

Explorative BPM: Lecture 6

Introduction to Digital Technologies (2)



Lecturer:

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„Reference Module Design for Explorative Business Process Management“)

Today: Lecture 6 – Introduction to Digital Technologies (2)

	Module 1			Module 2	Module 3		Module 4	
THEORY	LECTURE 1 INTRO I	LECTURE 2 INTRO II	LECTURE 3 INTRO III	LECTURE 4 BUSINESS I	LECTURE 5 TECHNOLOGY I	LECTURE 6 TECHNOLOGY II	LECTURE 7 INTEGRATION	LECTURE 8 CONCLUSION
	BPM: <ul style="list-style-type: none"> •Introduction of key concepts 	eBPM: <ul style="list-style-type: none"> •Introd ambidexterity •5-Diamond Method 	Innovation management <ul style="list-style-type: none"> •Key concepts •methods 	<ul style="list-style-type: none"> •Organizational purpose •Mega- and business trends 	<ul style="list-style-type: none"> •Digital technologies •Technology trends 	<ul style="list-style-type: none"> •Affordances •Technology Acceptance Model 	<ul style="list-style-type: none"> •Synthesis •Idea/Process generation & evaluation 	<ul style="list-style-type: none"> •Final Presentation •Feedback
PRACTICE	GROUP WORK: BPMN	GROUP WORK: Process Improvement Methods	GROUP WORK: Customer-Journey/Blueprint	GROUP WORK: Trends & Org. Purpose	GROUP WORK: Technology trends in industry	GROUP WORK: Emerging technology integration	GROUP WORK: Design Space Analysis	

Questions to be answered



What are affordances?

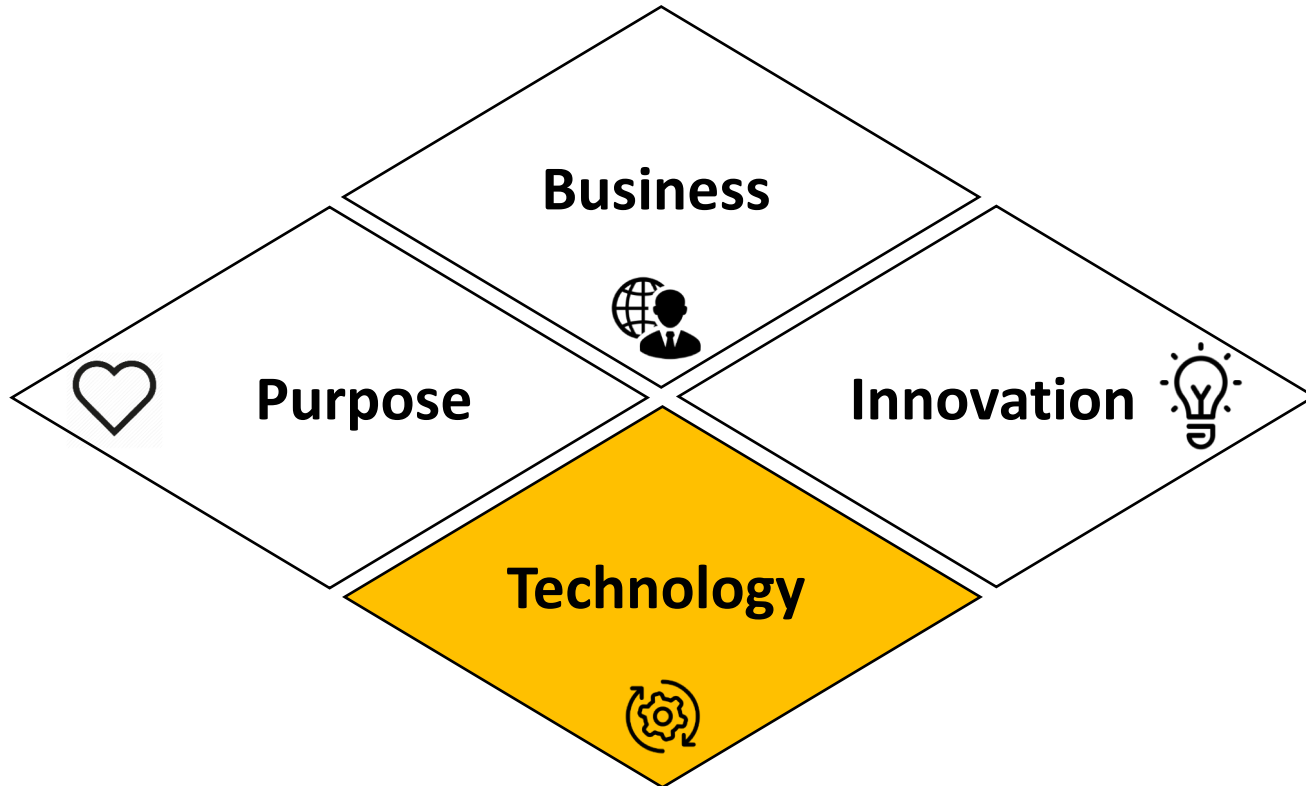


How are affordances actualized?



How can affordances explain the use of digital technology?

Five-Diamond-Method



What is ...?

Definition

Affordances are *action potentials* that emerge as a *relational property through the interaction between users and IT artifacts* (Marcus & Silver 2008)

They are related to actors' goals and enable their achievement.

There is a duality between *enabling and constraining affordances* of IT artifacts, e.g. a firewall provides security affordances while constraining affordance to unauthorized users.

Affordance actualization refers to the actions taken by actors as they use one or more affordances through the use of technology to achieve concrete outcomes and reach organizational goals

Affordances – various definitions (1/2)

- Origin in ecological psychology (James Gibson)
 - Animals do not have minute representations of objects -> they directly perceive what the object will enable them to do
 - „An affordance is what is offered, provided, or furnished to someone or something by an object“ (Gibson 1986)
 - „action-driven“ view of perception -> we perceive to take actions
- Examples by Gibson:
 - A cliff affords (1) walking (locomotion) or (2) falling off (injury)
 - A knife affords (1) cutting or (2) being cut
 - Middle-sized metallic object affords (1) grasping or (2) electric shock (if charged)
 - Etc.

Affordances – various definitions (2/2)

- “what is offered, provided, or furnished to someone or something by an object,” and “a property of the relationship between an object and an actor which is defined as an opportunity for action” (Volkoff & Strong 2013)
- “the action potential that can be taken given a technology” (Majchrzak et al., 2013)
- “a relational construct linking the capabilities afforded by technology artifacts to the actors’ purposes” (Faraj and Azad 2012)
- something “constituted in relationships between people and the materiality of the things with which they come in contact” (Treem and Leonardi, 2012, p. 146)

Features vs. Affordances

A technology has **features** (built-in functionalities, as intended by designers)



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Users have goals and perceive **affordances** to realize certain actions



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Examples?

Affordances versus other concepts

Many studies on affordances do not clearly explain what an affordance is – they sometimes refer to features of technologies or outcomes of using them (Leidner et al. 2018).

Example	Technology Features	Affordances	Outcome
Commuting to work by train (=using a technology)	Speed of train, number of carriages, size of windows, etc.	Working, sleeping, meditating (=things made possible by riding the train)	Arriving at work in time, getting work done in the office, etc. (= what can be achieved by using the technology)
Streaming movies on Netflix	?	?	?
?	?	?	?

Types of Affordances

Type of Affordance	Description	Example
Physical Affordance	What we can physically do based on our physical abilities and object properties	Individual: a 15kg product can be carried by individual Collective: a 150kg product can be carried by group
Psychological Affordance	Relate to capacity for thought, reflection and emotion -> affords personality, knowledge and experience	Upon request, an ERP system can deliver information about stock shortage
Social Affordances	Relate to cultural world of social structures, conventions and group dynamics	Skype enables work-related activities, regardless of physical location
Functional Affordance	Relate to human-made objects with intended functions	Print button (designed artifact) on online form (environment) clicked on through mouse (physical affordance) prints form (functional affordance)

Questions to be answered



What are affordances?



How are affordances actualized?



How can affordances explain the use of digital technology?

Theoretical Framework of Affordances

In the broadest sense, the effect of affordances is contingent on two central elements:



Affordance recognition:
an actor perceives an object in
terms of an action possibility.

e.g. a smartphone affords being
up-to-date with daily news



Affordance actualization:
an actor makes use of the
affordances.

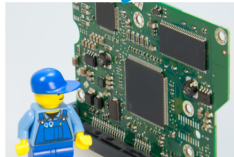
e.g. I regularly take advantage of
the affordance



The recognition of an affordance does not necessarily lead to its actualization!

From Individuals to Organizations 1/3

Organization-wide
actualization only occurs
when individual
actualizations aggregate!



From Individuals to Organizations 2/3

- Individuals who pursue goals reflect on the outcomes they want to achieve with a given technology -> thinking in terms of affordances and outcomes
 - E.g. a nurse may think about an ERP system that she can provide the physician with all the relevant information about a patient -> would *ensure high quality care*
- The individual would also outweigh all negative consequences
 - E.g. the nurse may reflect on whether the process of typing in the data would slow down the treatment
- The individual may be positive or negative towards the technology
 - E.g. the nurse may have the abilities to work with the system (e.g. typing in data quickly, etc.) and her environment would be supportive or not (e.g. providing time to get used to the system)

From Individuals to Organizations 3/3

- Whether actualizations on the individual level lead to organizational effects depends on three aspects:
 - 1. Consistency:** how well joint actions serve to realize organizational affordances. Individual actualizations need to be compatible and reinforcing
 - E.g. to provide high-quality treatment, physicians may „capture and archive“ patient data with ERP system (=affordances) -> they may do so through typing, dictating, etc. These actions must be consistent
 - 2. Extent:** how far the actualization process achieves longer-term organizational goals
 - E.g. most physicians type in their data but many heavily use dictation -> translation costs may be high
 - 3. Alignment:** how well actions contribute to achieving organizational goals
 - E.g. some share data only with specific nurses but the goal is to share data with nurse pools

Individual factors

- Action goals (per definition!)
- Capabilities
- Awareness
- Motivation
- Needs
- Attitude



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Organizational factors

- Organizational goals
- Organizational culture
- Awareness about technology
- Reward programs



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Levels of Affordances

- Affordances exist at different levels of abstractions and hierarchies
- Some lower-level affordances might need to be actualized to enact higher-level affordances (e.g. „1st order“ vs. „2nd order“; see Leidner et al. 2018)
- E.g. e-mail system:



Questions to be answered



What are affordances?



How are affordances actualized?



How can affordances explain the use of digital technology?

Affordances „in the wild“ – Study 1/2

- Leidner et al. (2018): What are affordances of an Enterprise Social Media system (ESM) (i.e. “Facebook for employees”)?



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Affordances „in the wild“ – Study 1/2

- Leidner et al. (2018): What are affordances of an Enterprise Social Media system (ESM) (i.e. “Facebook for employees”)?
- Data collection in a globally operating financial service corporation
- Interviews with 100 employees in the hiring program how and why they use the ESM

- They identified three user groups:
 - Strong users
 - Medium users
 - Weak users

- Each group used the system in different ways → different affordances to different people (see discussion before on individual factors)

Affordances „in the wild“ – Study 1/2

Example: „Networking Affordance

- ESM affords employees to network with others both during work and when they have time off

Type of Affordance	ESM Features	Uses of ESM	Specific Affordances	User Group
Networking Affordance	User profile feature	<ul style="list-style-type: none">Create personal profileConnect to othersCreate friends	<ol style="list-style-type: none">Building relationship with peersSocializingTaking a break	<ol style="list-style-type: none">All user groupsOnly strong and medium users

Affordances „in the wild“ – Study 1/2

Example: „Organizational Visibility“

- ESM affords creating visibility of new hired employees

Type of Affordance	ESM Features	Uses of ESM	Specific Affordances	User Group
Organizational Visibility Affordances	Event planning features	<ul style="list-style-type: none">• Use posting feature to market/respond to events• Use sharing features to post comments and event pictures	<ol style="list-style-type: none">1. Participating in onboard events2. Building relationships with peers3. Interacting with superiors	<ol style="list-style-type: none">1. Strong and medium users2. All user groups3. Only strong users

Affordances „in the wild“ – Study 1/2

Hierarchy of Affordances

- Some affordances need to be actualized before others can be recognized/actualized
- Different affordances lead to different outcomes

1st order affordance	2nd order affordance	Outcome
Interacting with peers	Building relationship with peers	Productivity enhancement
Participating in events	Building relationships with superiors	Attractive job assignments
Participating in events	Finding resources	Felt sense of social support

Affordances „in the wild“ – Study 1/2

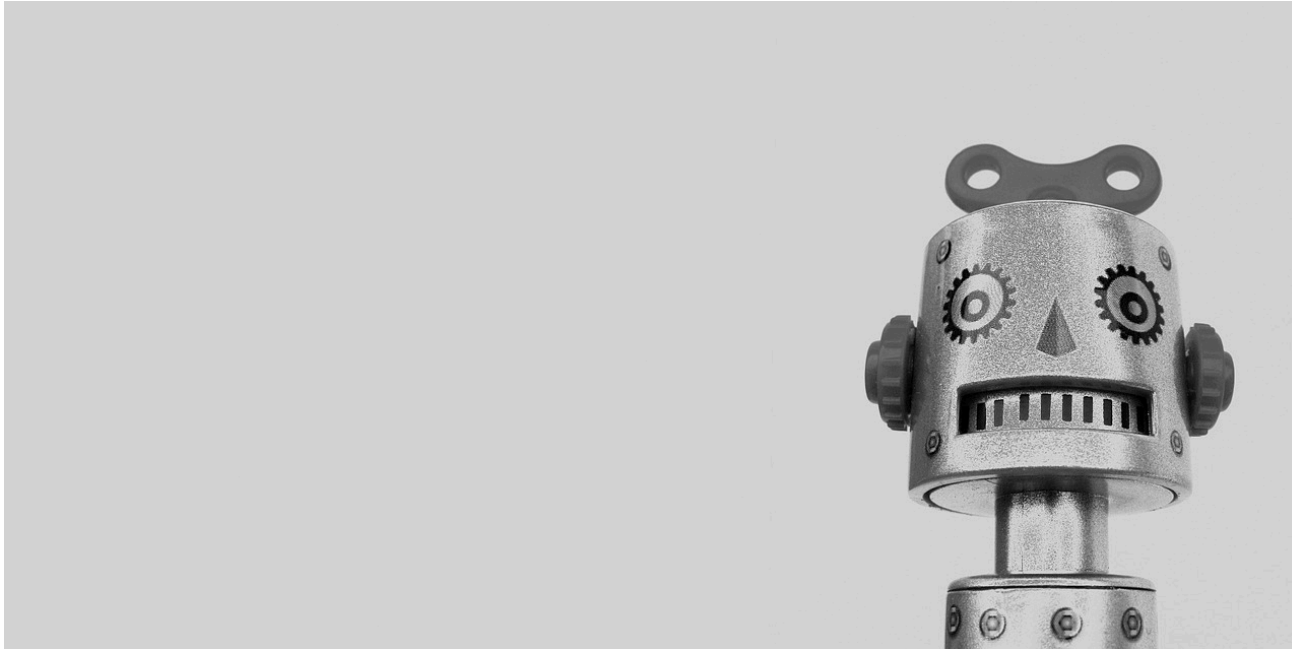
- Leidner et al. (2018): What are affordances of an Enterprise Social Media system (ESM) (i.e. “Facebook for employees“)?

Key findings

- ESM provides many features for socialization → these features afford different actions
- However, they also afford different actions to different users → not a „one size fits all“-perspective
- Affordances lead to different outcomes → these may align or may not align with organizational goals

Affordances „in the wild“ – Study 2/2

- Keller et al. (2019) → What are affordances of Predictive Maintenance?



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Affordances „in the wild“ – Study 2/2

- Keller et al. (2019) → What are affordances of Predictive Maintenance?
- Predictive maintenance: weak AI-enabled solution to automate and intelligently schedule maintenance activities based on the continuous analysis of a system's operating conditions
- Despite the hype, there is little evidence about how this technology is implemented
- Interviews with 14 technicians in industry setting
- They find that there are three steps in the affordance actualization process
 1. Affordance recognition (*What can we do with the technology?*)
 2. Experimentation with affordance (*How can we bring it to use?*)
 3. Actualization of affordance

Affordances „in the wild“ – Study 2/2

Affordances recognition:

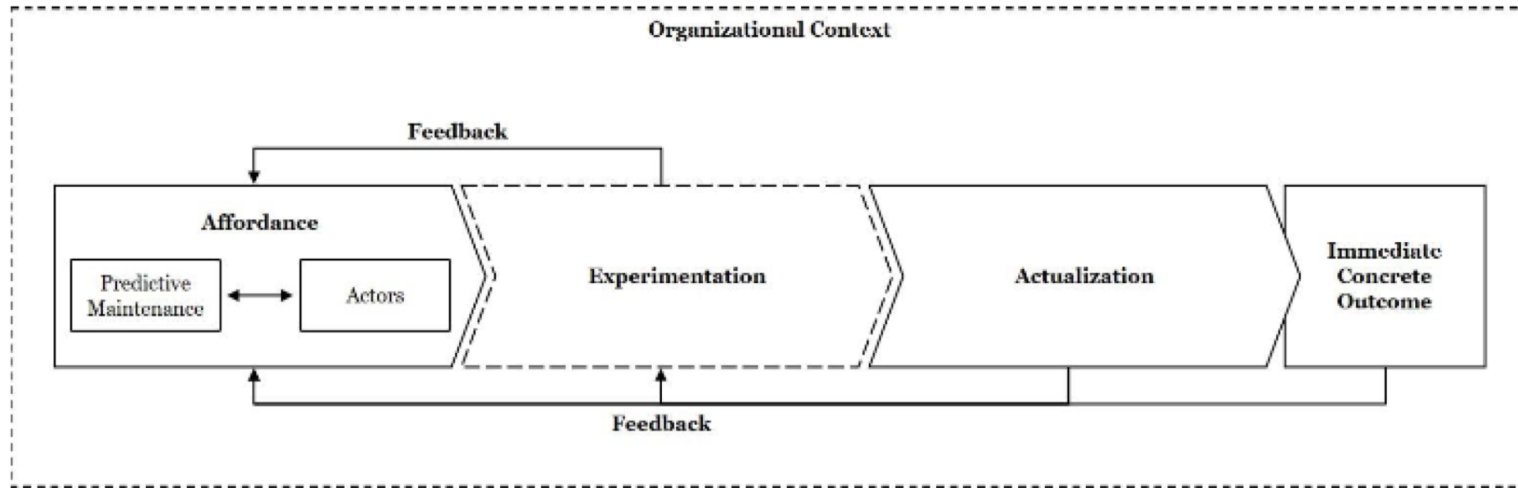
- 1. Monitoring conditions in real-time:** The system affords users to track and better understand the current situation of the machine and interacting factors
- 2. Diagnosing states remotely:** Predictive maintenance affords technicians to remotely diagnose the current machine state. They may take maintenance-related actions even when absent from the organization
- 3. Planning future maintenance activities:** Machine learning affords technicians forecast disruptions and plan for needed actions

Affordances „in the wild“ – Study 2/2

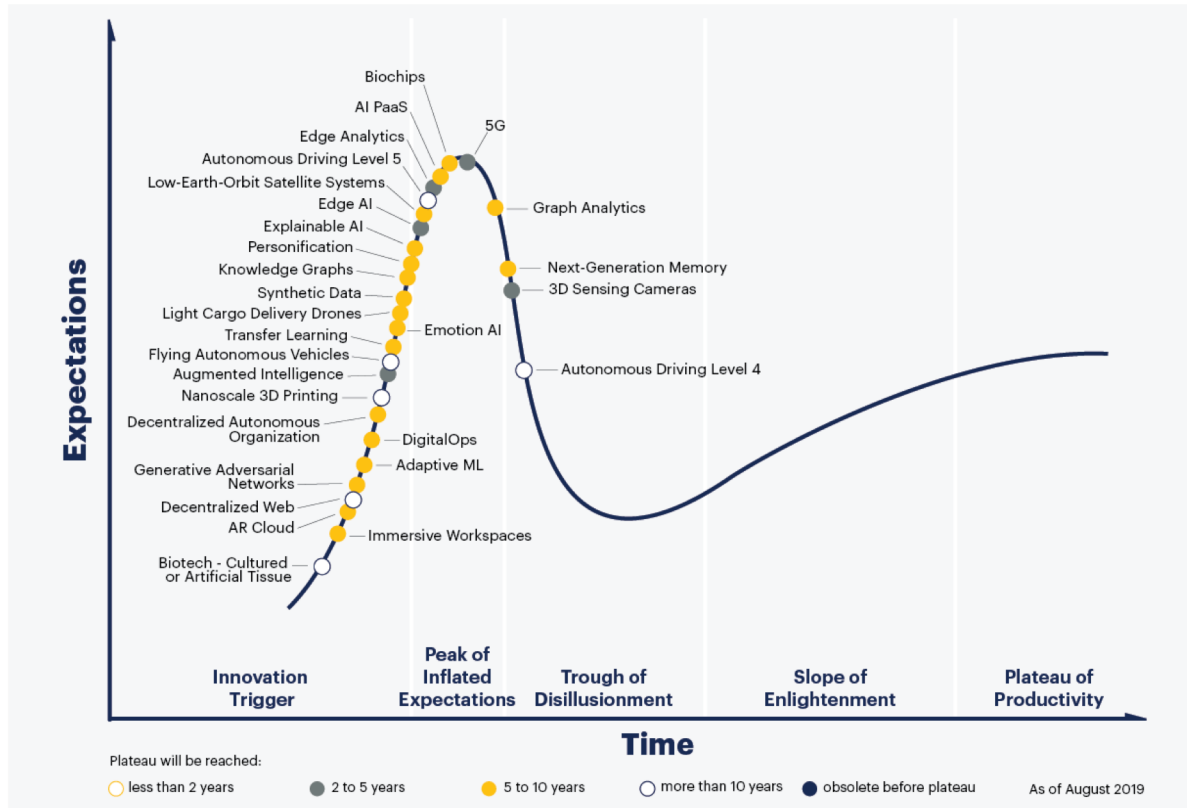
Experimentation: Since there is no existing use case on how to implement predictive maintenance, there is experimentation needed

- 1. Conceptual exploration:** establishing knowledge about the underlying functionalities and technical foundations (e.g. through training)
- 2. Constraint mitigation:** Any constraints are identified and articulated. These constraints are recognized when implementation is being done (e.g. lack of formalized expert knowledge; lack of data strategy)
- 3. Conceptual adaptation:** The affordances of the technology are adjusted to the specific needs of the organization (e.g. how can the use be brought in line with existing solutions)

Affordances „in the wild“ – Study 2/2



Gartner Hype Cycle 2019 for emerging technologies associated affordances



... choose an emerging technology and explain potential affordances and functionalities in use cases you can think of!

What do affordances tell us about explorative BPM?

1. New technologies are important → but more important is if/how/why they are used
2. New technologies are only about actions → how are they used and what does it contribute to the organization?
3. Affordances describe the actions of people when they pursue certain goals
4. Affordances are dependent on individual and organizational factors
5. Some affordances might be desired, some might be not
6. Affordances lead to different (and sometimes unexpected) outcomes

Answered Questions



What are affordances?

- Action potentials associated with digital technologies
- Concept to explain technology use in a non-deterministic way



How are affordances actualized?

- By actors who aim to realize a certain goal



How can affordances explain the use of digital technology?

- By providing situated explanations combining actors, goals and features

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