative**: Establish a knowledge oriented corporate **culture**
 - **Strategic**: define which knowledge to **retain** and which to **establish**, organizational structures, management systems
 - **Operative**: **Execution** of strategic knowledge goals and definition of **operational** knowledge goals for the day-to-day business

Probst et al. (2010)

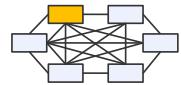


Knowledge Identification

“How do I create transparency about existing knowledge?”

- **Task:** Analysis and description of knowledge environment
- **Challenge:** Provide overview over internal and external data, information, and capabilities.
- **Problems:** Inefficiency, uninformed decisions, duplication

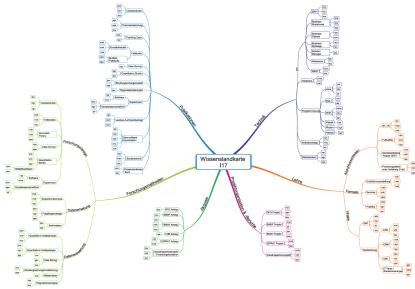
Probst et al. (2010)



Knowledge Identification

Approaches to Knowledge Identification

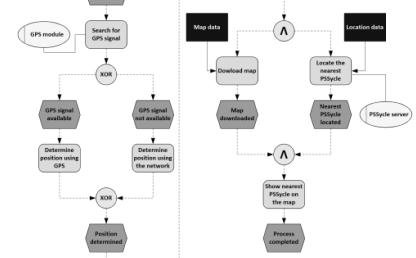
Knowledge Bearer Maps



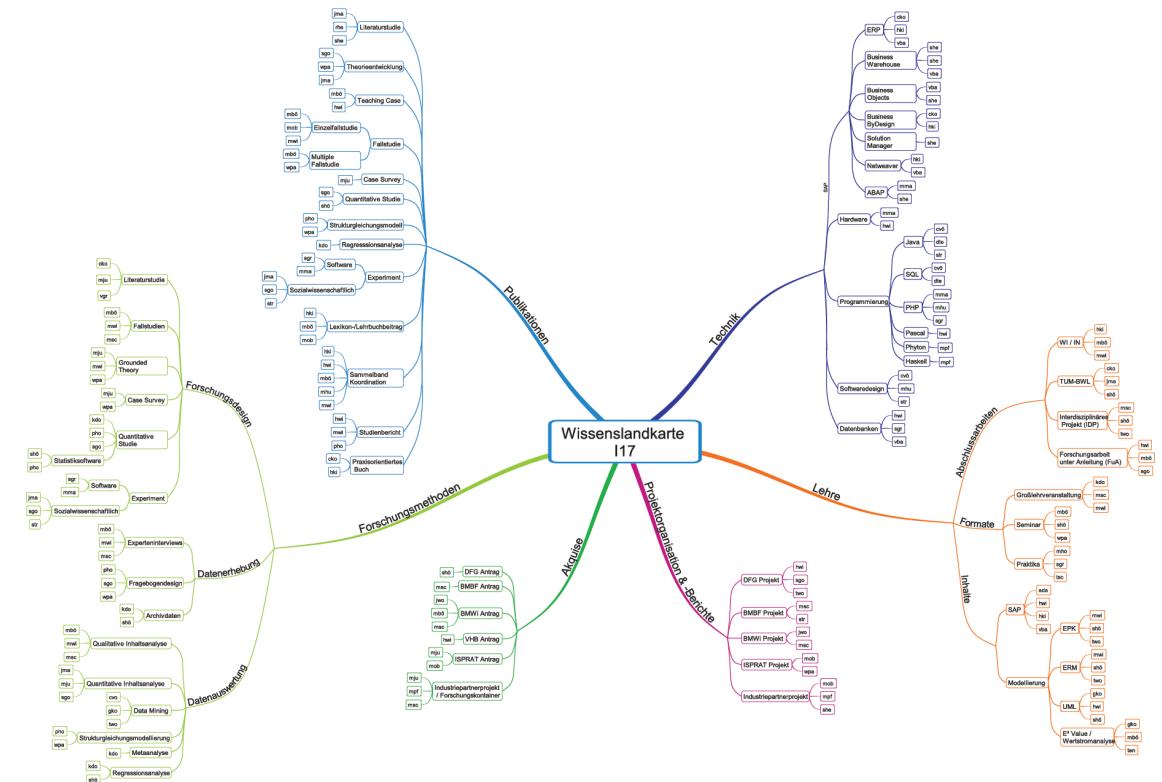
Knowledge Balance Sheet



Process Modelling



Example: Knowledge Bearer Map



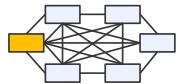
Example: Knowledge Balance Sheet



		Wirkung von Einflussfaktoren (Zeilen) auf andere Einflussfaktoren (Spalten)																					
		Ursache																					Aktivitäten
		GP-1	GP-2	GP-3	GE-1	GE-2	GE-3	HK-1	HK-2	HK-3	HK-4	SK-1	SK-2	SK-3	SK-4	SK-5	SK-6	BK-1	BK-2	BK-3	BK-4	BK-5	Aktivitäten
GP-1	Akquisition	X	2	1	3	3	2	1	2	0	0	0	2	2	1	2	0	1	1	1	2	1	30
GP-2	Softwareentwicklung	1	X	1	3	2	3	1	0	0	0	1	1	3	1	2	2	3	2	1	2	2	31
GP-3	Service & Kundenbetreuung	2	0	X	1	3	1	1	1	0	0	1	1	2	2	2	1	3	0	0	0	0	21
GE-1	Wachstum	3	2	2	X	2	3	0	0	2	0	0	2	1	2	0	2	1	1	1	2	2	28
GE-2	Image/ Kundenzufriedenheit	3	0	2	3	X	2	0	1	3	0	0	1	0	0	0	0	3	1	2	2	2	25
GE-3	Rentabilität	1	2	0	2	2	X	0	0	2	0	0	0	0	1	0	0	1	1	1	2	3	19
HK-1	Fachkompetenz	2	3	3	2	3	1	X	0	2	1	1	1	3	3	3	1	1	1	0	2	2	35
HK-2	Soziale Kompetenz	3	0	3	0	2	0	0	X	3	1	0	2	0	0	1	0	3	1	3	2	2	27
HK-3	Mitarbeitermotivation	3	3	1	3	2	1	1	2	X	1	0	1	1	2	2	3	2	2	2	1	2	35
HK-4	Führungskompetenz	3	2	1	2	2	2	2	3	3	X	1	2	2	3	1	1	2	2	2	1	2	39
SK-1	Führungsinstrumente	1	1	0	1	1	2	2	3	3	X	1	1	1	1	1	1	0	0	1	1	1	24
SK-2	Unternehmenskultur	0	1	1	0	0	0	1	2	2	0	0	X	0	1	2	3	2	1	1	0	2	19
SK-3	Informationstechnik	2	2	2	1	2	2	3	1	1	2	3	0	X	2	2	3	1	1	0	1	1	32
SK-4	Dokumentiertes Wissen	3	3	2	2	2	2	2	1	2	1	0	1	2	X	3	1	0	1	1	1	2	32
SK-5	Innovation	2	3	1	3	2	2	2	0	2	0	0	1	1	2	X	1	2	1	2	2	2	32
SK-6	Interne Kooperation	2	2	2	1	2	1	2	2	2	2	2	2	2	3	X	1	1	0	0	0	31	31
BK-1	Kundenbeziehungen	2	2	1	2	3	2	0	2	2	1	0	1	1	1	0	0	X	1	1	1	1	27
BK-2	Lieferantenbeziehungen	1	1	1	1	1	2	1	0	1	0	0	0	2	2	2	0	2	X	1	2	1	21
BK-3	Beziehungen zur Öffentlichkeit	2	0	0	0	1	0	0	2	2	0	0	1	0	0	0	0	2	1	X	2	1	14
BK-4	Beziehungen zu Kapitalgebern, Investoren und Eignern	1	2	0	2	0	2	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	10
BK-5	Beziehungen zu Kooperationspartnern	1	1	1	1	1	2	2	1	0	0	0	1	2	3	2	1	1	0	2	X	2	26
		Passivsumme																					30

0: keine Wirkung 1: schwache Wirkung 2: mittlere Wirkung 3: starke Wirkung (es können positive oder negative Wirkungen eingegeben werden)

Quelle: https://www.bmwi.de/Redaktion/DE/Downloads/W/wissensmanagement-fw2013-teil3.pdf?__blob=publicationFile&v=1

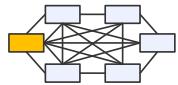


Knowledge Acquisition

“What capabilities do I acquire from external sources?”

- **Task:** Decide what knowledge to acquire through recruiting or acquisition (Consultants, mergers, or acquisitions)
- **Challenge:** Ensure best possible access to external knowledge
- **Problems:** Un-used potential for knowledge acquisition in existing cooperations

Probst et al. (2010)



Knowledge Acquisition

Approaches to Knowledge Acquisition

Hiring

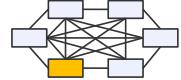


Consulting



Outsourcing, Mergers, or Acquisitions

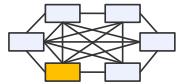




Knowledge Development

“How do I build up new knowledge?”

- **Task:** Build up new knowledge in addition to external acquisition
- **Challenge:** Develop new capabilities, better ideas, and increasingly powerful processes
- **Problems:** Creation of new knowledge in areas without expertise is very difficult (e.g., R&D)



Knowledge Development

Approaches to Knowledge Development

Learning Environment

The screenshot shows the openSAP learning management system. At the top, there are navigation links: 'User openSAP', 'Kursübersicht', 'Kurs', 'Anmeldungen', 'Deutsch', and 'Anmelden'. Below the header, the course title 'Leadership in Digital Transformation' is displayed, along with the subtitle 'Prof. Dr. Thomas Krcmar'. A 'Starten' button is visible. The main content area features a large image of the Burj Khalifa in Dubai, with the text 'Leadership in Digital Transformation' overlaid. To the right of the image, there is a detailed course description and a schedule: '06. October 2025, 09:00 Uhr (UTC) bis Mittwoch, 04. November 2025, 09:00 Uhr (UTC)', 'Autorenkarte: English', and a 'Für diese Kurse anmelden' button.

Room for Experiments

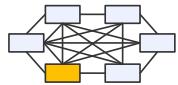


Workshops



Prerequisites

- Create freedom
- Reduce workload
- Congruence of interests
- Make room for errors



Example: Knowledge Development: MOOC

openSAP

Über openSAP Kursbereiche ▾ Kurse Ankündigungen  Deutsch ▾ Anmelden ▾

Leadership in Digital Transformation

Prof. Dr. Helmut Krcmar

Bitte melden Sie sich an, um fortzufahren. 

Kurs im Selbststudium



Leadership in Digital Transformation

TUM Technische Universität München

openSAP Thought Leaders

Teilen  Facebook  Twitter  Google+

Digital transformation is first and foremost not about new technologies. It is about changing the way a company creates value, interacts with its customers and business partners, and competes in established and emerging markets. It is an organizational change process that reaches every corner of the company.

Digital transformation projects are characterized by high social complexity, structural rigidity, and procedural ambiguity. Initiating, executing, and governing the digital transformation of their companies is a major challenge for today's leaders.

In this course, you'll learn about the characteristics of digital transformation, how it evolved, and how the organizational and technological changes associated with digital transformation change the role, the skills, and the concept of leadership.

 Dienstag, 06. Oktober 2015, 09:00 Uhr (UTC) bis Mittwoch, 04. November 2015, 09:30 Uhr (UTC)

 Kurssprache: English

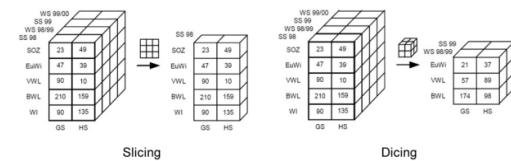
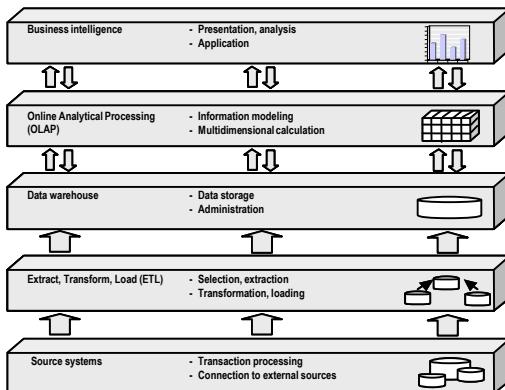
Für den Kurs einschreiben 

0:00 / 1:25 10x    

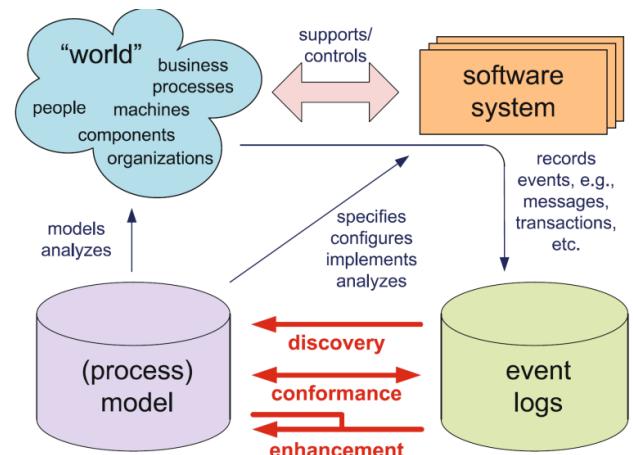
openSAP (2010)

Example: Experiment with discovering knowledge from data or information

Data Warehouse



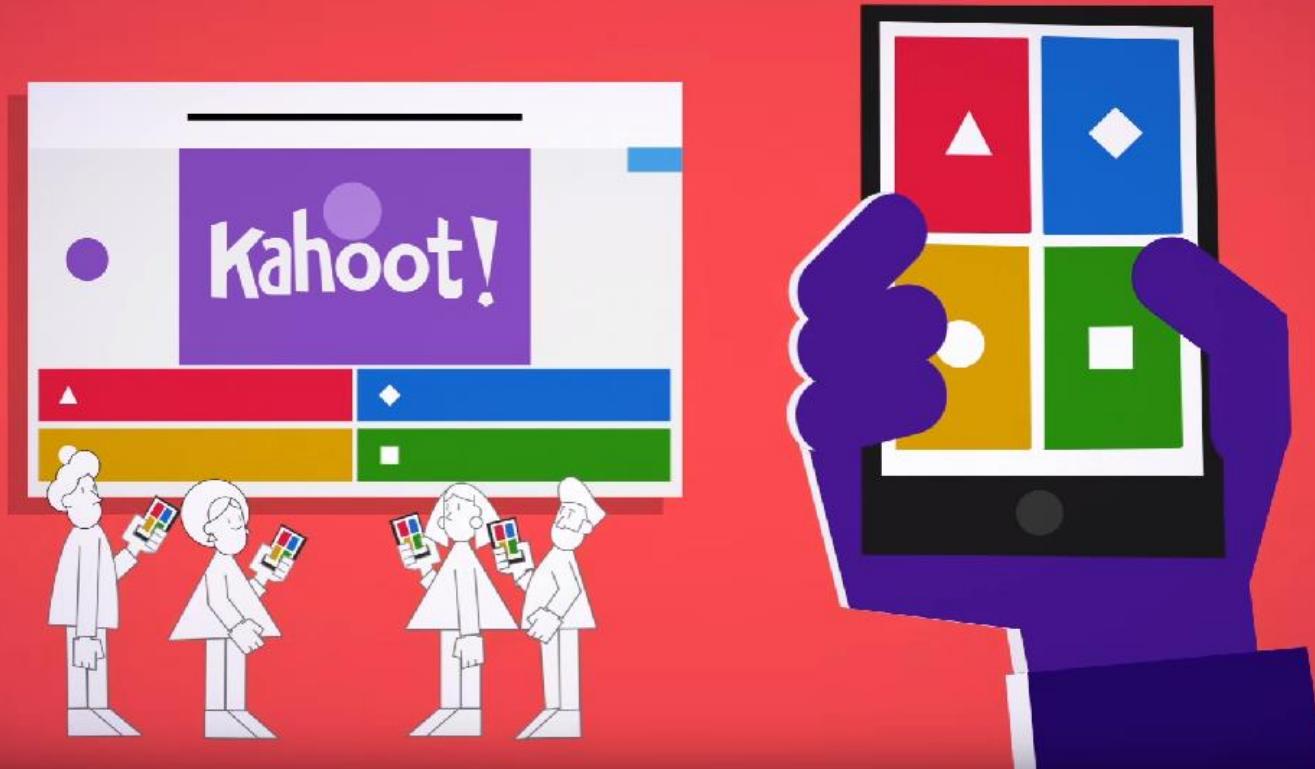
Process Mining



(van der
Aalst, 2011)

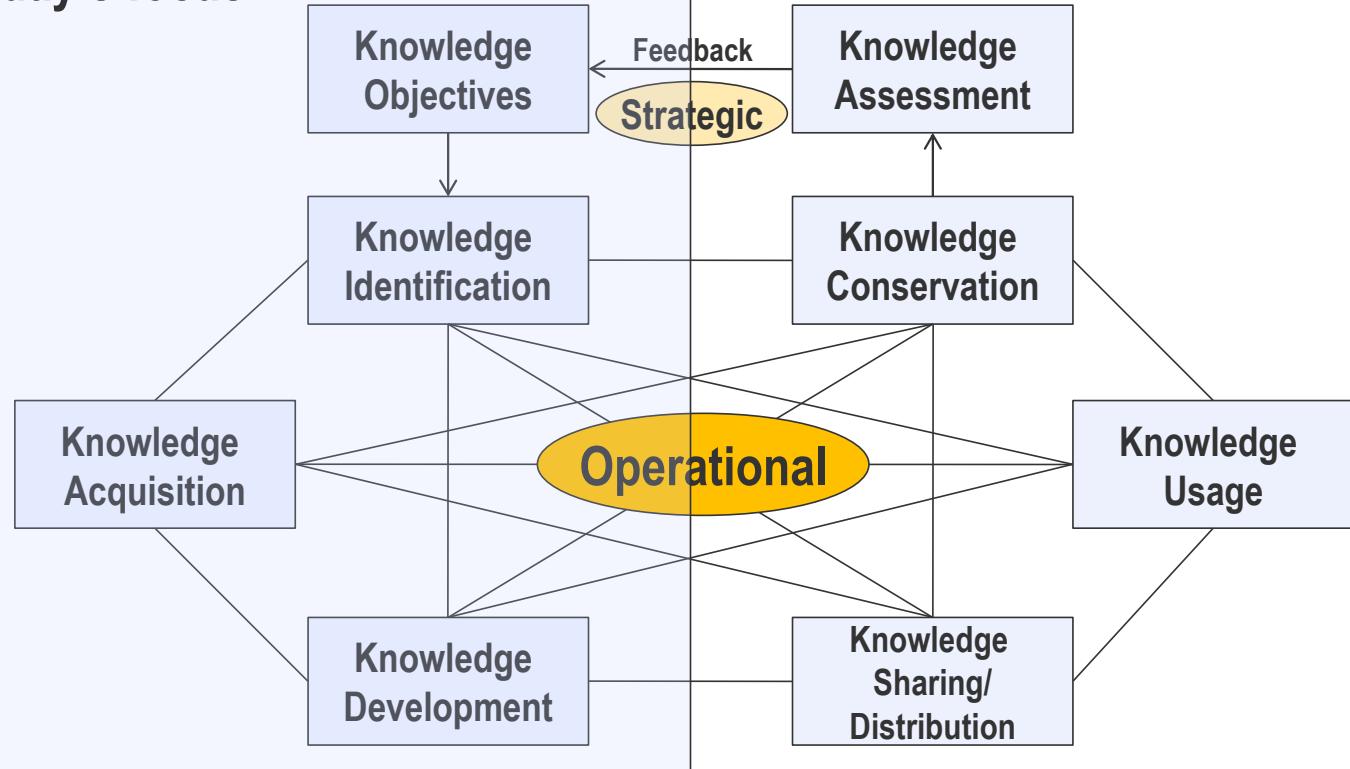
Quiz Time!

Go to kahoot.it



Core Processes of Knowledge Management

Today's focus



Adapted from Probst et al. (2010)

Literature

Core Literature

- **Krcmar, H. (2015):** Informationsmanagement (Vol. 6), Springer Verlag, Berlin 2015. pp. 660-695.
- **Probst/Raub/Romhardt (2010):** Wissen managen: Wie Unternehmen ihr wertvollste Ressource optimal nutzen (6. Aufl.). Gabler, Wiesbaden.

Additional Reading

- **M. Bellmann, H. Krcmar, T. Sommerlatte (2002):** Praxishandbuch Wissensmanagement. Strategien - Methoden – Fallbeispiele. Symposium, Düsseldorf

References

- Ackoff, R. L. (1989). From Data to Wisdom. *Journal of applied systems analysis*, 16(1), 3-9.
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- Bhatt, D. (2000). EFQM Excellence Model and Knowledge Management Implications. In.
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- Brooking, A. (1999). Corporate Memory: Strategies for Knowledge Management. London: Thompson Business Press.
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- Krcmar, H. (2015). *Informationsmanagement*. Berlin Heidelberg: Springer Gabler.
- Krcmar, H. (2015). Leadership in Digital Transformation. Retrieved from openSAP website: <https://open.sap.com/courses/ldt1-tl>, last accessed 09/01/2019.
- Lank, E. (1997). Leveraging Invisible Assets: The Human Factor. *Long range planning*, 30(3), 406-412.
- Müller, C. (2007). Graphentheoretische Analyse der Evolution von Wiki-basierten Netzwerken für selbstorganisiertes Wissensmanagement. (PhD), Universität Potsdam,
- Nonaka, I. (1994). A Dynamic Theory of Organizational Knowledge Creation. *Organization Science*, 5(1), 14-37.
- Probst, G., Raub, S., & Romhardt, K. (2010). *Wissen managen: Wie Unternehmen ihre wertvollste Ressource optimal nutzen* (6 ed.). Wiesbaden: Springer Gabler.
- Rehäuser, J., Krcmar, H. (1996). *Wissensmanagement im Unternehmen*. In G. Schreyögg, Conrad, P. (Ed.), *Wissensmanagement* (6 ed., pp. 1-40). Berlin, New York: de Gruyter.
- Zack, M. H. (1999). Developing a Knowledge Strategy. *California Management Review*, 41(3), 125–145.



Information Management and Knowledge Management (IMKM)

Lecture 12

Basics and Tools of Knowledge Management

TUM

Chair for Information Systems

© Prof. Dr. H. Krcmar

Lecture Schedule

Information Systems Strategy

Business Value of IT

Business IT Alignment

IT-enabled Strategies

Guest Lecture: Digital Leadership and the CIO Role

Digital Platforms

Information Management

IT Controlling and IT Governance

IT Sourcing and IT Offshoring

IT Security, Privacy and Risk Management

Guest Lecture: Natural Language Processing for IM

Knowledge Management

Basics

Tools

Guest Lecture:
Applications



IMKM Lecture 12: Basics and Tools of Knowledge Management

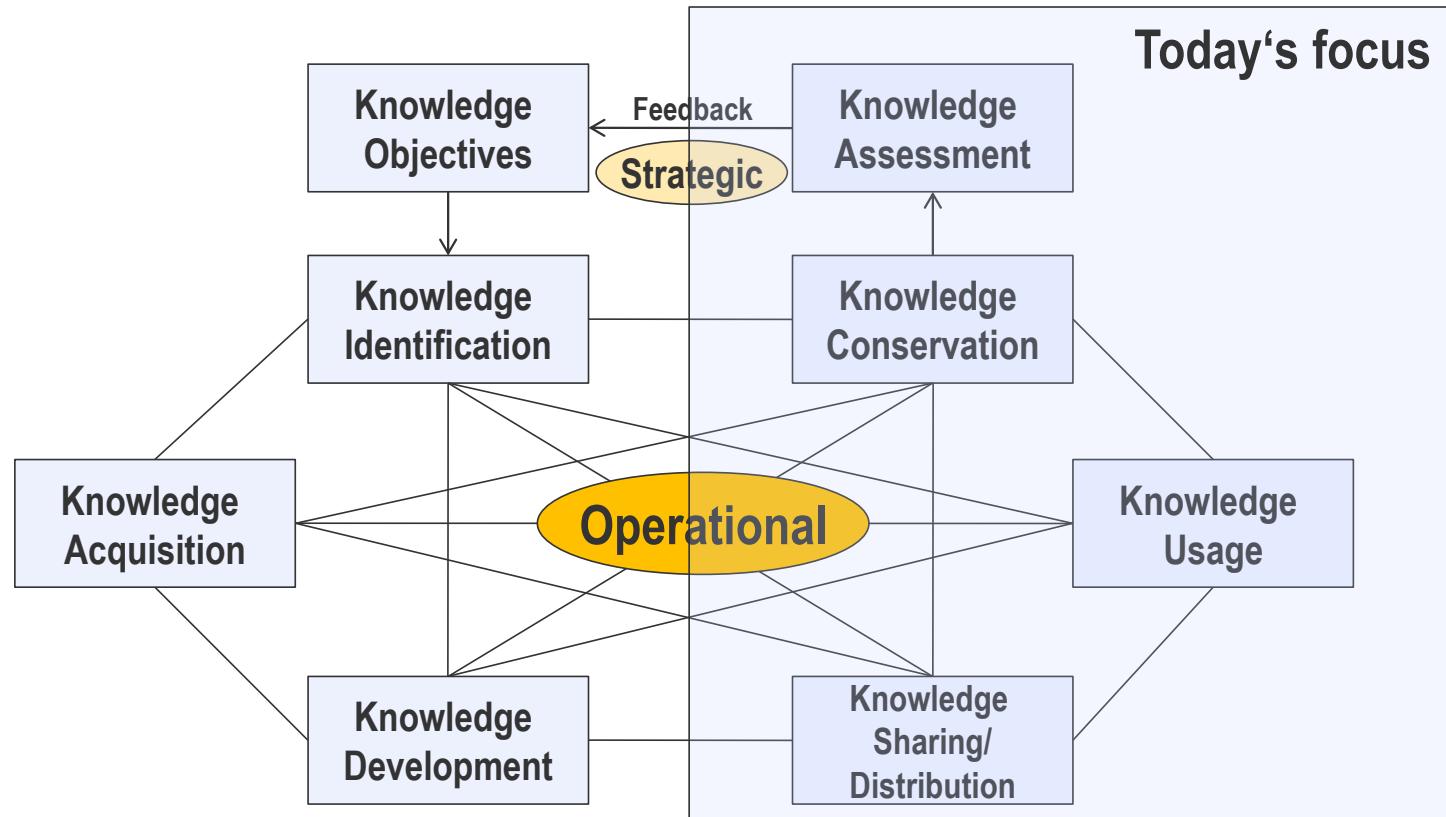
Outline

1. Core Processes of Knowledge Management
 1. Knowledge Sharing/ Distribution
 1. Organizational Metaknowledge
 2. Knowledge Usage
 3. Knowledge Conservation
 4. Knowledge Assessment

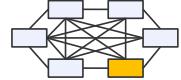
Learning Objectives

- You know the core process of knowledge management and can give examples for each step.
- You understand the concept of organizational metaknowledge and how it supports knowledge management.

Core Processes of Knowledge Management



Adapted from Probst et al. (2010)



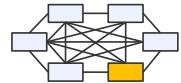
Knowledge Sharing and Distribution

“How do I get knowledge to the right places?”

- **Task:** Make knowledge accessible for the people who need it
- **Challenge:** Transfer knowledge from *individuals* to *groups*
- **Problems:** Existing knowledge is *not codified* and accessible by others

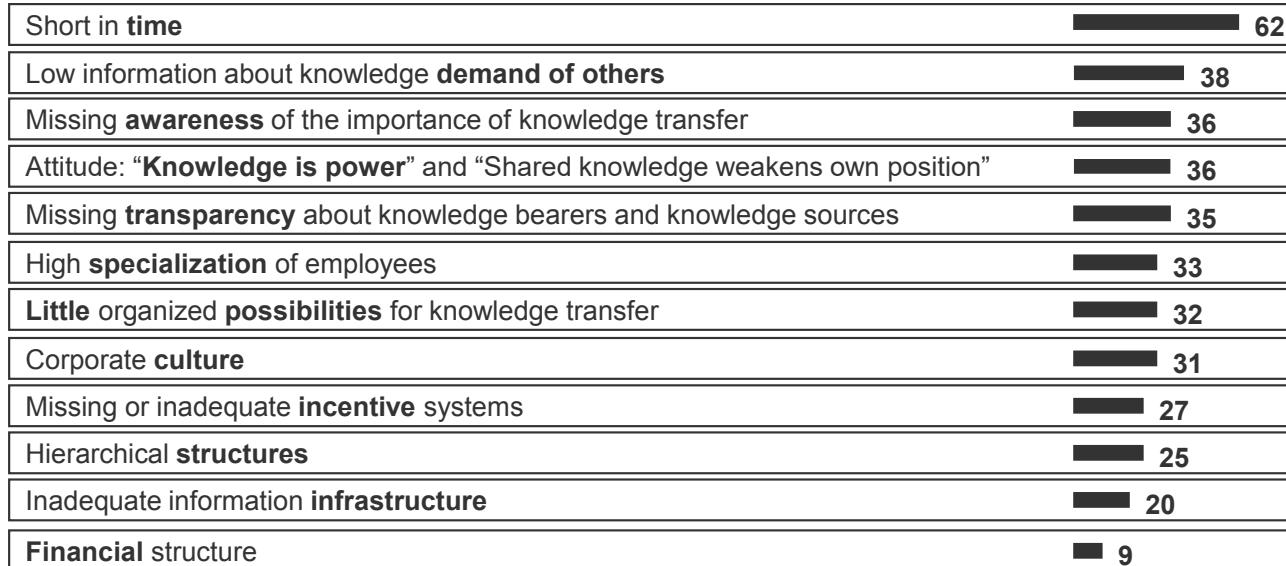
Probst et al. (2010)



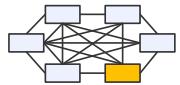


Barriers of Effective Knowledge Transfer

Percentage of respondents who are hampered by this knowledge transfer barriers:



Missing time is seen as number one enemy of effective knowledge transfer



Knowledge Sharing and Distribution

Approaches to Knowledge Sharing and Distribution

Room for Exchange



Wikis and Enterprise Social Networks

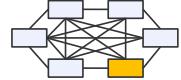
Ingo Müller - June 13 at 10:09 AM from Desktop
Theme: „Datenanamme und Sonderzettel im ComCo 2.0“
Hallo zusammen, ich bitte alle ComCo Admins die Kolleginnen und Kollegen vor Ort über folgendes zu informieren:
„Um Daten in den „Blaublätter“ darin liegende Sachen nicht verworfen werden, ...“ & „... & ...“
„... & ...“ da es zu erheblichen Synchronisationsproblemen führen die teilweise sogar dazu führen können, dass Daten nicht mehr geöffnet werden. Herz-gehrte auch Punkte“, die immer wieder z.B. bei Produkten verwendet werden.
expand ▾

Kraus, Sabine - 21 hours ago
Hallo Zusammen,
heute ist es auf ComCo unter Neues auf allen SOC Seiten (inkl. Regionen) als Info eingestellt.
Sabine Kraus

Ingo Müller - May 28 at 2:06 PM from Desktop - Edited
Theme: „Alter ComCo Sharepoint 2010 im Moment funktioniert nicht bzw. ist nicht einsehbar. Bitte kann ich mich eine Info geben, wenn dies bei Ihnen ebenfalls der Fall ist.
Besten Dank. Miete mich, wenn er wieder funktioniert.
<https://comco-sharepoint-my.sharepoint.com/:/community/mu-comco/>

(Reverse-) Mentoring





Example: Wikis

- Enable anyone to contribute
- Edit any page
- Low contribution threshold
- Uses a simplified mark-up language
- Can be used collaboratively

Create Wiki Page

Instructions
Graded Course Wiki for Chapter 3.

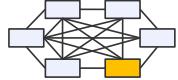
* Indicates a required field.

1. Wiki Page Content

* Name Energy Security: Nucle

Content

If the United States decides to decrease its dependence on Middle East oil, the current administration is likely to power to make up the shortfall. This presents another set of security concerns that will affect the military's mix reliance on nuclear power means a greater chance of diversion of fissile material by nonnuclear states or terrorist this, the armed forces will undoubtedly be called upon to provide secure escort for nuclear materials. In addition become more critical to the nation's power grid, they themselves become more attractive as terror targets and increased National Guard protection.



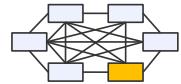
Example: Enterprise Social Networks

Common obstacles for knowledge sharing:

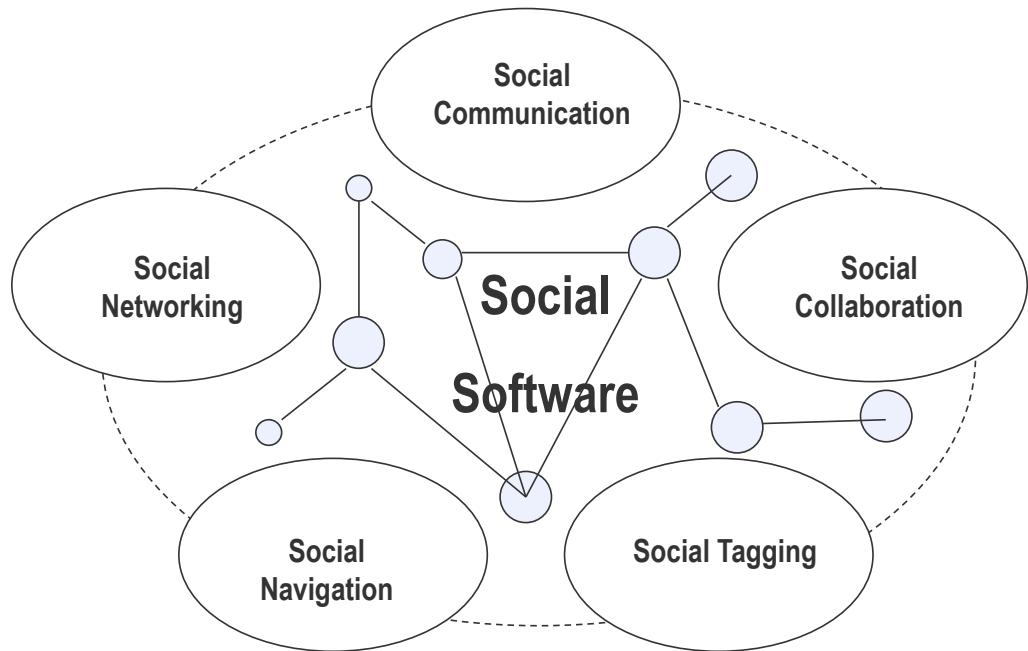
- Digital objects are difficult to **find**.
- When found, objects are difficult to **assess**.
- Systems are not strong at **identifying people who can help** find or assess objects.

“Social software” may help overcoming some difficulties.

Grudin (2006)



Example: Enterprise Social Networks



Müller (2007)

Example:



Acme Sites

- Noelle Kelly

Channels

- # announcements
- # cs-marketing
- # cs-sales
- # feedback
- # product
- # proj-coupons**
- # team-cs

Direct Messages

- slackbot
- Noelle Kelly
- Steve Young
- Terrance Perez

#proj-coupons

Noelle Kelly
Are we still on track for the new offers?

Steve Young
We are! Here's the schedule:

Coupons launch plan
314kB PDF

Noelle Kelly
Awesome. Happy to help with the rollout.

vacation policy

Messages Files

190 results Most recent Filter by

announcements — Sep 19 Matt Brewer 8:21 AM Good news, everyone! The vacation policy has been updated to reflect our new accrual rates.

24 reactions 4 replies

ask-acme-leadership — Jan 02 Lee Hao 12:30 PM I'm seeing some feedback about our new vacation policy. A few thoughts on why we changed it for this upcoming fiscal year...

new-hires — Dec 04, 2017 Zoe Maxwell 9:45 AM Here are some links for your HR orientation later today. We'll cover the vacation policy, PTO requests, and personal days.

Channels & direct messages

general

announcements

ask-acme-leadership

new-hires

Date

Starting Ending

Acme Sites

- Lee Hao

Channels

- # announcements
- # big-wins
- # business-ops
- contract-faqs
- # general
- # new-accounts**
- # sales

Direct Messages

- slackbot
- Lee Hao
- Liza Dawson
- Madeline Dawson

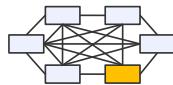
#sales

Lee Hao
@Liza what opportunity are you focusing on this week?

Liza Dawson
/Salesforce BigCo

Salesforce APP

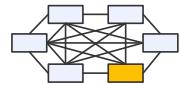
BigCo | Opportunity
Account Owner: Liza Dawson
Annual Revenue: \$5,000,000
Industry: Retail
Type: Potential Customer
[Show Account](#)



- ## Conversations in channels
- Public
 - Private
 - Direct messages

- ## Conversations as searchable knowledge base
- Share channels with other firms
 - Voice and video calls with screen sharing
 - Integrated file sharing

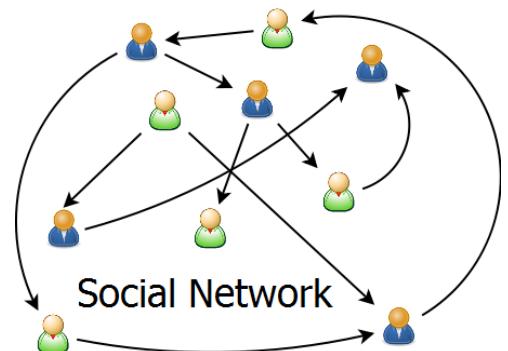
- ## Integration in other tools
- Salesforce
 - Zendesk
 - Jira



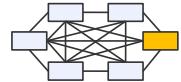
Supporting Concept: Organizational Metaknowledge

*“Organizational metaknowledge refers to knowledge about **who knows what** and **who knows whom** within the organization.”*

- Enterprise social networks can make invisible communication **visible**.
- Visible communication improves metaknowledge with two mechanisms
 - **message transparency**: Seeing coworkers' messages helps to infer about others' knowledge.
 - **network translucence**: Seeing the structure of coworkers' communication networks helps to infer about who coworkers talk with somewhat regularly.



Leonardi (2014)



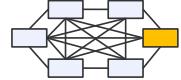
Knowledge Usage

“How do I make sure knowledge is actually used?”

- **Task:** Ensure the *productive use* of organizational knowledge
- **Challenge:** Knowledge identification and distribution is not enough
- **Problems:** Various *barriers* inhibit the use of external knowledge

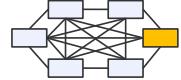
Probst et al. (2010)





Example: Knowledge Communities

- Informal group of people with a **shared interest** in and affinity to a specific subject.
- Communities support, for example, platform functionalities in an app store
 - administration of **membership** and related work-flows
 - provision of **tools** for communication and cooperation among the members (e.g. bulletin boards, chats, repositories, etc.)
 - analysis of **member data** and profiles of members in order to give recommendations for contacts or likes to knowledge units



Example: Lessons Learned

Systematic **documentation** and processing of **experiences** in an organization to systematically learn from those previous experiences.

Example

Xerox: Shared database with tips of and for technicians to fix printers

Pro

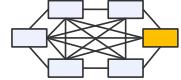
- Preserves knowledge for the organization
- Avoids extra or duplicate work
- Reduces training time of new employees

Contra

- Additional effort for documentation
- Requires willingness of employees to share **and** use knowledge
- Management must plan in time and promote an open failure culture

Lehner (2009), p. 189





Example: Best Practice Sharing

Document the **best possible solution** (in terms of efficiency or effectiveness when compared to others) to a given **problem** with the aim of replacing existing processes by best practices.

Example

Texas Instruments: **Best Practice Sharing Facilitators** to find, document and communicate best practices and promote sharing tools.

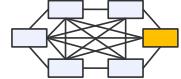
Pro

- Increase efficiency and/or effectiveness
- Solutions are proven in practice

Contra

- Often lack generalizability (too contextual or specific to an organization)
- Too strong focus may be limiting, ignoring other types of knowledge (e.g. customers)

Lehner (2009), p. 190; Davenport & Prusak (1998), p. 169



Example: Story Telling/ Learning History

Method to create and distribute stories (learning histories) about an organization.

Common stories

“How will the organization deal with obstacles”, “How will the boss react to mistakes?”,
“Is the big boss human?”, “The rule-breaking story”...¹

Pro

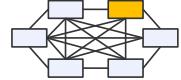
- Sets knowledge into a context and is thus well-suited for complex issues.
- Human beings **learn** particularly well from stories
- More flexible than Lessons Learned or Best Practices

Contra

- Highly time-consuming / high personnel effort to create stories
- No short-term benefits

Lehner (2009), p. 190; 1: Martin et al. (1983)

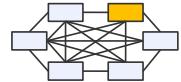




Knowledge Conservation

“How do I guard myself against knowledge losses?”

- **Task:** Select important knowledge, ensure adequate **storage** and perform regular **updates**
- **Challenge:** Ensure existing knowledge is **useable** in the future
- **Problems:** Knowledge can be lost through re-organization, movement of labor



Examples for Knowledge Conservation

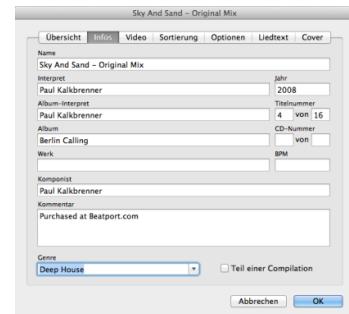
Knowledge repositories

are depositories for **explicit** knowledge in which knowledge units (KU) are registered, administrated and are made accessible for potential users.

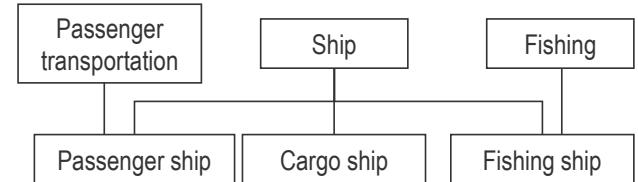
Core functionalities are:

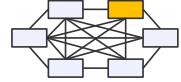
- **storage** of KU's
- supplementation of KU's through **meta data**
- **classification** and **indexing** of KU's in order to offer a search possibility within a KU
- documentation of **connections** between KU's, people and other units (e.g. key words)
- documentation of **change** histories of KU's
- support of **editorial processes** for KU's
- **search** functionality supporting the identification of KU's

Metadata



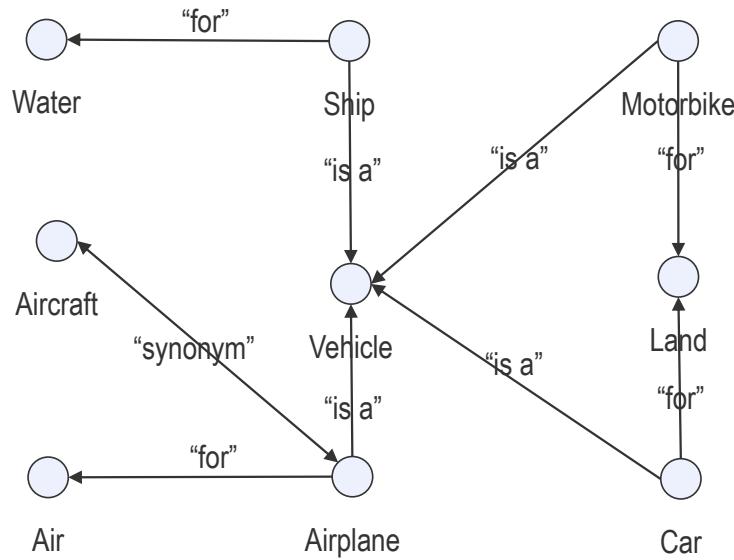
Taxonomy: poly-hierarchical classification



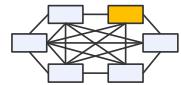


Example for Knowledge Conservation: Ontology

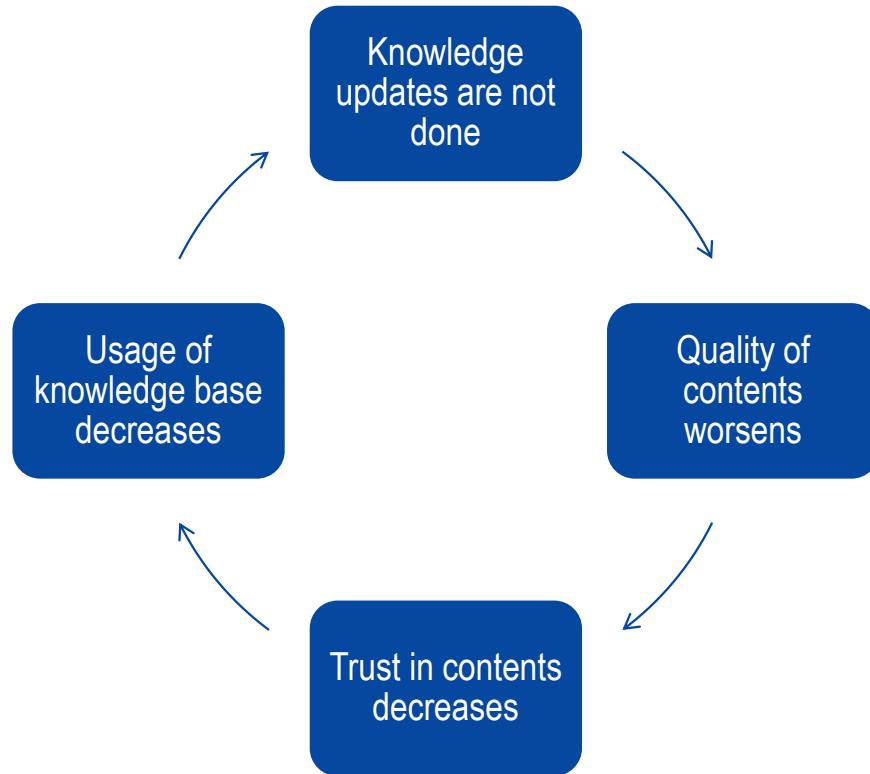
Concepts (Vehicle, Water, Air) are set into relation (hierarchic, synonym, spatial) to each other



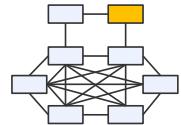
Adapted from Lehner (2009), p. 198



Negative Reinforcement Cycle of Knowledge Losses



Adapted from Probst et al. (2010)

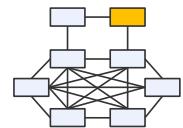


Knowledge Assessment

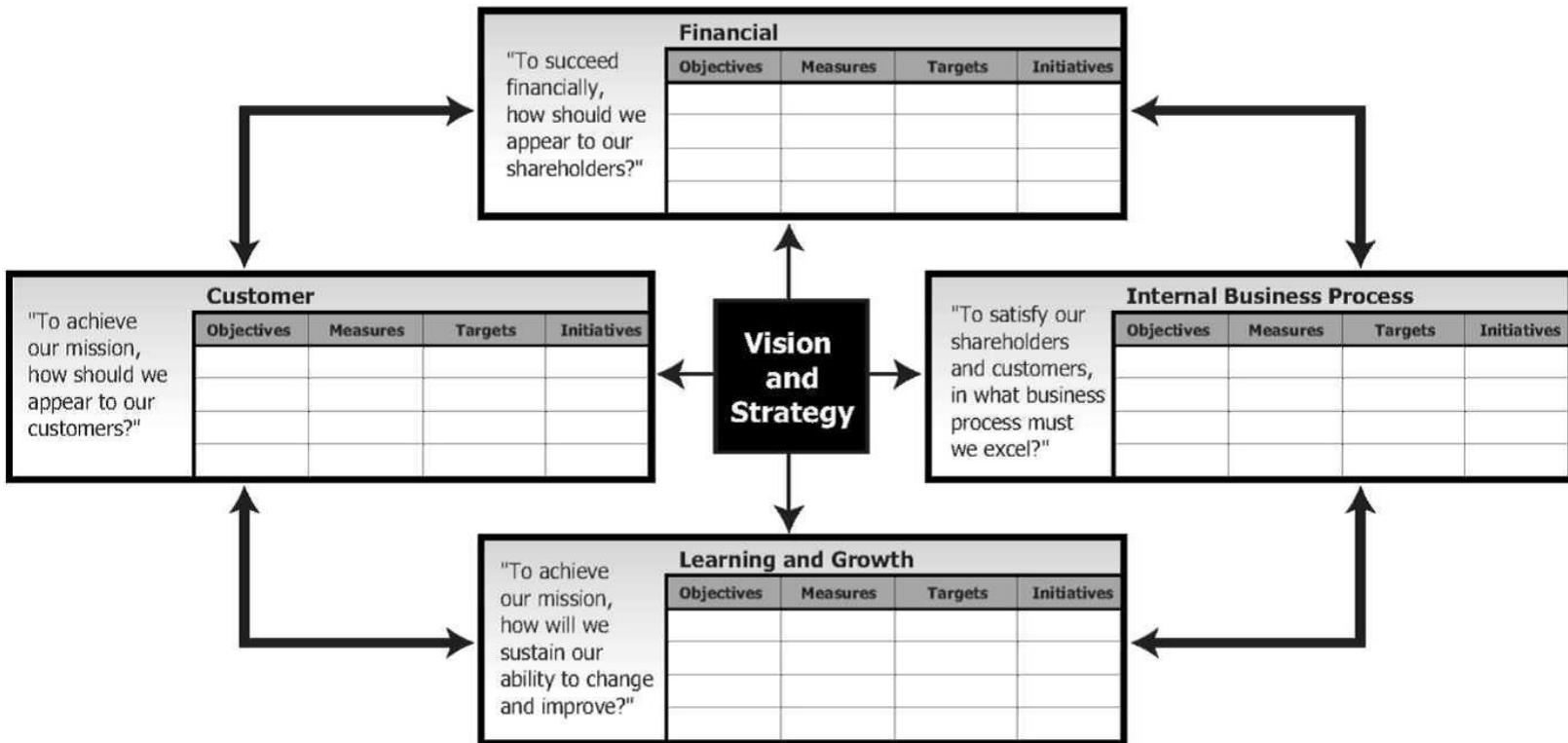
“Do the investments in knowledge management pay off?”

- Measure efforts in knowledge management
- Reveal **success and failure** of knowledge management
- Without measures like this, knowledge management is not efficient and the management cycle remains incomplete.
- For measuring knowledge, it is crucial to select suitable **indicators**.
- Example: Balanced Scorecard

Probst et al. (2010)



Knowledge Assessment: Selection of indicators with Balanced Scorecard



Kaplan & Norton (1992)

Example for Knowledge Assessment: Benchmarking

Systematic comparison of products, services or processes to identify strengths and weaknesses.

Forms

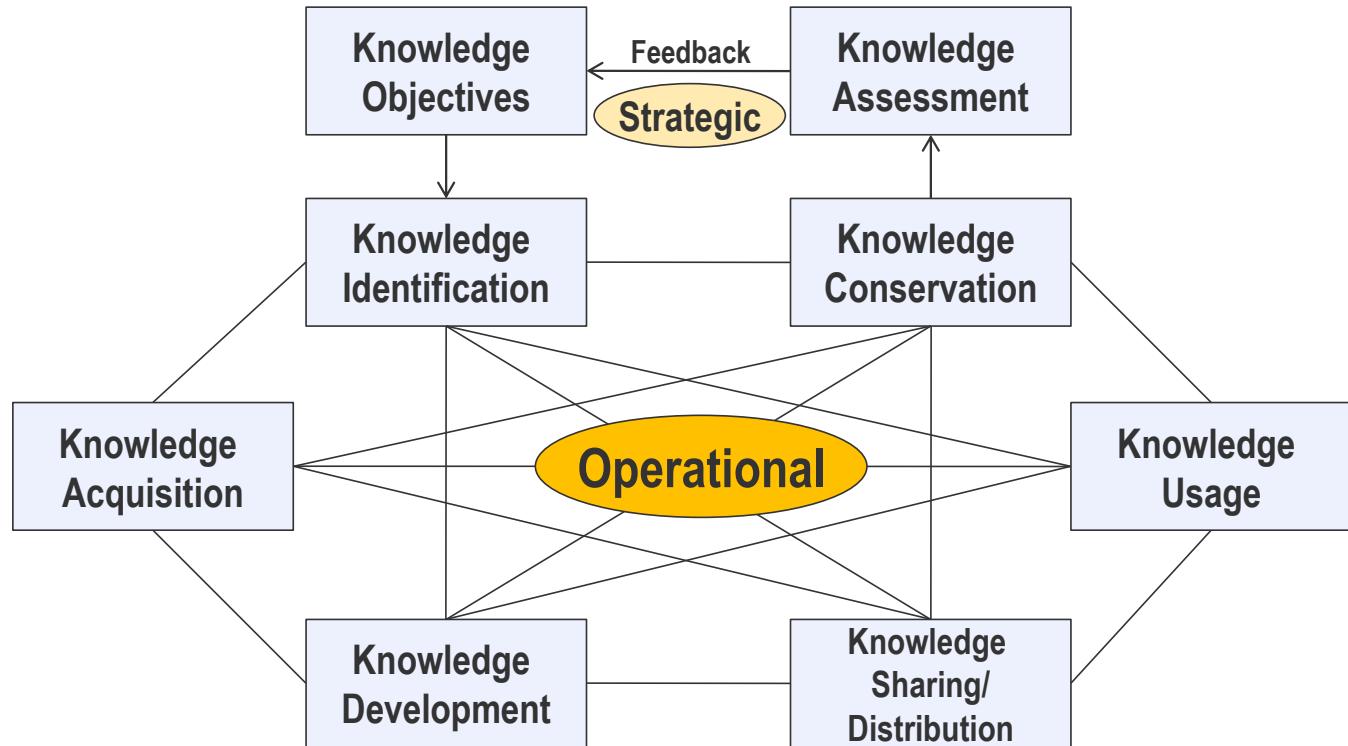
- Internal (departments, business units)
- Competitive (other companies)
- Functional (non-identical processes)
- Generic (statistical comparison with other companies)

Examples

- KM Performance Framework (de Gooijer, 2000): BSC + behavioural sci.
- Process-oriented Performance Measurement (PPM)

Lehner (2009), pp. 232

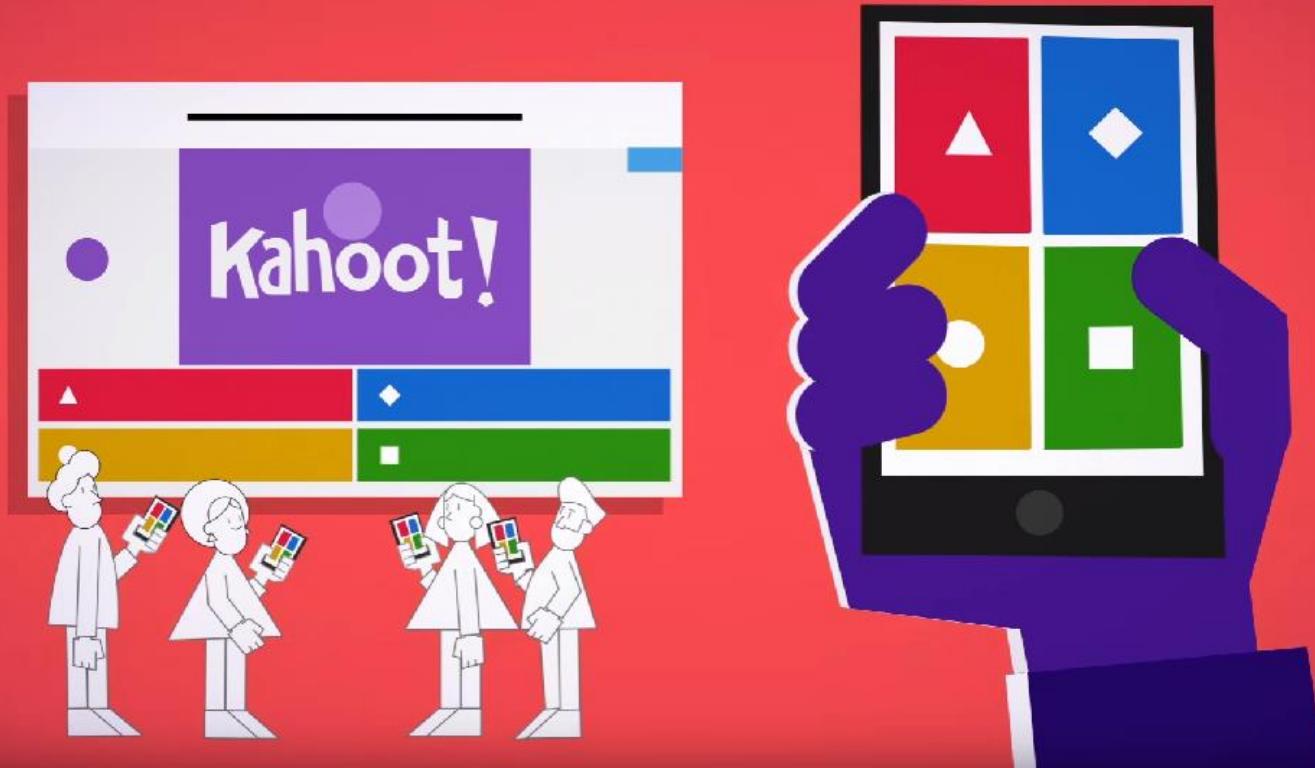
Core Processes of Knowledge Management



Adapted from Probst et al. (2010)

Quiz Time!

Go to kahoot.it



Literature

Core Literature

- **Krcmar, H. (2015):** Informationsmanagement (Vol. 6), Springer Verlag, Berlin 2015. pp. 660-695.
- **Probst/Raub/Romhardt (2010):** Wissen managen: Wie Unternehmen ihr wertvollste Ressource optimal nutzen (6. Aufl.). Gabler, Wiesbaden.

Additional Reading

- **M. Bellmann, H. Krcmar, T. Sommerlatte (2002):** Praxishandbuch Wissensmanagement. Strategien - Methoden – Fallbeispiele. Symposium, Düsseldorf

References

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