Explorative BPM: Lecture 5

Digital Technologies



WIRTSCHAFTS UNIVERSITÄT WIEN VIENNA UNIVERSITY OF ECONOMICS AND BUSINESS

Lecturer:

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Today: Lecture 5 – Introduction to Digital W





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Questions to be answered





What is digitalization?

What are characteristics of digital technologies?

How do digital technologies change customer needs?



How can the technology diamond be applied?





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What is ...?



Definition

Digitization

Changing something from analog to digital form - refers to information only (e.g. copying music from vinyl into a digital format) \rightarrow "we digitize information"

Digitalization

Digitalization is the use of digital technologies to change a business model and provide new revenue and value-producing opportunities. It is the process of moving to a digital business. \rightarrow "we digitalize processes"

Digital Transformation

Transforming a business by means of digitalization-related opportunities.

 \rightarrow "we digitally transform the business"



Digitalization in Business



Organizational View:

1

- How can we digitalize processes and operations?
- How can we automate certain aspects of the organization?
- What are means to make organizational work more efficient and effective?

Customer View:

2

- What does the customer need?
- How can we improve the life of the customer?
- What are trends in terms of new technologies that may be useful for the business?



Digitalization is everywhere...





... further ideas?



Dimensions of Digitalization







Matt et al. 2015

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Technology Trends







PAGE 13 https://www.gartner.com/smarterwithgartner/5-trends-appear-on-the-gartner-hype-cycle-for-emerging-technologies-2019/



Two central differentiations (Yoo, 2010; Yoo et al., 2012)

Physical Materiality

- Any digital technology has a body or shell; it has tangible and concrete components
- "...refers to artifacts that can be seen and touched, that are generally hard to change, and that connote a sense of place and time" (p. 1398)
- E.g. sensors in a running shoe

Digital Materiality

- Software-based capabilities -> any physical artefact can be expanded through code
- "...refers to what the software incorporated into an artifact can do by manipulating digital representations" (p. 1398)
- E.g. sensor in a running show can communicate with insurance



What is a digital technology? (2/4)



Three central **principles** (Yoo 2010)

Reprogrammability:

- Procrastinated binding between form and function; e.g. apps on smartphone can be changed/added later on
- Separation of the semiotic functional logic of the device from its physical embodiment
- Can perform wide array of functions

Homogenization of Data:

- All information is stored as 1 or 0
- Can be transmitted across and processed of different devices and networks
- Separates content from medium

Self-referential nature:

- Digital innovation requires the use of digital technology (e.g., computers)
- → the diffusion of digital innovation creates positive network externalities that further accelerate the creation and availability of digital devices, networks, services, and contents
- → fosters further digital innovation through a virtuous cycle of lowered entry barriers, decreased learning costs, and accelerated diffusion rates
- \rightarrow Digital technology has democratized innovation and almost anyone can now participate





Seven material properties of digital technologies (Yoo 2010)

- Programmability: The ability of a digitalized artifact to accept new sets of logic to modify its behaviors and functions.
- Addressability: The ability of a digitalized artifact to individually respond to a message that was sent to many similar artifacts.
- Sensibility: The ability of a digitalized artifact to monitor and respond to changes in the environment.
- **Communicability**: The ability of a digitalized artifact to send and receive messages with other artifacts.
- Memorizability: The ability of a digitalized artifact to record and store information that it generated, sensed, or communicated.
- **Traceability**: The ability of a digitalized artifact to chronologically interrelate events and entities over time.
- Associability: The ability of a digitalized artifact to be related and identified with other entities (such as other artifacts, place, and people) based on certain commonly shared attributes.





"...they provide an environment of open and flexible affordances that are used in creating innovations characterized by convergence and generativity."

Yoo et al., 2012



What is a digital technology? (4/4)



Convergence

- Digital technologies merge user experiences (e.g. internet, phone and TV)
- They bundle user experiences (e.g. smart phone affords speaking, texting, streaming, gaming, etc.)
- They connect previously disconnected industries (e.g. WhatsApp competes with telecommunication providers)

Generativity

- Digital technologies are not fixed and static but they are dynamic and malleable
- "Procrastined binding" of form and function -> new features can be added after design is initially finished
- Wakes of innovation -> the introduction of one innovation triggers the development of new innovations
- Give rise to "derivative innovations" as the use of DT leaves traces of data (e.g. traces of running shoes can lead to design of training plans)



Digital Technologies: Three types of computing



 Representational computing: user and technology are in dynamic relationship where technology conveys symbolic representation of sth. in the real world (decoupled from actual experience); e.g. reading a thermostat, the user understands the temperature outside





Digital Technologies: Three types of computing



Three types of computing

 Imagined computing: technology becomes alter ego, attributing to user's emotional states, intentions and beliefs (related to experience), and being decoupled from representational world; e.g. playing World of Warcraft





Digital Technologies: Three types of computing



Three types of computing

- Experiential computing: technology becomes embedded in lifeworld of user. It is not interpreted or experienced.
- Experiential computing means that technology penetrates/becomes part of and shapes our lived experience in our everyday life → interwoven with daily enactments





Digital Technologies: Dimensions of Experience



We actively construct space through movement; e.g. Google Maps



Experience of time through retrospection (past experiences) and anticipation (what is to come); e.g. WhatsApp



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Previously: "Mass market model"





Effects of digital technologies for economies and markets

- From mass customization to ...
- From broadcast communication to ...
- From the firm as key influence to ...
- From economies of scale to ...



Today: "Customer Networks"





Effects of digital technologies for economies and markets

- From mass customization to "customer networks"
- From broadcast communication to two-way communications
- From the firm as key influence to customers as key influencers

from: Kelly 2016

From economies of scale to economies of customer value

Kelly 2016

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Digitalization leads to new needs and expectations



Need	Representation	Example
On-demand	"I can get what I want, when I want it"	Amazon
Real time	"I can get accurate information when I need it"	Google
Unique	"The experiences I am making are special and individual"	AirBnB
Personal	"It needs to match my lifestyle"	Outfittery
Local	"I am served wherever I am"	Uber
Effortless	"The technology I am using just works"	Apple





- Access: Need to access digital content as easily, quickly and flexibly as possible → immediate and instant access
- 2. Engage: Thirst for content and possibility to engage with content
- 3. Customize: seeking for increasingly "individual digital experiences"
- **4. Connect:** will to share experiences and connect with other users
- 5. Collaborate: Working together to achieve common goals



Five Key Behaviors of Customers



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Being always there for the customer and provide simplicity, convenience, ubiquity and flexibility:

 Mobile Commerce: use of QR codes and interaction touchpoints for customers, e.g. Tesco's virtual supermarkets in subway stations in South Korea



Example: Tesco's subway supermarket















Being always there for the customer and provide simplicity, convenience, ubiquity and flexibility:

- Mobile Commerce: use of QR codes and interaction touchpoints for customers, e.g. Tesco's virtual supermarkets in subway stations in South Korea
- Omni-Channel Experience: integrated experience across all touchpoints; e.g. Wal Mart's shopping app detects when app is opened in Wal Mart store -> 12% of online sales come from in-store app use
- Working in the cloud: cloud solution to enhance flexibility and collaboration
- On-demand services: demands can be met anywhere and anytime (e.g. Coursera, Online Banking)





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Becoming a source of valued and relevant content for customers to consume and share it:

- Utility: supporting customers with useful content, e.g. Columbia Sportswear's app gives "outdoor advice", teaching rope knots and enabling GPS-based journey tracking
- Content publishing: Gathering user interactions through relevant content (e.g. Red Bull's "Bulletin" underlines company's value and encourages content production for online channels)





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Making product/service customizable to unique needs of customers

- Recommendation Engines: use of algorithms to match/predict taste of customers (e.g. Netflix uses mixture of behavioural data and human recommendation patterns → 75% of customers' viewings is enabled through algorithm)
- Personalized Interfaces, Products and Services: increasing identification with platform (e.g. customized emojis in IOS) and more options to adjust offering (e.g. Nike Flyprint allows for 3D printing of running shoes)





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Creating and maintaining relevant interaction with customers to develop value for own business activities

- Social listening: tracking, analysing and evaluating online interactions to improve customer experience, e.g. US cable provider Comcast has been able to detect regional outages before its engineering's team did
- Social customer service: online customer tools to increase efficiency and effectiveness (e.g. United airline's chatbot mixes between algorithmic responses and personal support through agent)
- Hosting and empowering community: creating a space where customers can meet, e.g. SAP Community Network hosts customers, business partners and employees to exchange questions and know-how -> more than one million unique visitors/month





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Not only sharing information but inviting customers to be part of project and work on common goal

- Crowdfounding (e.g. Kickstarter)
- Open competitions (e.g. Netflix)
- Collaborative Platforms: enables users to create content, e.g. app stores (e.g. "Local Motors" has a community with 150.000 car fans who share ideas, plans and designs for e-cars. Some of the parts can be produced with 3D-printing)





Being always there for the customer and provide simplicity, convenience, ubiquity and flexibility:

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Five-Diamond-Method for Explorative BPM: Detailed view



Technology Diamond



Activity 3: Technology diamond

Techniques

- Identify technology trends (Divergent)
- Identify existing and emerging digital technologies (in industry in focus and related industries) (Divergent)
- Evaluate technology trends and digital technologies (in line with the organizations context) (Convergent)
- Select relevant digital technologies (in line with organizations strategy) (Convergent)

Tools

 Multi source research (e.g., internet, competitors, interviews, conferences, Gartner Hype Cycle)

Roles

- BPM manager / process consultant*
- Technology/ Digitalization expert**
- Facilitator

Output

Relevant technology trends and digital technologies





Questions to be answered





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 $\rightarrow X$

 $\rightarrow X$

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