UiO : Department of Informatics
University of Oslo

Digital Innovation

IN5210 INFORMATION SYSTEMS

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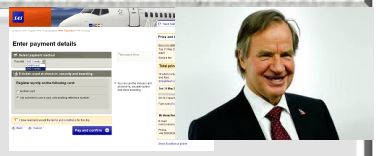
UiO : Department of Informatics
University of Oslo

Current research projects

Bendik Bygstad

Topic	What I am trying to find out	Organization
Digital innovation in airlines	*How do airlines deal with digital transformation?*	SAS Norwegian
Large eHealth systems	*What IT architecture and governance is suited for large eHealth infrastructures?*	Helse Sør-Øst
Lightweight IT	*How can heavyweight and lightweight IT interact?*	Kalnes Hospital
Travel inter-mediaries	*How can hotels chains compete with online travel agencies, such as booking.com and TripAdvisor?*	Nordic Choice
Critical realism	*Which mechanisms can explain observerved phenomena with IS? in*	



Learning outcomes

First session

- Understand the concepts digitalization, digital innovation and digital transformation
- Knowledge of the elements of digital strategy

Second session

- Explain Commons Based Peer Production
- Analyse generification of software

Core reading	
	Bharadwaj et al (2013)
	Sia, Soh and Weill (2016)
Supplementary reading	
	Gizaw, Bygstad and Nielsen (2016)
	Staring and Titlestad (2008)

A paradigm shift in research after 2007…

- From IT to digitalization
- From IT strategy to digital business strategy
- From innovation with IT to digital innovation

A paradigm shift in research after 2007…

- From IT to digitalization
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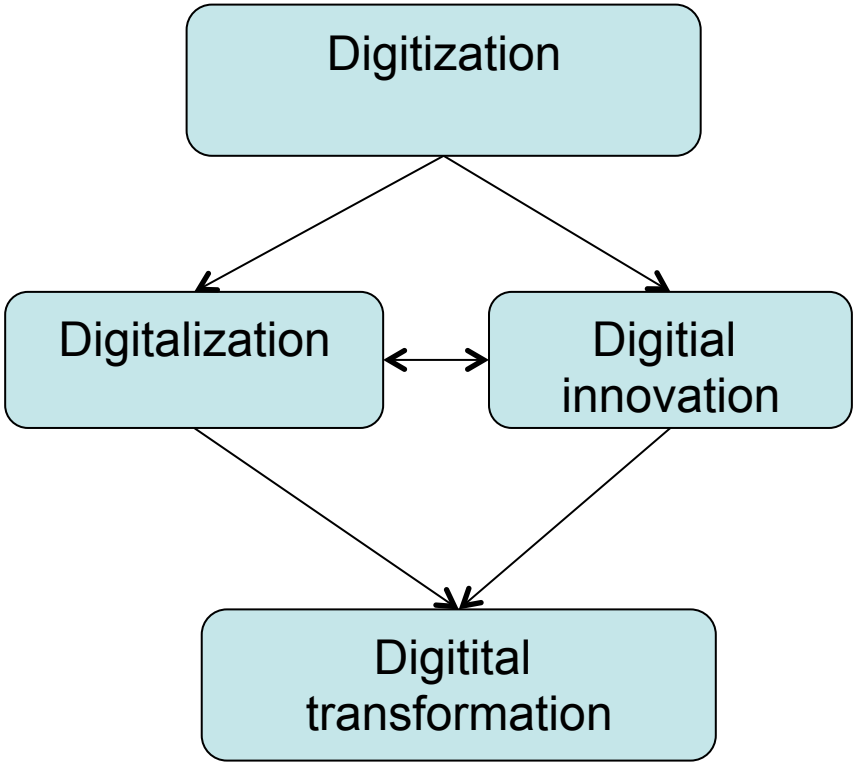
What happened in 2007?

Some key terms



Description

- **Digitization:** Converting analog information to digital
- **Digitalization:** Using digital technology to change socio-technical structures
- **Digital innovation:** Recombining digital (and physical) elements in new ways
- **Digital transformation:** Significant changes in ways of producing/consuming, which over time transforms organizations, industries or society.

Sources

- Yoo et al., 2010
- Bharadway et al., 2013
- Osmundsen at al, 2018
- Svahn and Bygstad, 2018

Digital innovation

- What is innovation?
- What is digital innovation?
- Is digital innovation different than non-digital innovation?
- How does digital innovation transform organisations and society?

Digital innovation

Q	A?
What is innovation? (and invention?)	
What is digital innovation?	
Is digital innovation different than non-digital innovation?	
How does digital innovation transform organizations and society?	

Digital innovation

Q	A
What is innovation?	New combinations of elements to create something that has value for a customer
What is digital innovation?	Recombinations of digital (and analog) components to create…
Is digital innovation different than non-digital innovation?	Se next
How does digital innovation transform organizations, sectors and society?	Examples?

Product Innovation vs Digital Innovation

	Product innovation	Digital innovation
Examples	Cars, lawn mowers, heat pumps, computers	Systems, apps, digital platforms, search engines
Key attributes of artifact	Physical volume products (dominant design)	Digital components in interaction
Product architecture	Modularised	Layered
Organization logic	Single hierarchic organization, with functional decomposition	Symbiotic relationships in networks
Development process	Planned, linear process	Dynamic, non-linear patterns
Industry structure	Vertical integration	Networks and platform ecosystems
Key innovation strategy	Linking dominant designs and scale economies	New combinations of digital and physical components to produce novel products
Continuous improvement	Improving loosely coupled components within stable, hierarchic architecture	Continuous versioning through devops
Strength of approach	Endlessly fine-tuning	Detect and seize market opportunities
Basic theory	Economies of scale Dominant design	Network economics Real option theory

Svahn and Bygstad, 2017
(forthcoming)

From IT strategy to Digital Business Strategy

MIS Quarterly

SPECIAL ISSUE: DIGITAL BUSINESS STRATEGY

DIGITAL BUSINESS STRATEGY: TOWARD A NEXT GENERATION OF INSIGHTS

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Over the last three decades, the prevailing view of information technology strategy has been that it is a functional-level strategy that must be aligned with the firm's chosen business strategy. Even within this so-called alignment view, business strategy directed IT strategy. During the last decade, the business infrastructure has become digital with increased interconnections among products, processes, and services. Across many firms spanning different industries and sectors, digital technologies (viewed as combinations of information, computing, communication, and connectivity technologies) are fundamentally transforming business strategies, business processes, firm capabilities, products and services, and key interfirm relationships in extended business networks. Accordingly, we argue that the time is right to rethink the role of IT strategy, from that of a functional-level strategy—aligned but essentially always subordinate to business strategy—to one that reflects a fusion between IT strategy and business strategy. This fusion is herein termed digital business strategy.

Digital Business Strategy

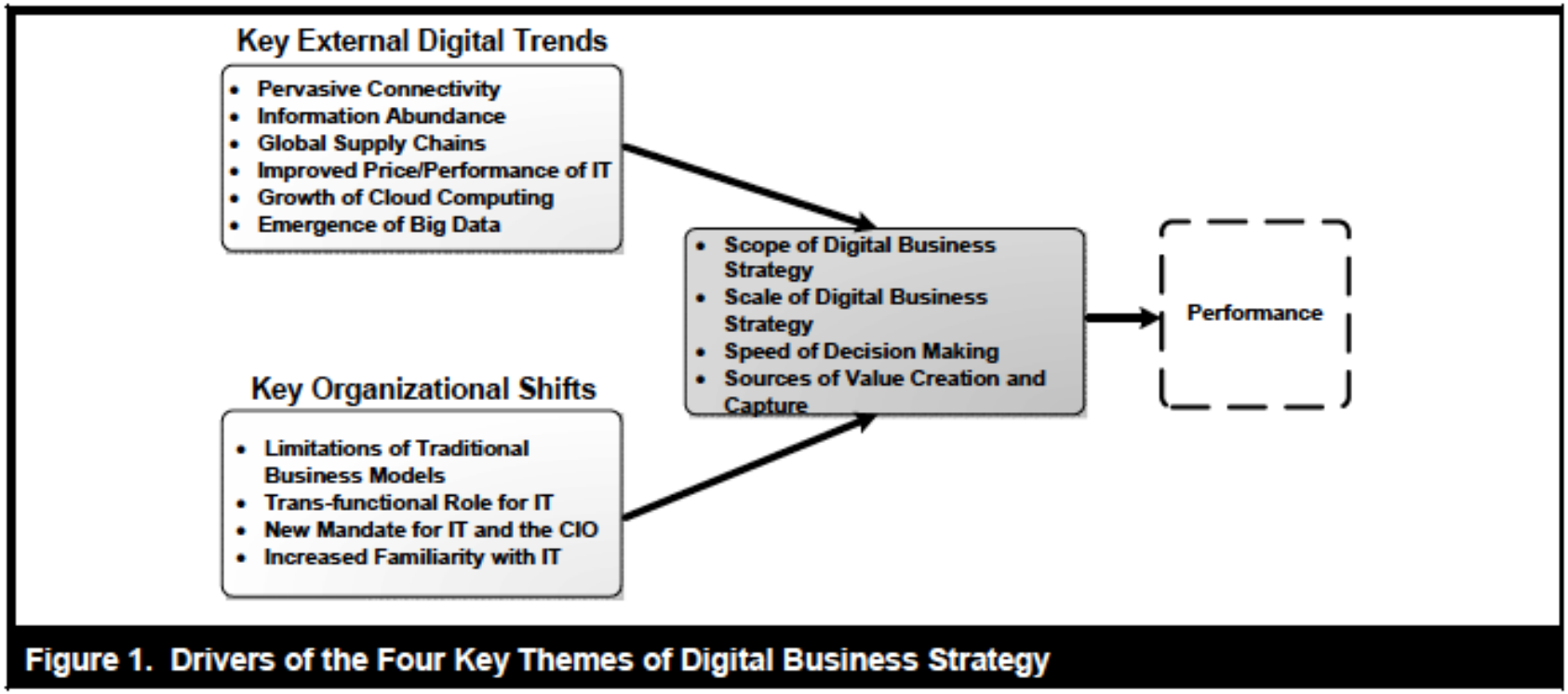

Figure 1. Drivers of the Four Key Themes of Digital Business Strategy

Digital Business Strategy

Dimension	Description
Scope of Digital Business Strategy	• Digital Business Strategy Transcends Traditional Functional and Process Silos • Digital Business Strategy Includes Digitization of Products and Services and the Information Around Them • Digital Business Strategy Extends the Scope Beyond Firm Boundaries and Supply Chains to Dynamic Ecosystems That Cross Traditional Industry Boundaries
Scale of Digital Business Strategy	• Rapid Digital Scale Up/Down as Strategic Dynamic Capability • Network Effects Within Multisided Platforms Create Rapid Scale Potential • Scale with Digital Business Strategy Will Increasingly Take Place under Conditions • of Information Abundance • Scale Through Alliances and Partnerships
Speed of Digital Business Strategy	• Speed of Product Launches • Speed of Decision Making • The Speed of Supply Chain Orchestration • Speed of Network Formation and Adaptation
Sources of Value Creation and Capture	• Increased Value from Information • Value Creation from Multisided Business Models • Value Capture through Coordinated Business Models in Networks • Value Appropriation through Control of Digital Industry Architecture

Part 2:

Digital Innovation:
Commons Based Peer Production

Benkler and Nissenbaum (2006)

Digital Innovation: Commons Based Peer Production

- “A socio-economic system of production that is emerging in the digitally networked environment.
- Facilitated by the technical infrastructure of the Internet, the hallmark of this socio-technical system is collaboration among large groups of individuals, (..), who cooperate effectively to provide information, knowledge or cultural goods without relying on either market pricing or managerial hierarchies to coordinate their common enterprise".
- Thus, the core characteristics of CBPP consist of I) decentralization, where individuals act as they see fit, without a central organizer, and II) the use of social cues and motivations, rather than prices and commands.
- Example: Wikipedia

Benkler and Nissenbaum (2006)

Discussion point:

- Why do initiatives such as Wikipedia work…?

Digital Innovation: Free and Open Source Software (FOSS)

FOSS:

- The terms Open Source and Free Software both designate "Software that comes with source code and a usage license that allows for modification and further redistribution of the source code by any user" (von Krogh et al 2003),
- The former emphasizing practical advantages of openness, and the latter the ethical

Staring and Titlestad (2008)

Case: HISP (Health Information System Programme)

The DHIS software 1996-2008

Table 1- Spread of DHIS use and development

	Use	Development
DHIS v1	South Africa (national scale), Botswana, Mozambique (pilot), Cuba (pilot in 2002), India (2000-2005), Zanzibar (national scale), Tanzania (pilot), Zambia (pilot), Malawi (national scale), Nigeria (some states), Myanmar (TB program).	South Africa
DHIS v2	India (4-5 states, since 2006), Vietnam (2 provinces, since 2007), Sierra Leone (4 pilot districts, since 2008, plans for all districts), Tajikistan (pilot, since 2007)	Norway, India, Ethiopia, Vietnam, Mali, Tajikistan

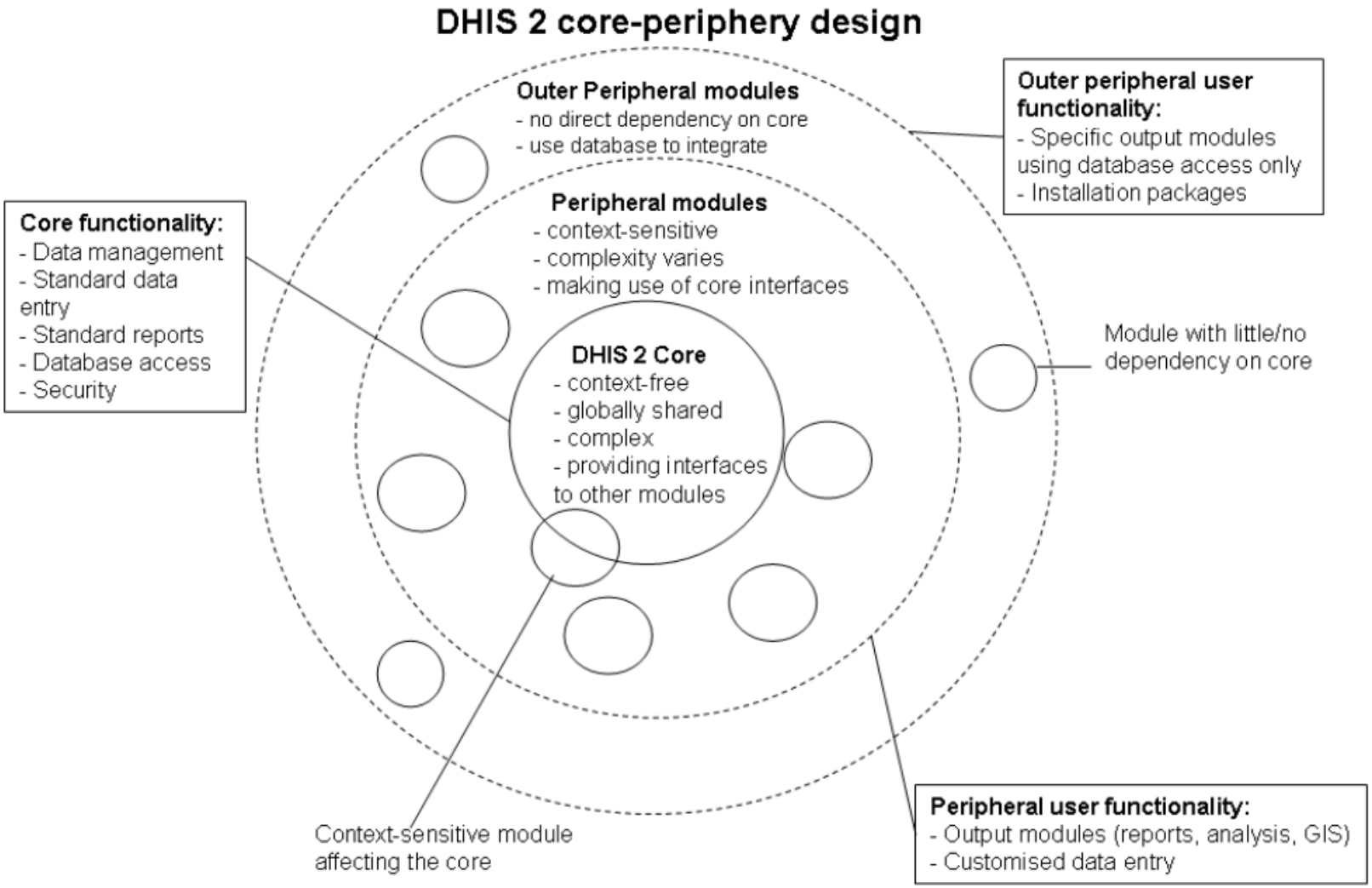

Figure 2 The modular DHIS v2 core-periphery architecture

Digital Innovation: Open Generification

Generification: The supplier strategy of taking a technology that has worked in one place and attempting to make it work elsewhere, and, in principle, 'everywhere'. (Pollock and Williams, 2010)

Open generification: A configuration of social and technical actors through processes of embedding and disembedding (Gisaw et al, 2016)

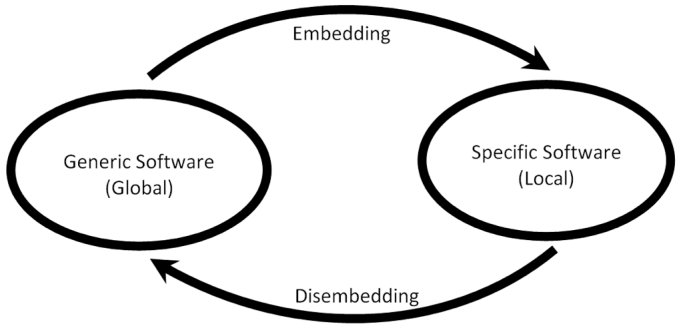

Figure 1: Open Generification as a continuous process of embedding and disembedding

Gizaw, Bygstad and Nielsen (2016). Open Generification: A Design Strategy for Health Information Systems in Developing Countries. Information Systems Journal.

HISP: Key lessons in a FOSS innovation programme

- Excess capacy
- Modularity
- Integration and cultivation
- “Snowflake topology”
- Open generification

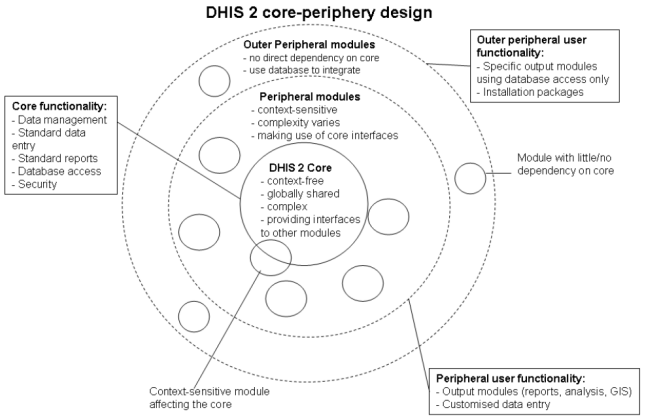

Figure 2 The modular DHIS v2 core-periphery architecture

Summing-up

Digital innovation:

- Commercial, company-centric
- Commons Based Peer Production

Bharadwaj

Benkler

Gisaw,
HISP, UiO

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