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Disentangling the Fuzzy Front End of Digital Transformation: Activities and Approaches

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Completed Research Paper

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Abstract

Digital transformation poses critical challenges to organizations. The initial phase – the "fuzzy front-end "– in such a profound innovation process is often perceived as ill-defined and chaotic, yet it may have great impact on the outcome. However, managers struggle with initiating this process and prioritizing between different activities. Prior research has pointed out the importance of a digital transformation strategy, however, less emphasis is put on the activities that enact this strategy. Drawing on qualitative data from eleven organizations with an ongoing digital transformation program and by employing activity theory, we delineate nine patterns of typical activities in the beginning of digital transformation. The prioritization of these activities reveals five approaches – centralized, bottom-up, IT-centered, innovation-centered, and channel-centered. The results contribute to a better understanding of the initial phases of digital transformation for practitioners and complement prior research on digital transformation strategy with deeper insights on typical activities and approaches.

Keywords: digital transformation, organizational change, digital innovation, digital transformation strategy, fuzzy front end, activity theory

Challenges in Initiating Digital Transformations

Digital transformation (DT) is critical and relevant to the survival of organizations in all industries (Kenney et al. 2015). It challenges managers to rethink their business models, foster digital innovation as a key driver for economic success (Gregor and Hevner 2015), and adapt their organizational strategy, structure, and culture to the requirements of the digital age (Matt et al. 2015; Sia et al. 2016). There are several factors that make digital transformations particularly demanding for organizations: First, digital transformation can be a radical and disruptive change where organizations transition to completely different state (Christensen 1997; Lyytinen and Rose 2003). Second, new demands of the network society (Clegg et al. 2016), changed user behavior (Brenner et al. 2014), and new technologies, such as connectivity of devices and mobile data access (Dery and MacCormick 2012) drive the speed of digital transformation. These diverse and novel external stimuli require decision makers to explain and interpret these signals and define a strategic vision for the future. This sensegiving process includes all employees and might also produce competing perspectives in different parts of the organization (Balogun et al. 2015). Third, organizational structures and routines are central in implementing the digital transformation vision (Rerup and Feldman 2011) and facilitate returning to stability and control after a phase of rapid and disruptive change (Berente et al. 2016). That is why the topic of how a company should approach its digital transformation is being

integrated into the overall corporate strategy to a greater extent rather than merely part of the IT-strategy, and executives are called to define a digital transformation strategy (Hess et al. 2016).

As a matter of fact, the outcome of an innovation is not yet clear in the beginning (Rhea 2003), which is why the initial stages of an innovation project are often perceived as ill-defined, random, and mysterious, and are therefore called the "fuzzy front end" (Reinertsen 1999). As digital transformation constitutes an organizational innovation process, this initial phase is a phase of experimenting, assessing opportunities, and collaborating to define the direction, actors, and approach before the start of a digital transformation program. Improving these initial stages from the first sensing of the need to change to the implementation of a specific innovation project bears great potential to impact positively on its success (de Brentani and Reid 2012; Gregor and Hevner 2015; Koen et al. 2002). While the front end of this complex organizational change is crucial to its success, it has received comparably little attention in research (Berghaus 2016).

In product innovation, the fuzzy front end finishes as soon as a formal innovation process starts, that is usually when a product enters the stage-gate-process (Markham and Lee 2013). The so-called "gate 1" marks the idea screening, when an idea is either terminated or enters formal development (Cooper 2009). However, since the processes are more complex in digital transformation, it is less obvious to identify the corresponding "gate 1" that marks the exact end of the fuzzy front end. In product innovation the fuzzy front end is a contained phase and almost a routine task for an innovation team. In digital transformation, the fuzzy front end includes not only product innovation but changing the identity of the organization itself, which does not only comprise idea generation but deciding if and where to innovate, which has implications for multiple stakeholders and employees. This is a non-routine task for the top management as well as for the project teams or task forces that are enacting the various activities. The gate 1" that concludes the fuzzy front end in digital transformation is the awareness that digitization has significant impact on the organization and may require transformational efforts. This could be the involvement of the top management instead of single initiatives by single actors; the initiation of an organizational change program instead of scattered, unrelated projects; a dedicated budget, team, and deliverables instead of skunk works. Therefore, the end of the fuzzy front end of digital transformation is not a simple idea screening followed by a stage gate process as in product innovation but marks the transition from single digitization activities to a transformation program of the organization.

Despite its relevance, anecdotal evidence shows that managers often struggle with understanding the impact of digital transformation and are unsure where to begin their own organizational transformation process. Research has uncovered a multitude of approaches to transform an organization for the digital age: Some organizations focus on leveraging the benefits of multiple digital channels (Hansen and Sia 2015), some take a more entrepreneurial approach in order to build a digital ecosystem (Hu et al. 2016), some focus on fostering digital innovation in order to achieve a competitive advantage (Sedera et al. 2016), while others suggest a collaborative workshop process to design a strategic transformation (Davis et al. 2010). These examples demonstrate that the current digital transformations are a new phenomenon that incorporate multiple smaller change processes that are affecting organizational routines.

Prior research has come to the conclusion that organizations need to approach their digital transformations by designing a digital business strategy (Bharadwaj et al. 2013; Hess et al. 2016). However, due to the fuzziness of the initial stages, the definition of a holistic strategy is not always a viable first step. Therefore, we suggest broadening the unit of analysis from a digital strategy to a system of activities undertaken during the beginning of digital transformation. Activites and organizational routines are of central relevance in digital transformation since they enact the transformation vision (Orlikowski 1996) and support stability and control during the implementation of organizational change (Berente et al. 2016). Thus, our research complements prior research on digital transformation strategy with this perspective on activities in the fuzzy front end of digital transformation.

Our research draws on rich data of multiple cases and employs activity theory as a structuring framework in order to gain a more complete view on the organizational set-up and activities during the fuzzy front end phase of digital transformation. Activity theory allows a more comprehensive study for its focus on activity systems rather than single artifacts and also takes the situational context into account (Alter 2003). Since most organizations have embarked on this change journey in the past years, this is an excellent chance to observe these initial steps and explore how companies have set-up activities in the fuzzy front end of this innovation process. This paper takes a descriptive approach to expand our knowledge about how companies actually approach, organize, and prioritize activities in their digital transformation. We are aiming at

delineating patterns of typical activities and understanding more about how they are prioritized in order to identify different approaches.

We have been observing an ever growing research interest and discussion among practitioners on terms like "digitalization", "digital transformation", or "disruption" with varying terminology. In the management and organizational literature, the term "transformation" is commonly being used to refer to a substantial and large-scale change (Tosey and Robinson 2002). The term can apply to both changes on the industry and on the organizational level. On the industry level it refers to major digital trends, like cloud computing, mobile (Scornavacca and Barnes 2008), analytics or big data that potentially enable new business models (Berman and Bell 2011; Hanelt et al. 2015). On the organizational level, digital transformation describes changes that affect multiple dimensions within an organization, requires a re-definition of strategy as well as a change of organizational routines, where the outcome is significantly different to the original state. In this paper, we are using the term "digital transformation" only with regard to changes on the organizational level. Since digital transformation includes many different activities and could potentially refer to different things in different organizations, we also use the plural form to acknowledge the breadth of meaning.

Another term that has become popular in recent publications on digital transformation, is the concept of "disruption" and "disruptive change". This is mainly based on the theory of disruptive innovation by Christensen (1997). In the current literature the term "disruption" is mostly used to describe the ground-breaking impact of innovations as opposed to sustaining and incremental changes, in order to highlight the urgency of taking action.

Activity Theory as Structuring Framework for the Case Analysis

Activity theory is a multidisciplinary meta-theory directed towards understanding the object-oriented and object-mediated interactions between humans (Kuutti 1999). It is often used in studies of work and technology, e.g., in human-computer interaction (Engeström 2000; Kaptelinin et al. 1999; Nardi 1996) or learning (Nardi 2007). It has also been applied to research how certain activities are transformed by the use of information systems (Allen et al. 2013). In prior research, activity theory has proven to be well suited to investigate "micro-practices" in strategy in order to reveal strategic practices (Jarzabkowski 2003) and to research the transformation of work practices that are central to organizational change (Groleau et al. 2012). In another research, activity theory was used as a basis to develop an analytical tool to identify paradox in organizational practice (Prenkert 2006), which proves the practical applicability of the framework in activity-based management. Another relevant aspect of activity theory is that it includes different organizational actors and their collective intentions and thus allows managers to recognize tensions and dilemmas in the relation between different activity systems when translating a strategic vision into practice (Blackler and Regan 2009). A shortcoming of activity theory that some researchers point out is that a time axis is missing so that the framework does not display the development of different activities over time (Shih et al. 2013) or the hierarchical relationships between different activity systems (Nandi and Nandi 2017).

Engeström's model of activity theory, depicted in Figure 1, is currently the most commonly used in research. Following is a description of the dimensions of an activity system and how we use these for studying digital transformation activities:

- **Subject (Sub):** The subject is referring to the individual or group of people trying to reach an objective.
- **Object (Obj):** This can refer to the object on which the activity is performed or the objective of the activity.
- **Tools (Too):** Tools are any artifacts or instruments that subjects use in order to achieve the objectives.
- **Rules (Rul):** These are external rules and regulations for the respective industry, but also internal governance mechanisms and approval processes.
- **Community (Com):** The community is used to describe the social context in which the activity takes place, which includes other actors that participate in the activity.
- **Division of Labor (DiL):** This describes how the different actions are divided between different actors or hierarchical structure applied to the actions.

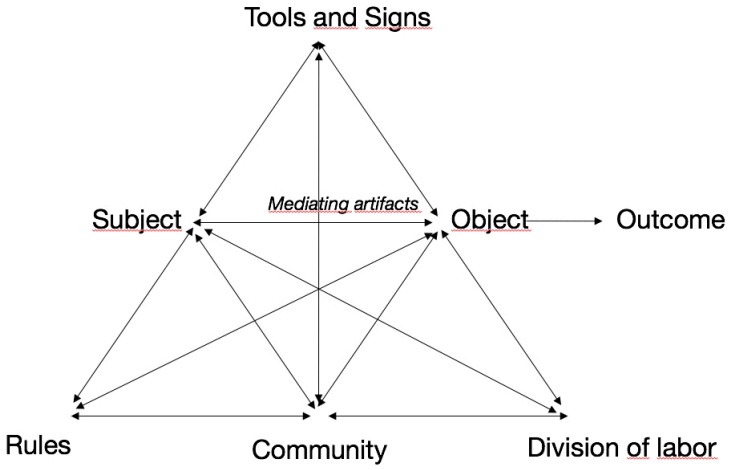

Figure 1. Activity theory framework adapted from (Engeström and Sannino 2011)

Activity theory has often been used to study individual activities, but is less frequently used to gain deeper insight in how systems of different activities relate and influence each other. Within digital transformation there are multiple sets of activities related to the overarching goal of digital transformation.

We believe that for studying the fuzzy front end in more depth by providing a detailed description of the set-up, roles, tools, and change within the company, activity theory provides a suitable framework since it allows to describe the typical courses of action within the fuzzy front end in a structured manner. It is also suitable to describe complex interactions, since it takes multiple perspectives into account (Engeström and Glăveanu 2012). By using activity theory as a guiding framework we are following Whittington's call to combine strategy-as-practice and information systems strategy in order to gain a better understanding of the strategizing process, explore what companies actually do in their strategy work (Whittington 2014) and how strategy emerges from activities in the organization (Jarzabkowski 2003).

In order to gain insight into the fuzzy front end of digital transformation, we decided to undertake in-depth analysis of multiple case examples. Our primary data source was the analysis of documents on transformation efforts and digital transformation impacts on the organization. These documents were prepared as part of an application for a "digital transformation award" in the years 2015 and 2016. It is part of a web award series that includes eleven categories for digital projects and is seen as one of the most prestigious awards for the digital industry in Switzerland, with over 400 applications across all categories every year. In order to keep the case examples confidential, the exact name of the award is not being disclosed. Insight into these applications was available since one of the authors is serving on the jury of this award. The selected applications provide a mixed sample of typical cases (Miles et al. 2014) from companies in Switzerland that comprises different industries and company sizes (see Table 1).

Insights on Activities from Case Analysis

Before presenting the activity systems identified in comparing the eleven cases, we would like to introduce some situational context. The overview of case examples examined in this paper (Table 1) shows company information, start of the digital transformation (DT) program, and motivations for each company. Despite covering many industries and company sizes, the motivation to start a transformation program often reflects similar drivers and objectives.

Three companies name "limiting existing structures" as their key driver to take action. This is referring to limiting IT infrastructures and capabilities, such as the lacking ability to quickly react to technological changes or implement up-to-date technology. "Changing regulations" was mentioned by an insurance company that specifically referred to a new national legislation forcing them to re-think their product landscape. Another driver is the "changing competitive landscape", which is reflected by the appearance of

new, previously unknown competitors and start-ups. Companies stated that the need to take action and initiate a DT program became obvious with the impending risk of actual or possible new competitors. In one case the company was already under growing economic pressure and needed to take urgent action. Companies that mentioned "digital industry transformation" as their main driver are sensing a general shift in their industry but not an urgent threat.

This motivation is also related to the objective "ensure digital readiness". These companies do not feel that they need to take action in a specific area, but that they are monitoring the changing context and react whenever they sense the need to. Another important objective is improving digital channels. One company stated that it was only two years ago that they started selling their products online, while another company specifically wanted to establish deeper connections with their customers. The third overarching objective that was mentioned is product innovation and the need to explore new business models in order to stay ahead of the competition and generate new revenue.

Table 1. Overview of case examples

Company	Industry	Size	DT start	Key Objectives	Key Drivers
Alpha	Consumer goods	1'600	2012	Strengthen digital channels (improve customer relationship)	Limiting existing structures
Beta	Insurance	700	2011	Product innovation	Changing regulations
Gamma	Insurance	7'500	2011	Product innovation	Changing competitive landscape
Delta	Consumer goods	1'700	2014	Strengthen digital channels	Limiting existing structures
Epsilon	Real estate	750	2012	Ensure overall digital readiness	Digital industry transformation
Zeta	Logistics	62'000	2014	Ensure overall digital readiness	Changing competitive landscape
Eta	Insurance	4'300	2014	Ensure overall digital readiness	Changing competitive landscape
Theta	Transport	33'000	2014	Ensure overall digital readiness	Digital industry transformation
Iota	Banking	60'000	2012	Product innovation	Changing competitive landscape
Kappa	Education	70	2009	Ensure overall digital readiness	Limiting existing structures
Lambda	Retail	360	2010	Strengthen digital channels (integrate digital and physical channels)	Changing competitive landscape (economic situation)

Table 1. Overview of case examples

This reflects the drivers and objectives before the companies actually started their digital transformation program by initiating different activities. The descriptions of the activity systems identified in this research follow the activity theory framework as guiding principle. During the analysis it became clear that despite

the companies being diverse in industry and size the activities have strong similarities. Note that the following descriptions summarize the aggregated empirical findings from all companies that conduct this activity, which means that not all details apply to each company.

Improve digital channels (AS_01)

This activity system is directed towards the objective of setting up, operating, and improving digital channels, such as websites, online-shops, or mobile apps (Obj). In every case example (Alpha, Beta, Delta, Zeta, Theta, Iota, Lambda) this is the daily business routine of a dedicated business unit consisting of up to 70 people (Subj). Important tools span from conceptual and visual design to programming and project management, and also include monitoring of analytics and social media channels for feedback (Too). Rules influencing this activity are the alignment with existing strategies and compliance with security guidelines of the firm (Rul). In one case, also regulatory guidelines for the industry need to be followed. In three case examples, the work is divided between one global and multiple regional units, wherein the global unit is providing guidelines and the regional units are responsible for implementing them in their markets (DiL). Important community members include gatekeepers to other business units or to regional units (Com). It is notable that two companies are also involving customers as test users for new features or innovations or have those tested by their own employees.

"In the beginning it was surely chaotic. The multichannel unit was built from scratch and we had to define all elements, such as our strategy or the innovation process. We moved people from other business units into the new multichannel unit, e.g. online marketing experts, because the marketing department did not really have expertise on digitization." (Banking)

Define processes and IT-infrastructure (AS_02)

This activity system includes all activities that are initiated for an updated infrastructure and simplified processes (Obj). Since this is not a usual daily activity, companies set up a new business unit or team for this (Sub). In two out of the five cases, the CEO and the CIO are also actively involved in this activity, not just in a supervising function. This shows the strategic importance of this activity for the company within its transformation efforts. Tools mainly include requirements definition and the selection of suitable technical frameworks, e.g. ERP or PIM systems (Too). It is also notable that companies use previously proven approaches for the process definition. Rules include mainly the existing IT strategy and given technical infrastructures (Rul). Partner networks also play a big role in this system. Partners can be IT partners for outsourcing, consulting agencies, and specialized partners for certain processes such as fulfilment or payment (Com). As for division of labor, the internal IT is in the lead, while partners get involved for specialized work packages and other business units engage in the process definition as needed (DiL).

"When digitization became a priority, we needed to prepare ourselves. We had old legacy systems, we had old infrastructure, employees were not mobile, there are many prerequisites that are important but that were not there. I would say that we prepared to be "digitally ready". We invested in service oriented architecture, in mobile infrastructure and process models." (Real Estate)

Adapt work practices (AS_03)

This system involves adapting daily work practices in order to implement the digital transformation of the company (Obj). The acting subjects are diverse, ranging from all employees, to the product development team, or the management team (Sub). This activity is completed by establishing additional regular meetings between the leaders in the organization; applying new approaches, such as design thinking; switching to agile approaches (not only in software development but also in other functions); or using new tools that require employees to change their daily work practices and enable closer collaboration (Too). The top management serves mainly as supervisors and sponsors of activities, while the middle management is responsible to implement these changing practices within their respective business units (DiL). Sometimes, also external partners are involved for consulting purposes (Com). New work practices are required to follow existing compliance and security requirements (Rul).

"Everybody had to change, not only those that were driving the change, but everybody had to learn how to share information, how to store information correctly. We abolished Word, Ecel, Outlook etc. and put information in a central space so that employees that did not share information were isolated.» (Education)

Create innovative digital business models (AS_04)

While continuous innovation of existing products or services is part of the digital channel management or adapted work practices, this activity system is being initiated in order to think ahead and develop more radical innovations or innovate the business model (Obj) of the company. This activity is carried out by dedicated teams or even newly set-up business units (Sub). Tools used for this activity comprise systematic trend scouting; evaluation and road mapping of trends; protoyping and pretotyping; design thinking; internal hackathons or idea contests; and setting-up strategic venture funds to support start-ups (Too). It was noteworthy, that the speed of this activity varied greatly among the companies in the sample, ranging from the subjects meeting in workshops four times a year to bi-weekly coordination meetings with the management team. Rules applied to this system are the alignment with the corporate digital strategy as well as internal approval processes (Rul). Partners play a big role in this activity. All companies in the sample collaborate with start-ups, expert freelancers, universities, or agencies in order to develop ideas (Com). Four companies even build a partner ecosystem with standardized processes for selecting and collaborating with a fixed set of partners. Two companies involve customers as lead users in the development of new innovative product offerings. Another surprising finding was that one company stated that during this activity they are also collaborating with competitors, e.g. in start-up accelerators. Subjects, partners and other business units collaborate during the ideation, while partners are often responsible to create mockups or prototypes, and business units are responsible for the implementation as soon as an idea proofs feasible (DiL).

"We have a lab with external people to scout for these weak signals, prioritize them, and develop a prototype to test ideas. We are still focusing on our core business and we do not have the skills to test new technologies quickly, you need makers, you need dreamers, you need to collaborate with start-ups and this is not our core competency.» (Real Estate)

Develop digital strategy (AS_05)

In three companies, strategy formulation and the development of a roadmap (Obj) is the task of the management team in cooperation with other business unit leaders, in the four other companies a dedicated project team is responsible (Sub). These project teams consist of various members of different business units: in one case just top managers are involved, and in another case intentionally members of different hierarchies are included for the definition of strategic goals and the detailed strategy formulation (DiL). In six cases, this is done using tools such as a standardized strategy process and various workshops, or assessments such as maturity models to examine the current status of the organization (Too). In three out of the seven companies using this approach external consulting firms are providing expertise on special topics (Com). Approving a digital strategy is the task of the top management and the advisory board, who also make sure whether the strategy complies with the overall vision and purpose of the company (Rul).

"We are a very traditional company. The digital transformation process started with a new lead for corporate development, who started to ask the question how we develop and change as a company in the future. This needed a lot of persuading with the management team. We hired an external consultancy and entered a very structured strategy process that lasted 14 months." (Consumer goods)

Align transformation initiatives (AS_06)

This activity is carried out when multiple digital transformation initiatives pre-exist within the company. Its objective is to align these different initiatives (Obj) according to the digital strategy and the approval of the c-level management (Rul). In both companies (Zeta, Theta) the internal IT department leads this activity (Sub). The reason for this is that both are larger companies with a strong internal IT. In one company the internal IT is the mandatory service provider and therefore has an overview on the complete digital portfolio. This led to the fact that they were the first to notice redundancies and the opportunity to create synergies. The IT project team defines guidelines and a concept for aligning these initiatives and

involves the business units as needed, while the c-level management, e.g. the CIO, is responsible for approval (DiL). Workshops with project leaders and portfolio management techniques are used to accomplish the task (Too). Besides the project leads additional internal thought leaders are also involved in the process (Com).

"We had the innovation unit that was founded two years ago. […] They were driving [the digital transformation]. Then there was a team in the IT and furthermore there were single experts that were pushing these topics. Then there were the same teams in other sub-organizations. At some point the top management consolidated these different activities and coordinated them across all organizational units which was a huge task to accomplish. You need to establish gatekeepers, find people that can do that and you have to convince people that this is necessary." (Logistics)

Define governance (AS_07)

This activity aims at re-defining roles and responsibilities regarding digital processes in order to react faster to market trends and user needs (Obj). This is done in an iterative manner and may even involve changing career paths in order to fill new roles and enable new decision processes (Too). In all companies (Zeta, Eta, Theta) a newly developed project team is responsible for defining governance in collaboration with business unit leaders (Sub). This process is aligned with the digital strategy and approved by the CEO or an expert committee (Rul). All employees are eventually involved (Com) and while the project team sets the guidelines, the supervisors are responsible to implement the changes (DiL).

"Our top management decided that digital transformation requires a change in organizational structures. This means that employees can now take a specialist career besides the classic career path. We introduced a new business unit which is lead by a digital transformation officer […] who did not primarily have industry knowledge but change management experience." (Insurance)

Change organization culture (AS_08)

In the majority of companies (Beta, Gamma, Epsilon, Zeta), this activity is owned by the top management in collaboration with the HR department (Sub). The goal is to adapt the behaviors of the employees accordingly, so they are acting more self-empowered, pro-active, and entrepreneurial (Obj). This is done by means of changed yearly assessment and behavioral guidelines for the employees (Too) according to the digital strategy and existing compliance guidelines (Rul). One company stated that they use events or contests as tools to communicate the strategy to employees in an emotionally engaging way. This activity is not only directed towards the employees but also to the top and senior management, e.g. by full day workshops that explicitly aim at training the top management. Eventually the middle management and supervisors (Com) are affected by this activity as well. While the HR department designs new guidelines and e.g. assessment processes, senior managers and other supervisors are expected to live and communicate the change to the employees (DiL).

"We have a program that includes the middle management that enters full-day events with short presentations and hands-on exercises, such as pretotyping. We are planning to extend this program to other leadership positions.» (Logistics)

Strengthen collaboration (AS_09)

Digital transformations both requires and enables a stronger collaboration and connection (Obj) between different business units. This activity is mainly driven by the top management, the digital transformation project team, and the human resources (HR) department (Sub). The companies in our sample (Gamma, Zeta, Eta, Theta) tried to achieve this in multiple ways, e.g. by relocating into a new headquarter with open work spaces; providing a modern infrastructure, e.g. smartphones, for all employees; and introducing flex-work models and social platforms to collaborate virtually (Too), according to existing behavioral, compliance, and security guidelines (Rul). Selected pioneer users enable this cultural change within the organization by assisting other employees with the adoption and leading by example (Com). The usage of these collaboration platforms requires employees to adapt their behavior which at the same time has an influence on the company culture. Completing this activity requires top management, HR, and also the IT-department to define new guidelines, and supervisors and employees to adapt accordingly (DiL).

"We had a company-wide project to connect employees. Not everybody had a computer before, we had people working in the field. Now everybody has a smartphone and now they have access to all information and communication channels and are more connected. This changed communication [within the organization] completely." (Transport)

Overview and Prioritization of Activities

After describing the most typical activity systems that occur in all case examples, we were interested in how organizations approach the fuzzy front end of digital transformation by prioritizing certain activities over others. In order to identify different approaches to digital transformation that are shaped by these activities, we deducted the order of the activities from the data sources. In particular, we were interested in the initial activities that companies began with when starting a digital transformation program. All the organizations in our analysis were advanced in their digital transformations and had started several activities in the past years. In this research we retrospectively explored how companies began their digital transformations and in what order they initiated the subsequent activities. Table 2 shows an overview of which activities play a key role in the digital transformations efforts in which company as well as the chronological order in which activities have been initiated in each organization.

Table 2. Overview and prioritization of digital transformations activity systems

Company	AS_01	AS_02	AS_03	AS_04	AS_05	AS_06	AS_07	AS_08	AS_09
Alpha	1	2			2				
Beta	2	4	4	1 (X)	3			4	
Gamma				4	1			3	2
Delta	1	2			2				
Epsilon		1		3	2		3	4	
Zeta	2			2	3	1	3	3	2
Eta			3	3	1		2		2
Theta	3					1			2
Iota	0			1					
Kappa		1	2						
Lambda	1								

Legend:

Darker color - activity was initiated earlier; numbers represent the order of initiation.

"0" – activity already existed (in a different form).

(X) – activity was initiated, but discontinued due to lacking success.

Table 2. Overview and prioritization of digital transformations activity systems

Approaching the Initial Steps of Digital Transformations

The analysis of case examples, the description of activity systems, and the initially prioritized activities reveal five typical approaches how organizations tackle and manage the fuzzy front end of digital

transformations. For each case we observed what activity triggered the initial step in digital transformation and what business unit was responsible for guiding the next step. In this section we discuss the different approaches and reflect on the usage of activity theory.

Centralized approach: These companies take a holistic approach to digital transformations (Gamma, Eta). They start by defining a digital strategy or include digital transformation as a key component in their corporate strategy. The fuzziness in this approach mainly arises from the re-definition of roles and responsibilities and is being structured by the distribution of work packages. This centralized approach often follows a typical strategy formation approach, by first analyzing the current status and identifying gaps in order to form a roadmap. For this a variety of tools and frameworks exists and has been developed in prior research, e.g. for diagnosing and improving digital service innovation (Nylén and Holmström 2015) or assessing digital threats to form new business models (Weill and Woerner 2015).

Bottom-up approach: In these companies, digital transformations start with scattered initiatives in various business units (Zeta, Theta). The challenge for these organizations is to create transparency of these pioneering digital initiatives and align them into a synchronized program, while also resolving conflicting responsibilities. Also, the top management needs to understand the importance of a holistic digital transformation program and eventually take ownership for guiding the transformation (Horlacher and Hess 2016). For managing bottom-up initiatives research has shown that different approaches exist – convergence, coordination, and separate stacks – depending on the degree of integration and the organizational set-up (Weill et al. 2013).

IT-centered approach: These organizations approach digital transformations in the first place as a technology-focused project (Epsilon, Kappa). They start by building an appropriate and future-proof digital infrastructure and then continue with more strategic and cultural-centered approaches. Their main challenge is that their current infrastructure and processes inhibit the implementation of digital innovation. This approach is taken by companies that start their digital transformations at a time when they are not under immediate competitive or economic pressure and therefore can invest more in building the infrastructure in order to achieve digital readiness. However, research has also uncovered that the focus on IT investments may not pay off and therefore CIOs find themselves under increasing pressure (Gerth and Peppard 2016) to not only focus on IT but align technology with business and strategic goals to a higher degree than before (Reynolds and Yetton 2015; Weill and Woerner 2013).

Innovation-centered approach: These companies focus on developing innovative solutions and pushing forward industry standards already in very early stages of digital transformations (Iota, Beta). This approach is adopted by companies, who focus on excelling in their industry and become an innovation leader. For them, digital innovation can serve to identify new business models in saturated markets and position themselves in a positive way during times of crisis. Therefore, this approach requires a proactive company culture. Most other companies tend to be rather cautious and adapt a "smart follower" strategy, by monitoring innovations and trends and start implementing them, as soon as they proved to be successful and feasible. Other research has also confirmed that companies that take an innovation-centered approach require an institutional entrepreneurship mindset within the company (Hu et al. 2016) and an environment that fosters creativity (Oldham and Da Silva 2015) in order to develop successful digital innovations.

Channel-centered approach: This approach is adopted by companies that have a low digital readiness (e.g. no online shop available or strong focus on brick-and-mortar stores) and need to reach level with the industry standards (Alpha, Delta, Lambda). Three of these companies notice a shift in consumer behavior which drives these activities. They focus on building and improving their digital channels as first key activity of their digital transformation program, aiming at strengthening the relationship to their customers through various initiatives. Current challenges revolve around incorporating technologies such as big data analytics in their operations. A particular challenge lies in combining digital and physical channels. The focus on digital channels is a common starting point for digital transformations, which can also be found in other research, which states that the transformation towards omnichannel retailing require deep organizational changes (Hansen and Sia 2015).

We have also found activities that are related to cultural change (AS_09, AS_08) and change of work practices (AS_03) to also be important in digital transformations, even though we could not identify a "culture-centric" approach. Companies that explicitly launch these activities do not only perceive digital transformations as an operational or strategic change, but as a cultural shift for the entire organization.

However, we have noticed in the course of the analysis that these activities are not something that companies begin with, but they are often introduced once it becomes obvious that the earlier activities have an impact on the daily work practices, behaviors, rules, and values within the organization.

The use of activity theory as a framework for this paper has proven to provide a systematic guideline in order to structure the different activity systems. It helped us during the analysis to explore the activity systems to a more extensive degree and capture subjects, rules, tools, or other details that would have been otherwise neglected. The dimension "community" for instance enabled us to include other important agents that are affected by or included in the course of an activity, which shows the intricate nature of each transformation activity. Broadening the focus to the larger social context of an activity is one of Engeström's contributions to activity theory (Allen et al. 2013). Since transformation is a complex change process that cannot be conducted by a single person or team but that is comprised of several steps and includes multiple perspectives, we found the activity theory framework to be ideal to break up this complex change process into smaller units that lead up to a larger goal. While our analysis focused on collecting data from multiple cases, we think that activity theory is also well-suited for an in-depth analysis of a single case, revealing motivations, combinations, causes, or contradictions within and between different activity systems, which was not in scope of our research. Another aspect that we would like to mention is that activity theory focuses on intended actions. We did not find any explicit evidence in our data, but we assume that emergent or unintended activities also play a relevant role in organizational transformations. This might be an interesting path for further research in this field.

Recommendations for practitioners

This analysis of the different activities and how organizations approach their digital transformations leads us to recommendations for practitioners in the field of digital transformation. The choice of certain activities varies according to the existing assets, the market context, and the situation of the company. We found, however, that depending on the approach a company certain activities are more appropriate than others. We base our recommendations on the specific activities that the companies in our sample experienced as successful and helpful in order to achieve their goals. In the following paragraph we list the key recommendations for companies that approach digital transformations from a centralized perspective, from a more specialized perspective (bottom-up, channel-centered, or IT-centered approach), and from an innovation-centered perspective.

Seizing the Creative Potential of the Fuzzy Front End

Companies that take a centralized approach initiate their transformations with structured analysis in the fuzzy front end in order to make sense of early signals from the outside and define a strategic roadmap. For these companies, we would like to emphasize that even though the fuzzy front end of digital transformation can be a vague, chaotic, and precarious process, it also bears a lot of creative and innovative potential. While there is an understandable desire to reduce the uncertainty and bring structure to the fuzzy front end, managers might also acknowledge the natural fuzziness of this stage and find a balance between structure and the positive impacts that may arise from experimenting and fast trial-and-error learning. Theses measures strenghten collaboration, networked thinking, and innovation and therefore complement the structured, systematic, analytical approach to digital transformation.

Use Hackathons, Innovation Jams or Offsite Days for Ideation

In order to assess the potential of ideas, companies in our sample used full days of ideation or hackathons in order to quickly create and evaluate ideas through prototypes. While hackathons are traditionally known as coding events for programmers their principle is not restricted to software development, but also design thinking or other innovation techniques can be used. One company in our sample invites employees in the company to an offsite event over two days where they allow them to work on new ideas. The management was surprised that teams spent long hours working during these days, even until nighttime, which demonstrated that they enjoyed being free from their daily business, connect with colleagues from other business units, and explore new ideas in a creative and playful way. The number of participants in this event also grew from year to year and even the CIO has expressed the intention to enter this event in the future.

In another company, teams that have an innovative idea that they want to explore further can enter a contest and win internal venture capital in order to realize it.

Introduce Fast Track Budgets

In large companies the budgeting processes take up a lot of time. In one case example, it would take up to six months from application until the budget was granted and the team could actually start to create a prototype to test an idea. When this company introduced the possibility to obtain smaller "fast track budgets" that could be used to test new ideas, they experienced an increased number of ideas which lead to an increased degree of innovative products and services, some of them would eventually enter the market. Another company introduced internal contests where teams with an innovative idea could apply for budgets, similar to venture capital, in order to further work on their ideas. While ideas that demonstrate strategic importance for the company are promoted by an executive sponsor, companies benefit from also developing a larger pool of innovative ideas in multiple areas of the organization.

Eliminate Administrative Barriers

Besides financial means digitization and experimenting with digital innovation requires connected thinking within the organization. Some companies in our sample had the experience that their existing structures hindered information flow and data exchange. In one case, customer data was available but could not be exploited in order to create personalized digital offerings. In order to enable this, data scientists were hired and a new technological solution had to be created first. In another case, very strict working time regulation did not allow the employees to work in times when they felt most creative and got in the way of flexibility in projects. By changing these, this company enabled its employees to work in a more flexible way and made room for a trust-based leadership. By making these comparably minor changes in administrative regulations, these companies enabled their employees to work in a more networked, flexible, and collaborative way.

Bridge Silos and Involve Different Actors in the Organization

Companies that take a bottom-up, channel-centered or IT-centered approach view digital transformation as functional challenge that they tackle in single areas, such as IT. Our research has shown that the activities related to digital transformation are very diverse and therefore also require a variety of actors. We would encourage managers to define the most important activities for the digital transfomation of their organization and then carefully reflect what diverse actors could be involved in these. We have seen in our analysis that companies collaborate with previous competitors, include junior employees in strategic decision making, or work with start-ups on ideas that are outside of their core business. This holds the potential for producing innovative ideas and accelerating the change process by combining diverse perspective. To minimize the risk of competing views and ideas we recommend the comparative analysis of the different activities, e.g. by using the activity theory framework, and identify contradictions between the different objectives, actors, and community involved in each activity, similar to the approach of Prenkert (Prenkert 2006).

Re-Organize for Agile and Flexible Teams

While specialized departments have increased efficiency in the past, in the digital world these silos impede flexibility and agile reaction to changing requirements. One company mentioned that its reorganization followed the example of Spotify, where the entire organization is organized in self-organized, cross-functional, and agile teams (Mankins and Garton, 2017). This company also nominated a Chief Digital Officer who is the first management member with substantial digitization knowledge but no previous industry experience. A re-organization is often planned by the top management and can therefore cause insecurities among the employees. In this specific case, a participative and transparent approach was chosen and the team leaders where involved in the planning process from the very beginning. While a complete re-organization certainly extends beyond the FFE phase, in this case it became clear to a very early stage that teams should be organized as cross-functional teams around the products instead of staying in their functional units.

Work with Partners for Missing Capabilities

Companies in our sample indicated that the dynamic and fast development of technology requires new capabilites, such as specialized knowledge in fields such as data science or analytics, or the ability to explore new topics outside the company. One company in our sample worked with universities on a global level and supported promising research projects, while another case formed an innovation team that did not only consist of employees but also external experts, such as futurists or designers.

Use Customer Journeys to Facilitate Collaboration and Keep Focus

One cases that started with a channel-centered approach used customer journeys to streamline and simplify their processes and build a new customer experience centered around the user needs. In a next step they used these customer journeys to simplify their product portfolio and ideate on new products. By focusing on the customer journeys they discovered more potential to streamline, simplify, and innovate than they would have if they had simply done a website relaunch. The cross-functional customer journey teams that worked in agile sprints also helped to break up existing silos and have staff from business units and IT collaborate more closely. In another case, these customer journeys helped to keep focus on the most important issues and prioritize resources accordingly.

Enable Cultural Transformations Instead of Innovative Lighthouse Projects

For companies that approach digital transformation from an innovation-centered perspective, the creation of innovative digital products and services as well as the identification of new business models for the digital future are of central interest. While other research stresses the importance to create a strategic vision for an organization's digital transformation our study and the use of activity theory shows that it is equally relevant to define how this vision translates into actionable activities and – vice versa – point out how existing activities contribute to the overarching goal. Even though this may sound obvious there are companies, such as case Iota, that focus on innovation activities while at the same time neglect to actively set up activities that enable collaboration within the company or a mindset shift among the workforce. The following examples help companies not only to focus on the innovative lighthouse projects, that take place in innovation labs but thus outside of the core innovation, but instead enable a transformation of organizational core values, leadership, and behavior.

Disseminate Learnings and Methods from Innovation Lab in the Organization

One of our cases had good experience in setting up an innovation lab with experts that were free from daily work. However, they also noticed that the employees in the core organization felt neglected and did not find a way to contribute their ideas. Furthermore, in particular employees that work with customers have a good idea of user needs and problems that form the basis for innvoative solutions. By strengthening the exchange between innovation lab and core organization, the innovation team got more ideas on areas to work on, while at the same time the other employees benefitted from methodologies, learnings, and expertise from the innovation lab.

Demonstrate How Employees Contribute to the Overarching Goal

In cases where there is both a traditional physical business and a newer digital business, it can be a challenge to get employees that work in the traditional business, e.g. in the brick and mortar store or in the field, behind supporting the digital vision. In one of our cases this was done by changing the incentive system. For example, if a customer ordered online and picked up the product in the store, this was counted as revenue for the store. Thus, all employees supported the digitization activities, because the management made transparent how each employee contributed to the digital vision. In another case the cultural transformation was facilitated by clearly communicating desired behaviors to the employees in order to move to a more transformational leadership. These behaviors were communicated through videos and physical cards and HR structured the yearly assessment rounds around these. In a last case, the cultural transformation started with workshops for the top and middle management in order to align them with strategic decisions and teach them methods how they can lead change in their respective teams.

Concluding Remarks

While this paper describes the various typical activity systems and discusses different approaches to manage digital transformations, we cannot make any remarks on one approach being more successful than another. Depending on the situational context of the organization, we might possibly find one company that failed with one approach, while another company has been highly successful with doing exactly the same. This is also shown by one of our case examples, which started with an innovation-centered approach, but terminated this endeavor due to the lack of outcome and switched to a channel-centered approach, while another organization stated that they have achieved a higher visibility and performance due to the focus on digital innovation. Since no "ideal" approach exists, managers tend to decide intuitively depending on their situational context. Each company thus comprises its path to digital transformations through a combination and network of several activity systems.

In this study we used activity theory as a framework to describe activities of organizations during the fuzzy front end of digital transformations. The prioritization of these activities reveal five approaches to initiate a digital transformation program: centralized, bottom-up, IT-centered, innovation-centered, and channel-centered. Data from eleven cases in Switzerland served as input for this research project. We feel that these results shed more light on how managers approach the digital transformations of their companies.

However, we also have to state some limitations to this study. Since the data source was mainly based on award application documents, a selection bias has to be considered, since only successful cases are submitted and, furthermore, these might tend to bias towards only mentioning activities with positive outcome. This was mitigated by explicitly including corresponding questions (e.g. "What activities does your company need to improve on in the future?") in the interviews. However, it was also found that the award applications contained very comprehensive and substantial information including honest statements about failures and a high degree of critical reflection. Table 2 also reveals that most companies initiate several activities consecutively, while within a few companies this is limited to one or two activities. Since in these companies the activities nevertheless lead to a major and substantial change, we would still argue that these cases can be counted as digital transformations. Also, in this paper we discuss isolated activities. In reality these are also influenced by different factors in the organization or in its context. Finally, it needs to be stated that the quality of descriptions within the applications documents varied between the different companies and there were not enough interviews conducted to qualify this research as in-depth multiple case studies.

These results may contribute to a better understanding of the initial stages of digital transformation and provide managers with a systematic compilation of different possibilities for structuring their own approach to digital transformation. For researchers it might be a promising field to study the performance of these approaches in different cases and different situational contexts in order to gain more knowledge on how to navigate the fuzzy front end of digital transformations more successfully.

Appendix – About the Research Methodology

The application documents that were used for the analysis of the case examples included the following information:

- Results of an online survey which include a self-assessment in the dimensions of a digital maturity model (Berghaus & Back, 2016) and free text entries to these questions.
- Written statement on: "What was your main progress within your digital transformation in the past 18 months?"
- Written statement on: "What activities were conducted to achieve this transformation progress?"
- Optional: complementary documents, e.g., presentations, market data, strategy papers (available in 9 out of the 11 cases).

We triangulated the data from these sources with additional interviews from all companies in order to gain a more holistic and complete picture of the fuzzy front end phase (Jick 1979). In total, 18 interviews were analyzed for this research. Interviews were conducted with employees responsible for implementing digital transformation, who have a good overview of existing activities and are involved in the strategy formulation of the firm. Positions of interviewees included for instance Head of Digital Transformation, CIO, or Head

of E-Business. Interviews were conducted in a semi-structured fashion and lasted between 35 and 50 minutes.

For the analysis of the material the following steps were followed:

- For each company we reviewed all transcripts of the interviews and all written documents separately in order to identify all key activities through open coding. Each key activity was labelled with a descriptive title, e.g. "build innovation lab" or "define digital strategy".
- For each activity, we extracted all information according to the six dimensions of the activity theory framework – subject, object, tools, rules, community, and division of labor – in order to gain a complete and systematic picture of the activities conducted.
- The total analysis across all companies yielded 41 activity systems. It already became obvious that many activities had strong similarities. In a next step, the key activities were clustered ac-cording to the overall objective of the activity. For example, activities labeled "build innovation lab" and "change business model" have been clustered into "create innovative digital business models". Overall, nine clusters of activity systems have been identified in this phase of the analysis.
- For each cluster, the detailed information in the six dimensions of the activity theory frame-work was consolidated and distinctive features were highlighted.
- In a last step, we re-read the data for each company and applied the clustered activity systems to each company in order to ensure validity of coding. During this stage, the chronological order of initiation of activities was captured for each company. Even though most companies conduct a combination of multiple activities, we were particularly interested in what their initial approach to digital transformation was and what activities were prioritized and considered most important to begin with. Therefore, we used these activities that were initiated first in each company to deduct the approaches.

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