



ISSN 1943-7544

Pacific Asia Journal of the Association for Information Systems

Research Paper

doi: 10.17705/1pais.12302

Volume 12, Issue 3 (2020)

Towards a Characterization of Digitalization Projects in the Context of Organizational Transformation

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Abstract

Background: *The digital transformation (DT) disrupts companies across all industries, forcing them to rethink and adjust their value creation. The necessity to adapt to a digital future seems clear; however, many companies still struggle with “becoming digitally transformed”. While existing literature shows that projects can play a crucial role in realizing DT, we have a limited understanding of these projects. Therefore, we investigate these digitalization projects by asking: How are digitalization projects in the context of organizational transformation characterized and how do they contribute to organizations’ DT? With this study, we provide an initial characterization of these digitalization projects and advance the understanding of their importance for the overall DT process.*

Method: *With our qualitative multiple-case study, we analyze five projects that were carried out in highly heterogenous contexts based on 27 semi-structured interviews. Subsequent to the individual analysis of each case, we draw insights from a cross-case comparison and identify common characteristics that distinguish digitalization projects in the context of DT.*

Results: *Our analysis reveals that despite digitalization projects are manifesting in different forms, they are predominantly characterized by their embeddedness in and contribution to an overarching DT process, their derivation from a central DT strategy, the central role of digital innovation in these projects, the integration of technology and business perspectives on a project level, and the application of novel project methods.*

Conclusions: *Digitalization projects in the context of DT can differ from traditional IT projects and thus need dedicated management approaches. We contribute to literature by elaborating an initial, theoretically sound characterization of these digitalization projects. In addition, we offer valuable insights to practitioners regarding how these digitalization projects can be recognized and managed successfully.*

Keywords: Digital Transformation, Digitalization Projects, Project Management, Technochange Management, Case Studies.

Citation: Barthel, P., & Hess, T. (2020). Towards a characterization of digitalization projects in the context of organizational transformation. *Pacific Asia Journal of the Association for Information Systems*, 12(3), 31-56. <https://doi.org/10.17705/1pais.12302>
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Introduction

Over the past decade, digital transformation (DT) has become one of the main challenges for companies across all industries (Berghaus & Back, 2017). DT describes a “process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies” (Vial, 2019, p. 121). This transformation triggered by emerging digital technologies can lead to a significant shift of an organization’s value proposition and value creation logics (Wessel et al., 2020). Thus, in the course of this change, organizations have to rethink, adjust, and innovate their business processes, products, services, and even entire business models (Wiesböck & Hess, 2020). To do so, they are required to handle new digital technologies and adapt their strategy, organizational structure, and culture (Vial, 2019). One key factor for surviving, or even profiting from the digital disruption, is the ability to manage the realization of DT (Matt et al., 2015). Research indicates that projects play a major role in this realization (Karimi & Walter, 2015; Krumay et al., 2019), as they manifest substantiate change (Jöhnk et al., 2020; Øvrelid & Bygstad, 2019). In the following, we focus on those *digitalization projects* that primarily target the transformation of organizations’ value creation.

Due to its holistic nature, DT can hardly be implemented in a “big bang” approach, but rather through numerous concurrent digitalization projects on all organizational levels (Gimpel et al., 2018; Zimmer, 2019). Thus, managing digitalization projects can pose a major challenge for organizations (Berghaus & Back, 2017; Chanas et al., 2019). While we know about the importance of these projects, still relatively little is known about their characteristics and how they specifically contribute to organizational DT in practice.

Research on technology-related projects is an established stream in information system (IS) research (Bygstad et al., 2010; Gregory & Keil, 2014; Wiener et al., 2016). However, while conventional information technology (IT) projects use digital technologies to support the existing value proposition of organizations and thus strengthen their identity, projects in the DT also utilize digital technologies to redefine the value proposition, potentially changing the prevailing organizational identity (Skog et al., 2018; Wessel et al., 2020). Therefore, for digitalization projects the consideration of business and organizational change is as important as the consideration of technological change (Wiesböck & Hess, 2020). A deeper understanding of the effects, DT has on corresponding implementation activities, would help us to derive suitable project management approaches (Wiener et al., 2019). This does not mean that established knowledge on IT projects is not relevant for digitalization projects, but established project management practices should be reevaluated in the light of DT, as different project types may require different management approaches (Shenhar, 2001).

While research on these specific projects is still relatively limited, literature offers first valuable insights regarding their characteristics and role for DT. For example, we learn that their outcome is often unclear at the beginning (Antonopoulou et al., 2017; Berghaus & Back, 2017) and primarily aims at the creation of business value (Gothelf & Seiden, 2017). They are strongly associated with DT strategy, as they themselves realize and form strategy (Chanas et al., 2019; Krumay et al., 2019). To ensure strategic alignment, they are often in the responsibility of a chief digital officer (CDO) (Haffke et al., 2016; Singh & Hess, 2017) or a dedicated digital unit (Fuchs et al., 2019; Zimmer, 2019). This extant research usually addresses digitalization projects from the perspective of an overall DT process and rarely drills down to the specific projects themselves. However, to derive appropriate project management approaches and to better determine the contribution of projects to organizations’ DT, an in-depth look on these digitalization projects is required (Henriette et al., 2015). Therefore, we aim to answer the following research questions (RQ):

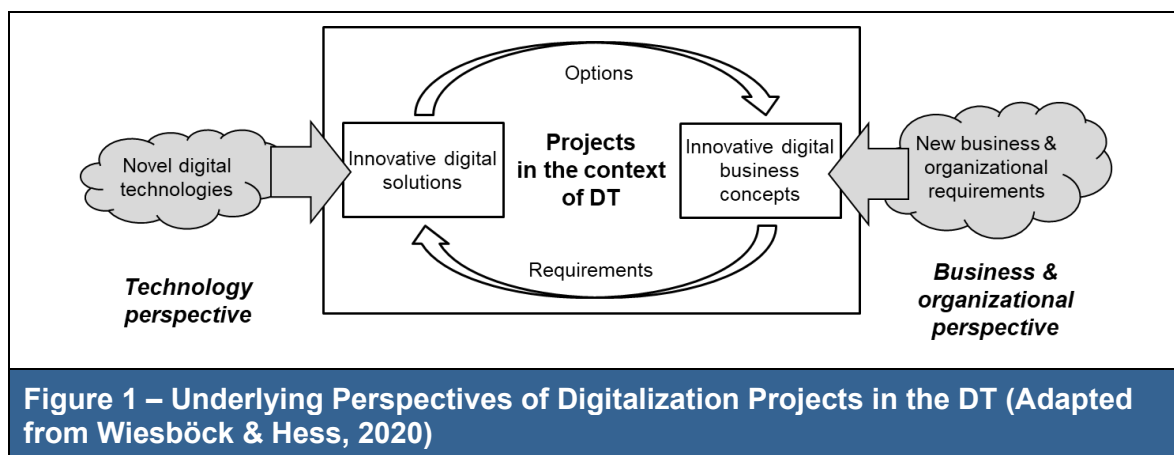
RQ1: How are digitalization projects in the context of organizational DT characterized?

RQ2: How do digitalization projects contribute to organizations' overall DT?

To answer these questions, we first derive an initial conceptualization of digitalization projects from the literature that helps us to structure our research. It is important to note that, while projects aiming at the enablement of DT, like IT infrastructure projects, are also important elements of organizational DT (Wiesböck & Hess, 2020), they are not in the main focus of this study. Instead, we focus on digitalization projects in the context of organizational DT, which we define as those projects that have a direct and transformative impact on organizations' value creation and are embedded into an overarching transformation process. Following this, we present five qualitative case studies to demonstrate how digitalization projects in the context of organizational DT are shaped and managed in practice and in which way they contribute to overall DT. Our research aims at two main contributions. First, by identifying characteristics of digitalization projects, we can add to IS project management research, and can potentially lay a base for the appropriate utilization, adaption, and development of project management practices for digitalization projects in the context of organizational DT (Shenhar, 2001; Wiener et al., 2019). Second, by studying digitalization projects in their respective organizational context, we can deepen our understanding of projects' contribution to overall DT (Berghaus & Back, 2017; Chanias et al., 2019).

Underlying Research Foundation

In order to develop an initial understanding of digitalization projects in the context of organizational DT, we build on the assumption that technological change, as well as business and organizational change are equally important objectives of these projects in the context of DT (see Figure 1). Accordingly, we will first consider these two underlying perspectives (IT and business/organization) and address how literature has combined the perspectives so far. We will then lay out how the integration of both perspectives is reflected in the context of DT and from this derive an initial conceptualization of digitalization projects.



Projects for Realizing IT Solutions

Research on projects has a longstanding tradition in IS literature, thus offering valuable insights for all types of IT-related projects. IT projects can be described as temporal organizations, with their own resources and governance, aiming to contribute to an organization's success by means of improved technological functionality, higher reliability, and lower operational costs (Jiang et al., 2018; Wiener et al., 2016). Typically, an IT project has "set, limited scope with an identifiable deliverable" (Jiang et al., 2018, p. 41) and "resists

change to its focus on achieving a specific output in budget and schedule parameters” (Jiang et al., 2018, p. 41). Conventional IT projects do not primarily aim at changing organizational foundations, but focus on implementing a technological solution (Markus, 2004). Consequently, studies in this field cover a wide range of topics related to the implementation of IT solutions, such as project control (Wiener et al., 2016), performance measurement (Aladwani, 2002), failure (Baghizadeh et al., 2020), risk (Bahli et al., 2011), funding processes (Cao et al., 2013), resource allocation (Kundisch & Meier, 2011), or prioritization (Shollo et al., 2015). Naturally, most if not all of the topics addressed by IT project management are also relevant for digitalization projects. However, the meaningfulness of some of this knowledge could differ in the context of DT, as we see that a shift in perspective is required. Using three example areas, we will demonstrate why a reassessment of IT project management practices can be valuable.

First, IT project management often focuses on limiting the potential downsides of projects. Project failure, risk, and distress are common themes in IS literature (Baghizadeh et al., 2020; Bahli et al., 2011). This seems to be a logical consequence of most IT projects aiming to achieve a specific outcome in time and budget (Jiang et al., 2018). Overachievement or opportunity seeking are pursued less often. This can be seen as a sensible orientation for developing complex and well-known systems like for example ERP systems, where organizations rely on flawless and efficient functionality. However, when innovation becomes an important objective of IT-related projects, risk aversion and a strong focus on the prevention of failure might lead to subpar results. Especially in the context of DT, where innovativeness is central (Berghaus & Back, 2017; Wiesböck & Hess, 2020), setting project control too narrowly on risk reduction could be detrimental (Wiener et al., 2019).

This area directly ties in to the second point. The measurement and evaluation of IT projects tends to be configured for short term, tangible outcomes, while the measurement of intangible and qualitative aspects is more challenging (Nagm et al., 2009). Also, strategic outcomes that are strongly oriented towards the future, like future customers and markets, are harder to evaluate for prevalent IT project measurements (Murphy & Simon, 2002). As argued, outcomes pursued with digitalization projects can be initially fuzzy, often intangible, and can have a strategic, future-oriented perspective on innovation and value creation (Berghaus & Back, 2017; Gothelf & Seiden, 2017). Therefore, it could be beneficial to utilize, adapt, and develop more holistic approaches for measuring project success (Aladwani, 2002; Nagm et al., 2009), as the application of methods aiming at short-term, tangible outcomes might limit the effectiveness of digitalization projects in the DT.

Third and possibly most important, IT project management traditionally focused primarily on the technological side of change (Harison & Boonstra, 2009; Markus, 2004). That is not to say that business-related aspects of change are neglected entirely. On the contrary, the importance of the organizational context for IT activities is a central topic in IS research (Murphy & Simon, 2002; Vermerris et al., 2014). Nevertheless, business and IT are often still seen as separated entities that need to be aligned as much as possible (Fonstad & Robertson, 2006; Vermerris et al., 2014). At the same time, we see that in the course of DT an integrated perspective on IT and business with a shared vision becomes essential (Gerster, 2017; Leonhardt & Hanelt, 2018; Reijnen et al., 2018). Thus, it appears necessary to address project concepts that do not only consider both sides’ perspectives separately but integrate them.

Integration of Organizational Change in IT Projects

Change management emphasizes the role of the organizational context, covering “soft” factors that affect and are affected by projects (Partington, 1996; Whelan-Berry & Somerville, 2010). Thus, change management offers a valuably complementary perspective to IT project management (Andersen, 2018). Research on change management typically pivots around the human aspect of organizations and also projects, such as management attention (Bruch et al., 2005), shared vision (Kotter, 1995), competences (Ashurst & Hodges, 2010), and communication (Todnem By, 2005). While these aspects can be addressed with dedicated change management projects, it is also argued that they are crucial for the success of IT projects (Andersen, 2018; Linderoth & Pellegrino, 2005) and especially IT-related transformation projects (Ashurst & Hodges, 2010; Iveroth, 2011). The particular strength of the change management perspective is that it also applies to complex problems where goals are not clearly defined and unclear, where there is a high degree of context dependency and problems due to interdependencies cannot be viewed in isolation (Beer & Nohria, 2000; Crawford et al., 2003; Martinsuo & Hoverfält, 2018).

As argued, the importance of integrating the perspective of organizational change into IT-related projects is apparent. Venkatraman stated in 1994 that the benefits from the deployment of IT cannot be fully realized, if organizational conditions are not taken into account (Venkatraman, 1994). This business-IT-alignment perspective strongly emphasizes the importance of business value for technology-related projects (Gerow et al., 2014; Vermerris et al., 2014). However, this alignment perspective still considers business and IT separately. As digital technologies increasingly permeate all aspects of a company, the processes, products, services and business models, a pure alignment of IT with the business strategy no longer seems sufficient (Bharadwaj et al., 2013; Yeow et al., 2018), but a dedicated digital strategy can be required (Matt et al., 2015). Such an integrative perspective, acknowledging the increasing inseparability of technology and business, also has to be reflected on the project level (Karimi & Walter, 2015). Otherwise situations can arise, in which critical aspects of either technological change, or organizational and business change are not addressed properly.

Elaborating her concept of *technochange* management, Lynne Markus argued in 2004 that if IT use triggers major organizational changes, thus creating a situation with potentially high risks and rewards, these changes need to be actively approached by measures related to organizational change programs (Markus, 2004). The resulting type of project is neither thoroughly addressed by IT project management, as it does not sufficiently consider aspects of organizational change, nor by change management, as it does not sufficiently reflect unique aspects of IT-driven change. A simple additive combination does not yield optimal results either, thus a different approach, i.e., technochange management, is required (Jackson & Philip, 2010; Markus, 2004). This leads to project management that significantly differs from the traditional isolated approach of IT or change project management, going beyond the simultaneous but separated execution of IT and organizational change projects (Hartl & Hess, 2019; Markus, 2004) (see Table 1). To effectively govern technochange, an integrated approach that encompasses both IT and organizational change is required (Harison & Boonstra, 2009). For this study, technochange is an useful concept that can inform us about how projects can be shaped and managed in the context of DT, as technochange situations show characteristics similar to DT (Hartl & Hess, 2019).

Table 1 – Technochange vs. IT and Organizational Change Projects (Adapted from Markus, 2004)

	IT projects	Technochange projects	Organizational change projects
<i>What is achieved?</i>			
Target outcome	Technology performance, reliability, and costs	Organizational performance	Organizational culture and/or performance
<i>How is it achieved?</i>			
Solution	New IT solutions	New IT applications plus complementary organizational changes	Interventions focusing on organizational change
Basic approach	IT project that produces outcome, meeting specifications and budget in time	Set of change initiatives consisting of IT project and organizational change measures	Organizational development practices, comprising a set of different change methodologies
Resources	Central role of IT department (dpt.), support by external partners	Central role of IT dpt., in cooperation with organizational managers and change specialists	Central role of HR dpt., in cooperation with organizational development experts and external partners

Digitalization Projects in the Context of Organizational DT

DT simultaneously presents a high-reward opportunity and an existential risk to incumbent firms (Sebastian et al., 2017). The transformation goes beyond simply digitizing resources, and can involve the transformation of products, services, processes, communication channels, or complete business models (Haffke et al., 2016). In that regard, DT can be seen as an innovation process, where digitalization and digital innovation over time transform organizations' value creation and value proposition (Berghaus & Back, 2017; Osmundsen et al., 2018; Wiesböck & Hess, 2020). What differentiates DT from other forms of IT-enabled organizational transformation is that it does not stop at strengthening the existing value proposition and organizational identity, but it can go as far as redefining the foundations of an organization (Wessel et al., 2020). In this respect, DT can also go beyond the impact of technochange situations. DT extends the view on IT as a competitive advantage by further leading to the business side, focusing on digital technologies to take advantage of new opportunities (Haffke et al., 2016). We argue that this characteristic of DT makes the integration of organizational and technological change, proposed by technochange management, even more crucial.

To account for the holistic nature of DT, organizations develop strategies that consider the different dimensions of DT, i.e. changes in value creation, use of technologies, structural changes, and financial aspects (Hess et al., 2016; Matt et al., 2015). This DT strategy again reflects the equal importance of organizational and technological aspects. Previous studies demonstrated that *digitalization projects* are strongly related to DT strategy, in that they can be utilized to realize strategy, but also themselves create elements of strategy (Chanias et al., 2019; Krumay et al., 2019). As these projects involve strategic change (Berghaus & Back, 2017; Henriette et al., 2015), they consequently require a strategic perspective, which demands a reassessment of existing assumptions regarding project design and management (Wiener et al., 2019). We consider these projects as an evolution of technochange projects in that they require more than mere IT implementation, have a high potential to trigger

organizational change, and need an integrated view on technology and business. However, going beyond the scope of technochange, projects in the context of DT have a stronger orientation towards the transformation of value creation, going as far as shifting the underlying value proposition (Wessel et al., 2020; Wiesböck & Hess, 2020).

The importance of projects for realizing organizational DT has been demonstrated by prior literature. By bringing these insights together, we aim to set out our initial understanding of digitalization projects and their impact on organizational DT. Digitalization projects can be part of an overarching, strategic DT process, therefore they require the linkage to other concurrent projects and digital initiatives from a holistic and connected perspective (Gimpel et al., 2018; Jöhnk et al., 2020; Osmundsen et al., 2018). In order to meet the demand of equally considering the organizational and the technological perspective of change, companies apply integration patterns that tightly connect business stakeholders, as well as the IT department (Bygstad et al., 2010). Instead of aligning over time, both sides progress highly integrated on a common path, fostering the projects' cross-functional nature (Gimpel et al., 2018). Just like DT itself, the projects can emerge top-down, bottom-up, or in a hybrid form (Chanas et al., 2019; Holotiuk & Moormann, 2018).

As the scope of said projects is not limited to the IT department, mobilizing the whole company can sometimes be necessary. Therefore, they often fall within the responsibilities of a special executive role, e.g., of the CDO (Singh & Hess, 2017; Tumbas et al., 2018). They can also be implemented by dedicated organizational units (Fuchs et al., 2019; Raabe et al., 2020) and sometimes bypass a company's established IT organization (Haffke et al., 2016). The implementation of those digitalization projects is likely to require new capabilities and new forms of project organization (Henriette et al., 2015). Teams might be smaller, with mixed competencies and a special set of skills (Tumbas et al., 2018). These teams can, to some degree, be empowered to operate autonomously, which calls for a mission command leadership style (Gothelf & Seiden, 2017). To complement missing capabilities, cooperation with internal and external partners could be necessary (Berghaus & Back, 2017). Digitalization projects that realize DT often follow initial exploratory pilot projects (Gimpel et al., 2018) and tend to have a smaller scale and shorter, iterative cycles than traditional IT projects (Tumbas et al., 2018). Accordingly, they are also strongly associated with agile project methods (Berghaus & Back, 2017; Gerster, 2017; Osmundsen et al., 2018). This agile approach can also require more flexible and faster project funding processes (Cao et al., 2013; Gimpel et al., 2018; Sebastian et al., 2017), as there often is little upfront commitment to scope, cost, and schedule. Overall, the outcome of these projects can be unclear at the beginning, lacking a predetermined usage and have an uncertain market potential, due to technical and contextual uncertainty (Antonopoulou et al., 2017).

While these insights from prior literature guide our research and help us to understand our observations, we know relatively little about how these characteristics manifest in practice, yet. Therefore, we investigated real world instances of digitalization projects to demonstrate how these projects are shaped and managed and how they can contribute to organizational DT.

Research Method

We selected a phenomenon-based, exploratory research methodology to study the nature of digitalization projects in the context of organizational DT. We applied a qualitative empirical case study approach in order to study the phenomenon in its real-life context (Yin, 2014), allowing us to capture knowledge from practice, and to gain novel insight (Benbasat et al., 1987). The case study method is appropriate for our purpose, as the phenomenon in question can only be studied in its natural setting, is based on contemporary events, cannot be controlled by the researcher, and lacks an established theoretical base (Benbasat et al., 1987). In addition, case study research is especially suitable for answering "how" and "why" questions

(Yin, 2014). We selected a multiple-case design because it allows for cross-case comparison and thus promises to yield more robust results (Yin, 2014). To enhance the study's external validity, we followed a theoretical replication logic and chose diverse cases with a high likelihood of contrasting results (Yin, 2014).

The case selection resulted in five case studies and was guided by our initial understanding of digitalization projects. Therefore, a criterion sample logic was used to search for projects contributing to the realization of organizational DT. As unit of analysis, one specific project in each organization (case site) was analyzed. We aimed at including different industries, in order to obtain a broad overview. In addition, we considered case sites that differ regarding companies' market focus in terms of business-to-business (B2B) or business-to-consumer (B2C), as well as size, age, and experience with DT activities. All the selected companies are based in Germany. Table 2 gives an overview of the five case sites, including a short description of the projects' objectives, the criteria based on which the projects were selected for this study, project duration from the first idea to the first implementation, number of team members (TM), information regarding the companies, and the number of interviews conducted.

Table 2 – Overview of the Sample

	Case A – TelCo	Case B – PlantCo	Case C – MediaCo	Case D - AccessCo	Case E - TextilCo
Project in focus / Criteria for selection	<u>Digitalization of sales process</u> / Project contributes to transformation of core business process in company under high DT pressure	<u>Digital extension of physical products</u> / Project marks shift of DT focus from efficiency gain to new value creation	<u>Development of digital business model</u> / Project explores completely novel business areas outside established core business	<u>Digital connection of existing products</u> / Project marks that DT becomes a strategic topic in a small company with little DT experience	<u>Implementation of omni-channel services</u> / Large scale transformation of core business process and digitalization of customer interaction
Project duration/ Team members	~5 years / 4 TM at start, later ~15 TM	~2 years / number of TM was not disclosed	~1,5 years / ~10 TM	~3 years / ~10 TM	~2,5 years / ~100 TM
Industry	Telecommunications provider	Plant construction	Media group	Automotive accessories	Textile
Revenue / Employees (2018)	> €7 bn. / > 10,000	> €0.3 bn. / > 2,000	> €2.5 bn. / > 10,000	> €0.2 bn. / > 500	> €2.8 bn. / > 14,000
Number of interviews	9	3	9	3	3

Data collection took place between July 2018 and March 2019, except for case B, where data collected as part of a previous study in 2016 was updated and extended with an additional interview in November 2018. For each case, we conducted at least three semi-structured interviews. We included a technical, as well as a business perspective in each project. In addition, project leads and liaison persons were interviewed. Interviews were conducted face-to-face or via telephone, following a guide with open-ended questions. For the interview guide we derived top categories from the project type comparison conducted by Markus (2004). These categories comprised a set of questions, inter alia covering topics regarding the project

team (e.g., “From which departments were team members staffed?”), the methods used (e.g., “How was project success tracked?”), and budget allocation (e.g., “Who was responsible for budget allocation?”). All interviews were recorded and transcribed verbatim (Miles et al., 2013), except one, in which due to technical restrictions only field notes were possible.

To increase the study's validity, primary data was triangulated using secondary data sources (e.g., internal presentations, corporate websites, etc.) (Miles et al., 2013). Subsequently, ATLAS.ti was used to analyze the collected data. Two researchers independently evaluated the data and jointly formed them into cases. We matched statements to the deductively derived head-categories, or, where necessary, adjusted, extended, or combined categories. Thirty-one head categories were derived in total, e.g., “project staffing”, “relationship business department” and “success measurement”.

Within-Case Analysis

In the following, the five individual case studies are presented. The case descriptions are structured along the project dimensions proposed by Markus (2004), and Hartl and Hess (2019). All interview quotes are translated from German.

Case A – TelCo Project

Target and solution - TelCo, one of the largest telecommunications companies in Germany, serves business as well as private customers. As technology advances rapidly in the telecommunications industry, continuous technological change is deeply rooted within TelCo. To meet the demands of the ongoing digitalization, the company launched a DT strategy, targeting various business areas, including architecture, operations, and HR. TelCo's overarching aim is to achieve organizational versatility and adaptability.

The specific project we analyzed aims to digitalize operation processes and work practices in the sales department. In the past, the complete sales process was paper-based, meaning that after contract conclusion, sales agents had to enter all customer information manually. The project in focus aims to develop and introduce a tablet application, which affects all underlying and related processes by switching from paper-based to digital sales contracts.

At first, the higher management and business departments did not embrace the initial idea put forward by a software developer in the IT department. Nevertheless, a small team unofficially developed a prototype. *“And at that time the project was a complete submarine. That means we had to do everything quasi unofficially. Officially we were not allowed to work on it”* (interview with the project initiator). Therefore, the initial impulse can be described as bottom-up. Integration into TelCo's official DT strategy happened only gradually. Initially, the objective was to increase the sales process's efficiency; however, over time, management recognized and realized the project's potential to transform the overall sales process.

Approach - The project was executed using a hybrid project method. At the start, the small project team aimed for quick results to gain the business department's commitment. *“We have been agile right from the start. Simply for the reason: we always wanted to show results relatively quickly. That was very important in the beginning. Towards the department, which then took over the app”* (interview with project initiator). Therefore, it chose an agile approach, which was not prevalent in the IT department at that time, but was easy to apply because the project was still relatively independent of the core company. The first phases, concept, analysis, and planning followed a waterfall approach, while the actual software development was done following a Scrum methodology. After TelCo's management officially approved the project, it had to adapt to the company's non-agile release model, which followed a classic waterfall approach. *“Where we are not yet agile at all is the deployment, for example. We*

currently do not have the ability to deploy after a sprint. Instead, we are still dependent on the deployment cycles that are specified by the company” (interview with product owner). The project team had to align with TelCo’s official release plan, which partly slowed down the progress. After the app had been developed and implemented, the focus moved to process change and the project switched back to a classic, non-agile, project management approach.

Project monitoring and controlling were oriented toward the predefined milestones. However, the detailed planning was adjusted continuously from sprint to sprint. Project success was measured from a business side, based on the sales agents’ acceptance quote of the new process, as well as from a technical side, based on the number of bugs contained in an already released functionality.

One person in the business department (sales) and one in the IT department formed the project leadership. These two worked in a close collaborative mode, as cross-functional knowledge was deemed essential for the project’s success. *“I would say [the sales department] is relatively heavily involved. Also in terms of know-how, also technically. So the...I would say they can easily discuss with [the IT people] on the eye level, also technically”* (interview with product owner). As many different departments were involved, an important project leadership competence was stakeholder management and coordination. The project was integrated into existing organizational structures to foster cooperation with all affected departments. In this way, TelCo tried to minimize issues and interfaces on which the solution heavily relied.

The use of agile methods was considered a main success factor as it allowed for quick testable results and an efficient development process. Further, strongly integrating the business department into the development process was seen as highly fruitful.

Resources - Initially, the IT department provided all financial and human resources from a budget for innovative projects. Eventually, when the business department finally approved the project, TelCo’s central budget for digitalization projects funded it.

The project team was staffed by internal employees, mainly from the IT department, as well as by external consultants. External partners were included because TelCo itself had neither enough internal resources nor all the required knowledge and competences. The agile approach needed to be trained at the outset, as it was new to some project members. The resulting team was interdisciplinary and cross-functional, from different departments, and with different backgrounds.

Case B – PlantCo Project

Target and solution – In the past, PlantCo, a medium-sized, family-owned company specializing in plant construction components, saw the DT primarily from the perspective of process digitalization and automation, in other words as a means to reach higher efficiency. The pressure to transform is still relatively low in their industry; however, as international competition is getting fiercer, increasing efficiency in order to reduce factor costs becomes crucial. *“We are certainly not a pioneer [of digitalization], there are one or two competitors who already have somewhat more innovative solutions or partner portals for product distribution, we are rather followers, not even fast followers”* (interview with head of IT).

Recently, the company decided to trigger activities directed at the digital extension of physical products, and building on this, of digital services. Specifically, the project in focus aimed to develop a mobile app for customers’ information queries regarding plant components. The underlying platform additionally could serve as a foundation for further services, such as providing spare parts or customer services, and could be a requisite for new, data-based business models. While digital additions to existing physical products have been tested for quite some time, the monetization of these solutions has been challenging. PlantCo now

assumes that by offering a tangible benefit to their customers, they can generate additional revenue.

The technical solution consists of an application on the customer's device and of sensors in the plant components. These are both connected to PlantCo's database. In a first step, customers are enabled to retrieve information on the products, specifications, and information on current operations, errors, etc. A challenge to this solution lies in the required data being stored decentralized at PlantCo; the data, therefore, first has to be consolidated. Introducing the project, which is now embedded into a long-term DT program, was a technology-driven idea initiated by a business department.

Approach - As this solution is heavily based on IT, the IT department played a leading role. However, the department also internally integrated a business perspective, as staff included professionals with a distinct business background. The project was not located in a single department, because diverse units or even the company as a whole were affected. The project, like the DT strategy, was seen as a trigger for organizational change, and itself relied on this change. The focus here was on reducing borders within the organization, ending a silo mentality, and fostering company-wide cooperation. This was seen as a requirement for creating future data-based business models. Initiating and supporting such company-wide change in a traditional company poses a major challenge.

The project was set up along an agile methodology. The project team was allocated a common project space to enhance communication, besides brief daily meetings. The cross-functional team created a working software increment as quickly as possible. In subsequent iterations, further development by the whole team took place. They had no traditional requirement specification, no extensive documentation, and only a rough conceptual description. The project team was granted a high degree of autonomy. Interference from outside the project was largely intercepted by the project leader, the head of IT himself, who has a strong business process background. *"PlantCo decided to get someone who is not an IT specialist at all, but someone from the business world"* (interview with head of IT).

Project control was relatively loose, with first detailed evaluations of progress being done after four months. The project was highly empowered by support from the board of directors to whom the project managers reported directly. Other heads of department were approached one by one, with the intention of winning them over to the project; also, the project team used "champions" to reach out to the whole company. PlantCo described the integrated working mode of IT and business departments, as well as the holistic perspective on actively triggered organizational change as main success factors.

Resources - The board provided the project with a high level of resources, from a financial as well as from an HR perspective. *"We have received excellent support from the Board of Management. If we see a point where we can spend the money wisely, then that's what we get"* (interview with head of IT). Financing came from a central IT budget that the board had allocated to the overall DT program. To achieve a flexible reaction to new topics and to foster innovativeness, the funding process for projects was restructured. Instead of adhering to a strict annual budget plan, a continuous approach was established, according to which a significant share of the overall budget is not strictly assigned, but flexibly decided on bi-monthly. This way, new projects can start fast-paced during the year.

The project team was staffed interdisciplinary, drawing employees from the IT and business departments who worked in an integrated rather than a parallel mode. For single topics, external consultants with expert knowledge were hired. These external partners were not only used for technological matters, but also for organizational change issues.

Case C – MediaCo Project

Target and solution - MediaCo is one of the main players in the German media industry. As the media industry itself was among the first industries to be strongly affected by digitalization, various companies reacted early to the opportunities and risks of DT. Therefore, MediaCo launched multiple initiatives and projects to transform from a provider of analog media to a heavily diversified group with a strong focus on digital products and services. While the industry is far advanced in the DT, the search for sustainable digital business models is still ongoing. For this purpose, a subsidiary (DigiSub) was founded to acquire and integrate digital business startups.

This case study, however, focuses on a project directly initiated by DigiSub which aims to develop a digital business model in the form of an internet-platform for electromobility (e-mobility). To reduce dependence on advertisement revenue, the project implemented a commission-based revenue model.

The project emerged from MediaCo's board of directors, as they identified a gap in the market for e-mobility in Germany, and considered a platform dedicated to this product as a fitting addition to MediaCo's portfolio. The idea was then taken up by MediaCo's business development department and DigiSub, both of which have extensive experience with various digital business models.

Approach - Although the project was organizationally integrated directly under the top management with shared management by the heads of corporate development and DigiSub, the project team had a high level of autonomy and had to adhere to only a few requirements. *"[At the beginning] It was very small, so not all ideas were prefabricated, but we looked at what we could optimize, what could be implemented and did it"* (interview with technical lead). As the project outcome was only roughly set at the beginning, MediaCo deemed an agile project method to be most appropriate. Thus, they decided to utilize Scrum. *"Do we overestimate ourselves, so do we assess the stories correctly or not, where do we have to learn, where did we think too narrowly, where do we have to think further? That is why we tried to apply Scrum from the beginning. With success"* (interview with technical lead). Instead of being separated, concept development, technical development, and implementation were handled in an integrated manner. The product owner and the main developer cooperated in a close working mode with frequent exchanges.

A user-centric perspective was strongly emphasized, thus user experience/interface (UX/UI) expertise played an important role in the development. In addition, as the resulting platform aims at a rather conservative market (automotive), quality requirements were set relatively high. The first runnable prototype was developed quickly and improved in further iterations. Once the first prototype was completed, the integration process into the core organization started. From that point on, the platform itself became more closely integrated into MediaCo's digital ecosystem. In the long term, the platform is expected to be integrated as an independent business unit in MediaCo.

While the project's autonomy was high, project monitoring and reporting also were very pronounced. The team not only gave weekly reports to the top stakeholders on progress and KPIs, but also monthly reports to the whole company, in order to gain valuable feedback from different parts of the company. *"We want to be open within the company so that our colleagues know what is happening at [the project], what is the development, so that our colleagues can get an idea, [...] and there are also highlights of the month, then learnings but also an area of what we have learned from the month from the lowlights"* (interview with product owner). After the go-live, actual user numbers and revenue were the most important aspects of success measurement and monitoring. The utilization of the MediaCo's distributed knowledge and the strong technical expertise of the product owner are considered main success factors.

Resources - Starting out, the project team was primarily staffed by employees of DigiSub. Later on, new employees were hired specifically for the project. The cross-functional project team itself was relatively small, complemented by strongly integrated internal partners for specific topics such as UX/UI, branding, or market research. Further, the internal software service provider played an important role. In this way, the extensive knowledge and expertise already existing in different parts of MediaCo (technical, business, mobility) could be utilized. This was possible due to frequent interaction between the project and different business units. In addition, a partnership with a university was used to gain further input. *“So I only see advantages at the moment we can use the internal expertise, e.g. Affiliate Team, SEO Team or Advertising Team. We have an infrastructure that is made available to us, i.e. rooms, IT, software, etc. We profit very much from the content that is generated internally by MediaCo, which we can use on our site, we are very strongly supported by traffic internally from [partner sites]”* (interview with manager operations).

Funding initially came from a central budget provided by MediaCo, which after go-live, was complemented by revenue from the platform itself. The project experienced a high level of top management support and attention, which helped utilizing internal expertise and cooperation.

Case D – AccesCo Project

Target and solution - AccesCo is a highly specialized manufacturer for automotive accessories, positioned as market leader in Europe in its niche. Although the pressure of digitalization is still relatively low in its industry, AccesCo actively approached the DT in order to defend its leading position, explore new business models, and deter entrance to new players. Thus, they act as pioneers in their market segment, even if at the time of data-collection, they considered themselves still to be *“at the beginning of a long [DT] journey”* (interview with head of technology). AccesCo sees DT as strategically important, a perspective strongly supported by the managing director, who has a determined focus on innovation.

Therefore, AccesCo launched a series of projects, paying most attention to the transformation of its products. While in the past, products were mostly developed and handled in isolation, they are now seen as an integrated system that extends the existing range with digital technologies. The overall aim is to create a system of different, yet connected, products that allows end customers to control different elements via a new mobile app. This product system collects and utilizes usage data, enables a more customer-centric view and acts as a potential basis for data-based business models. Further, AccesCo wants to foster organizational and cultural change, in order to become more agile and innovative. The project’s idea originated in the company’s strategic initiative, while the research and development (R&D) department developed ideas for specific sub-projects. After reaching a certain degree of maturity, the head of the sales department evaluates the ideas’ potential relevance to AccesCo’s customers.

Approach - The project was set up along a pre-defined milestone plan. The established plan-based model still functions in the overall process. This is not only due to AccesCo’s traditional product development process, but also results from earlier negative experiences with agile methods. *“We came from the classic milestone/waterfall method, then a very strong swivel to an agile approach was done, but this led to a lack of acceptance, especially in non-technical areas”* (interview with head of technology). Eventually, a hybrid project method emerged over time. Early project phases were performed in an agile working mode, in order to achieve quick progress and to create a basis for further decisions. Also, in the development phase, agile methods resembling Scrum were utilized. However, as soon as the development was deemed complete, all further steps followed a pre-planned waterfall logic.

Internal cooperation with different business departments, especially the business development unit was distinct. To foster cooperation, innovative techniques, like design thinking, were utilized. This way, the project could also focus intently on the end user, thus

exceeding the traditional consultancy mode of the sales department. Furthermore, department-spanning cooperation was fostered and pursued in order to meet the strategic goal of a company-wide transformation process. The project leadership resided with the R&D department and the business development section, as the project was partly integrated in these two divisions. In addition, project leaders pursued a strong connection to the sales department to gain access to market insights.

Due to the initiative's strategic nature, project leaders regularly reported directly to the top management. As the project was primarily motivated by strategic considerations, qualitative rather than quantitative measures were used to track project progress. AccesCo considers the focus on soft factors such as organizational culture and fostering digital thinking with all employees to be main success factors.

Resources – As the R&D department is responsible for the development of new products, the project team was mainly staffed from this department in the initial phase. AccesCo relied heavily on internal resources and aspired to keep key activities within their control. However, as the development of digital solutions required skills and experiences that the company did not have itself, experts from outside the company were hired. Further, external partners were engaged for app development and UX/UI design. *“Because that was also a learning from the preliminary project that we said, if we want to make a product that is state-of-the-art, then we also need a good design, because that's how acceptance stands and falls ... UI/UX exactly ... and that, that is done with an external service provider. [...] the goal of the strategy is to develop our competence in-house but not to take over things that other people can do better. [...] the strategy has a strong focus on working with partners who are good in their field”* (interview with project member).

Funding for sub-projects came from decentralized budgets which departments have at their disposal for development projects. There is no central budget for digitalization projects.

Case E – TextilCo Project

Target and solution – TextilCo is one of the largest textile manufacturers in Germany and also active globally. The textile and fashion industry are heavily affected by DT along the entire value chain, from sourcing and production over logistic to sales. Therefore, TextilCo started a DT process targeting the majority of its value creation activities, of which sales is one central aspect. Since 2014, TextilCo followed a corresponding long-term end-to-end omni-channel roadmap consisting of various projects.

The specific omni-channel service project in focus here aimed to transform the customer interface and can be regarded as a hybrid of process and service innovation. The project dealt with three main services: “Click-and-collect” (order online and collect in store), “order-from-store” (order from store and collect at home), and “return-and-replace” (e.g., order online and return/replace in store or reverse). As mentioned, the project was embedded into an extensive DT process and was initiated by the top management. Changing customer expectations was named as main driver, but TextilCo saw the project also as a reaction to the digital advances of their competitors. The project was carried out by the affected business units and the IT department.

Approach – Before the actual conception and developing phase started, the top management preselected the three mentioned omni-channel services “click-and-collect”, “order-from-store”, and “return-and-replace”, providing them with the highest priority for releasing. Next, all affected departments from the business side, the representatives from the subsidiaries as well as the process and integration architect sat together and created respective integrative desired to-be processes for each service. It is thereby important to mention that this integrative workshop approach was a new way of implementing projects at TextilCo. Usually, the

departments worked separately from another. However, as the project touched several functional processes, an integrative workshop approach was needed.

During the development phase, the project followed a waterfall approach for the most part. *“The project was based on the waterfall system, so we came over the processes. First of all we defined the main processes with all departments and with colleagues from the German, UK and French markets, which was important”* (interview with project lead). However, some agile features were applied, such as the integration of internal users and the conduction of integrative, cross-departmental workshops for the conceptualization. Given the fact that the project had a significant impact on various business units, several alignment meetings in the form of regular jour fixes were carried out.

The overall responsibility for the project laid on at two project leads, one from the IT department and one from the business side. These project leads were responsible for the communication to the top management and the coordination of all sub-project teams, which were structured along the involved business functions. Corresponding to the overall project, each sub-project was owned by a sub-project leader from the business side as well as a counterpart from the IT side. The sub-project teams were in charge of generating ideas on how to implement the new omni-channel services in their respective departments. Furthermore, a special role called “process and integration architect” was created, who ensured that the concept stayed aligned with the targeted to-be processes and that dependencies between the affected departments were addressed. *“We realized pretty quickly at the beginning in the initiation phase that in such a highly integrative project you need a common basis and perhaps also a framework to work better together. And that's why we decided at the beginning to build processes in an integrative way with all the departments involved representing what we actually want to achieve within the project”* (interview with sub-project lead). Again, the role was filled with one manager from the business and one from the IT side.

As the project was one of the first large-scale cross-departmental projects, TextilCo recognized its potential to change work practices across the entire organization. Therefore, dedicated change management practices were integrated into each sub-project, this way promoting sustained organizational change across all departments and channels. *“[Change management] dealt with these changing customer needs and these effects on the company, which the project also brings with it, because suddenly we are no longer thinking only in channels, but are trying to think comprehensively and carry it into the company, and there we are also promoting cultural change”* (interview with sub-project lead).

The project progress was constantly monitored by a regular steering committee on the highest management level. On a project level, progress was documented based on jour fix minutes. To ensure the quality of the resulting service, TextilCo introduced the role of the process and integration architect dedicated to review the conceptualizing work. In addition to that, the retailers from the subsidiaries were involved in the testing as well

TextilCo saw the cross-departmental cooperation, as well as the involvement of internal users (i.e., retailers) into the project as major success factors. *“So what was particularly good was that we all got involved right from the start and, let's say, kept everyone informed throughout the project. That was very complex, but I think it was extremely important to pay special attention to this”* (interview project lead). On the one hand, this approach ensured that the resulting changes were quickly accepted and on the other hand, it enriched the solution with insights from the user perspective.

Resources – Most of the 100 project members came from the IT department and the involved business departments, including experts for retail operations, finance, frontend order management, logistic, change management, HR, training, and legal. Also, employees from

affected subsidiaries were part of the project team. TextilCo relied mostly on internal resources for the project execution.

Funding was provided from a central budget, which has been determined to a certain extent in advance, at least a certain frame. This project-based budgeting was adjusted on a yearly basis.

Cross-Case Analysis

Following the individual project analysis, we conducted a cross-case comparison (see Table 3). We compare the projects by their central characteristics, as laid out before. Target outcome addresses the main objective of each project. With regard to the projects' main contributions to organizational DT, we distinguish between the originally planned contribution and the emergent aspects that only evolved during the course of the projects. Then the central idea of the solution is summarized. Finally, the basic approach of the projects is explained and information is given about the (human) resources the projects have worked with. By comparing the five projects' characteristics along these dimensions, we were able to identify relevant variations between the projects, but also common elements that we argue can be central characteristics of digitalization projects in the context of organizational DT:

- Embedding in and contribution to an overarching DT process
- Existence of emergent outcomes that develop over the course of the project, despite the projects being largely derived from a central DT strategy
- Central role of different forms of digital innovation
- Integration of technology and business perspectives
- Application of novel project methods

Table 3 – Cross-Case Comparison of Digitalization Projects					
	Case A – TelCo	Case B – PlantCo	Case C – MediaCo	Case D - AccessCo	Case E – TextilCo
Target outcome / Contribution to DT	<u>Transformation of sales process / Planned:</u> Narrowly defined goal, to increase efficiency for specific application <u>Emergent:</u> Developed into vehicle to test agile methods, promote cross-collaboration and digitize customer interaction/ channels more holistically	<u>Transformation of product offering and added services / Planned:</u> Extension of core products and creation of opportunities for data-based services <u>Emergent:</u> Options for monetization of digital services clarified only slowly over time	<u>Development of new digital business field / Planned:</u> Exploration of new digital business models outside core business, demonstration of viable business models <u>Emergent:</u> Exact business model not clear at the start, different options were tested and combined	<u>Transformation of product offering / Planned:</u> Connection of existing products into platform and shift from hardware to software provision <u>Emergent:</u> Restructuring in the company, opening of silos and fostering of cross-functional collaboration	<u>Transformation of customer interface / Planned:</u> Digitalization of customer channels and sales process <u>Emergent:</u> Shift from department- to channel-centric, leading to improved cross-departmental teamwork and reduced silos
Solution	<u>Bottom-up & technology-driven process innovation</u>	<u>Top-down & technology-driven product & service innovation</u>	<u>Top-down & business-driven business model innovation</u>	<u>Top-down & business-driven product innovation</u>	<u>Top-down & business-driven process & service innovation</u>
Basic Approach	<u>Hybrid project method;</u> initialized at IT dpt., then shifted to business dpt.	<u>Agile project method;</u> in responsibility of IT dpt., strong involvement of business dpt.	<u>Agile project method;</u> initialized at digital subsidiary, then integrated to core org.	<u>Hybrid project method;</u> in responsibility of R&D and business development dpt.	<u>Plan-based project method,</u> in responsibility of IT and business dpt.
Resources	<u>IT & business dpt.,</u> large scale external experts	<u>IT & business dpt.,</u> partly external experts	<u>Digital subsidiary,</u> new hires & internal partners	<u>R&D & business dpt.,</u> new hires	<u>IT & business dpt.,</u> internal partners

We found that all projects are embedded in and this way **contribute to an overarching DT process**. In four cases (cases B, C, D, and E), the projects were **initiated top-down**, resulting directly from the companies' DT strategy. The projects are utilized as drivers to give the DT process momentum (especially cases B or C) or primarily realize a set element of DT strategy (especially cases D or E). This supports our premise that **digitalization projects are in fact used to implement DT strategy** (cf. Chantias et al., 2019). As seen in case A, these projects can also be initiated bottom-up, and are then later integrated into the DT strategy, in the course of the project. However, all projects were not simply a direct result of the strategy, but also reshaped strategy through their concrete manifestation of change. The contribution of the projects can also have an **emergent impact beyond the objectives originally planned** (cf. Chantias et al., 2019). In case A, change based on digitalization of the sales process opens up possibilities for efficiency gains by means of automatization on the one hand and effectiveness gains by better advice of customers. In case B, organizational change is pursued actively, aiming at limiting isolationist tendencies and fostering department-spanning

cooperation. This is regarded as vital for the project's success, but also important for the company's long-term progress. In case C, the project directly changes the core organization by adding another business field, while in case D the company aims to support organizational change with employees from different departments working together in digitalization projects and subsequently carrying innovative and agile practices back into their respective departments. Similar in E, the collaborative, department-spanning **cooperation practiced during the project, is sought to be perpetuated** by the means of targeted change management practices. In each case however, the digitalization projects are deemed to unfold their full effectiveness only in combination with other concurrent or subsequent projects (cf. Gimpel et al., 2018; Zimmer, 2019). To account for their strategic nature, we saw that in all cases **top management support** and attention was deemed crucial for boosting the projects, which is especially visible in case A where the project was initiated bottom-up and only later-on, when the top management team came on board. received the required financial and HR support. Top management involvement was however not only necessary for the provision with required resources, we also see that the scope of the projects was not limited to single organizational areas, so decisions could not only be made isolated within organizational units (cf. Berghaus & Back, 2017).

In all projects **different forms of digital innovations** are developed and utilized to contribute to organizational DT. These digital innovations are formed by a combination of an innovative digital business concept and an innovative digital solution (cf. Wiesböck & Hess, 2020), which is reflected in the two sides of digitalization projects set out previously. However, the types of innovation can be quite diverse and can occur with a stronger focus on the internal organization, e.g., in the form of process innovation (case A) or with a stronger focus on market offerings, in the form of product and service innovation (cases B & D). Business model innovation (case C) and transformation of the customer interface (case E) can be seen as hybrid forms, as they cover both process and service innovation (cf. Fichman et al., 2014; Wiesböck & Hess, 2020). Our findings imply that the **specific innovation focus will influence the project's characteristics** and determine suitable project management methods. We found that the digitalization projects observed cover the innovation activities of initiation, development, and implementation, but exploitation only takes place in case C (cf. Kohli & Melville, 2019). We therefore conclude that exploitative activities are not the primary focus of these digitalization projects. However, we also observe that **development and implementation activities can continue after exploitation has already started**, which is particular to projects involving digital innovation (cf. Arvidsson & Mønsted, 2018). This observation leads us to highly relevant aspects, that distinguish digitalization projects in the context of organizational DT from other projects types and can make their management especially demanding. Both, the inherent combination of technological and business solutions, and the **continuous and open-ended character** of the solutions are reflected in organizational embedding and the utilized project methods, which we will elaborate on next.

We identify the **integration of technological and business** aspects as a central theme across the cases. Integration is visible in both, the utilized resources (e.g., project team) and the project structure. This integrated view is pronounced to different extents: in cases B, C, and E, technology and business are viewed as inseparable; in cases A, the need to strongly align technical development and process change is clear; in case D, however, a certain division between technology (R&D) and business (sales) remains, but more integrated approaches are increasingly pursued. This ties in to the ongoing discussion on whether existing IT departments, new digital units, or other players are the driving force behind the DT and resulting projects (cf. Fuchs et al., 2019; Haffke et al., 2016; Weill & Woerner, 2013). Different foci were identified in each case, some leaning more toward a technological perspective, the other more toward the business side. We found the aspect of **cross-functional human resources** in each case. Looking at the case context, we see that by having business and IT people working on the same deliverables and taking ownership for the same projects, business and IT departments as a whole can grow closer together in the

respective organizations. The collaboration and exchange in cross-functional teams helps IT people to get a better view on business value, while business people can become aware of the crucial role of digital technologies that form the core of the new solution and the importance of corresponding skills. Therefore, a beneficial side effect of digitalization projects can be an **improved collaboration of IT and business departments in the entire organization**, and can possibly help the IT department to strengthen its position in the context of organizational DT (cf. Leonhardt & Hanelt, 2018). Different from previous observations that innovative digitalization projects can often bypass the internal IT department (Haffke et al., 2016), we found that in most cases the IT department played a central role.

Lastly, we see that the **applied project methods** reflect the partly fuzzy, to some degree open ended project targets. In case B, the company has data and technology available and devises ways to utilize them. Similarly, in case C the company recognizes a market gap due to its experience in digital business. In both cases, the companies did not have an exact target in mind; however, they knew the direction in which to start, thus showing strong commitment to a flexible and agile project approach. Contrastively, in case D, where a hybrid method was applied, the company observed developments in related market segments and had a clear target outcome. It therefore could plan in detail how to pursue this target. Similarly, in case E, a general roadmap was laid out based on department-spanning workshops before the project started and was then executed in a plan-based manner. Case A started in a relatively experimental agile mode; however, a plan-based frame was set to approach process change. We observe a clear link between the initial openness of digitalization projects and the utilization of agile methods (cf. Berghaus & Back, 2017; Gimpel et al., 2018). While we did not observe projects that bared any pre-determined usage or market potential (cf. Antonopoulou et al., 2017), in cases B, C, and D the **market potential and exact usage of the projects' outcome was unclear at the beginning** and thus iterative approaches were favored. The use of agile, iterative approaches was chosen not only because the goal of the projects was not entirely clear in advance, but also because there might not be a full completion, i.e. digital products, services (cases B, D), and business models (case C) might never be "finished", but can be continuously adapted and developed further (cf. Arvidsson & Mønsted, 2018; Kohli & Melville, 2019). This continuous development is supported by agile approaches. The previously mentioned integration of IT and business departments is also decisive here, as only this way digital solutions can be delivered and developed continuously (cf. Horlach et al., 2020). The continuous development of solutions is only possible if project outcomes can be sustainably embedded into the organization. This can be done through the broad anchoring in the organization (cases A, B, E), for example by ensuring that the **IT department and related business departments equally take ownership** of the projects. Alternatively, a new organizational unit can be created that continuous the development of solutions once the project is finished (case C).

Implications, Limitations, and Future Research

We contribute to literature by providing an theoretically sound and empirically assessed initial characterization of digitalization projects in the context of organizational DT, including how they can be managed and how they can contribute to overall DT. Following RQ1 - *How are digitalization projects in the context of organizational DT characterized?* – we seek to identify their specific characteristics. We find that they can take very different forms, either more internally oriented towards processes, or more externally oriented towards market offerings. However, regardless of this orientation, the projects we investigate all have a form of digital innovation at their core, i.e., a combination of a digital business and a technological solution (cf. Wiesböck & Hess, 2020). This combination is reflected in the implementation of the digitalization projects, where we observe approaches that are strongly reminiscent to the concept of technochange management (cf. Markus, 2004). This integration of the technological and the business perspective can be considered as a central challenge in the

context of DT (cf. Haffke et al., 2016; Reijnen et al., 2018). Our study now helps to understand, how this integration can be incorporated in digitalization projects. On an operative level, we see that cross-functional teams consisting of business and technology experts are utilized, on a higher level we see that the IT department and business units take shared ownership of the projects. This close-knitted collaboration is in turn a prerequisite for the continuous delivery and development of digital solutions resulting from these projects (cf. Horlach et al., 2020).

These observations leads us to RQ2 - *How do digitalization projects contribute to organizations' overall DT?* – where we assess the impact of said projects on their organizational context. One important finding here is the aforementioned closer integration of IT and business departments, which has the potential to change value creation logics beyond the scope of a single project (cf. Leonhardt & Hanelt, 2018). Digitalization projects are often embedded into far-reaching transformation programs and processes and are not expected to realize DT strategy on their own. In this overall process, they can be utilized in different ways, either for initiation and gaining momentum, or for later stages of realization. Either way, they are considered as strategically relevant and thus receive the respective top management attention and support. In that regard, we see that the demands placed on digitalization projects can exceed the scope expected from conventional IT projects. The perspective on organizational change is not only taken as an enabler for the technical solution, but organizational change can be the aim itself. We therefore argue that these digitalization projects can be seen as a next evolutionary step from technochange projects that have a similar emphasis on organizational change, but also have a strong orientation towards transforming organizations' value creation and even have the potential to redefine organizational identity.

Besides answering our research questions, we were able to derive findings regarding factors that are potentially critical for the success of digitalization projects in the context of organizational DT. In principle, all the projects examined were considered a success, at least to some extent. There seem to be some enabling factors that make it easier and faster to achieve project success. These enablers can be developed in an evolutionary way during the project duration, but they can also be approached actively before. The projects under study all lead to organizational change to a certain extent, but they also require change, for example when competencies from different areas are necessary and cross-departmental cooperation practices must be established. These practices can evolve during the project, but they can also be actively developed and anchored at the project level with dedicated roles, as for example in case D. Top management support is crucial to get the resources needed, but also to enable transformation that is not limited to a small area of the company. This top management support can be acquired over time, as in case A, but projects can be realized faster if top management is on board from the beginning, as in case B, where the head of IT takes ownership of the project from the start. This is also accompanied by the positioning within the company. Is the project seen from the beginning as strategically relevant for the entire organization, or rather as a limited local issue. Novel project methods offer opportunities, especially where the exact goal of the projects is still unclear. However, it should be checked what elements of a method fit and are helpful, the employees must be taken along and compatibility with the working mode of the core organization must be ensured. Furthermore, as we see that the outcomes of these digitalization projects are often some degree open ended, it must be ensured that the core organization that takes over the solution at some point has the capabilities and flexibility to further develop the solution.

We see this study as an important step toward understanding “*how*” DT is realized in organizations. We demonstrate options of how projects realizing DT are set up and how they are managed in practice. Consequently, we argue that digitalization projects in the context of DT should be considered as a combination of IT, innovation, and organizational change projects.

Regarding practical implications, our aim is to enable practitioners to identify critical digitalization projects and to differentiate them from other project types, such as conventional IT projects. Subsequently, appropriate project management practices can be chosen. Further, we were able to identify success factors from the cases, especially a purposeful application of agile methods, integrated working modes of business and technology, and a holistic perspective on organizational change. While we do not claim that the presented cases represent “best practices”, practitioners can learn which project design and management options exist, in which contexts they are applied, and which consequences can result from them. For example, if a company merely knows the direction in which their transformation process should evolve and has no detailed target image, agile project methods and largely autonomous project teams could be suitable.

Our findings are not without limitations. First, one can argue that the concept of technochange is not necessarily the only possible starting point for understanding characteristics of digitalization projects. Nevertheless, based on our empirical findings, we argue that technochange provides a helpful initial frame that allows for subsequent adjustments. Second, our findings are based on five cases from Germany only, which do not allow for generalization. Although we tried to cover a broad range of different industries, markets, and company sizes, it is likely that additional insights will be gained from analyzing a larger number of cases, e.g., with a different regional focus. Third, we include a range of different project types (process, product, service, and business model innovation) to demonstrate the variety of DT foci. As we assume that the specific focus will strongly impact the way projects are designed and managed, further research should deepen our understanding of different project types and derive specific insights and recommendations. For example, a typology of different types of digitalization project could be a suitable starting point for this. While we focus on describing how digitalization projects are managed, further research could more intently address the question on how they should be managed. Also, as digitalization projects often do not stand alone in their organization, an investigation on the program or project portfolio level appears to be highly relevant for future research. With this study, we do not claim to provide a complete and final conceptualization of digitalization projects in the context of DT. Rather, we hope that our first understanding of these projects can serve as a helpful starting point for further in-depth research.

Conclusion

Our research is motivated by the aim to gain an initial understanding of digitalization projects in the context of organizational DT, and on the characteristics that make them special. Building up on existing literature, we utilize Markus' (2004) concept of technochange as a starting point for research on digitalization projects. Furthermore, we combine this knowledge with insights from five qualitative case studies. In the cases, different project foci and correspondingly different project approaches can be found. As an underlying theme, the integrated view on both, technological und organizational change, is identified. This integration can be found in different aspects of digitalization projects, such as the project staff, integration, and method. Also the contribution of digitalization projects to far reaching organizational change, specifically regarding the value creation, is demonstrated. These findings can serve as a valuable guideline for practitioners responsible for the management of digitalization projects as well as for researchers aiming to conduct more in-depth studies in this field.

Acknowledgments

This paper builds upon a previous conference paper (Barthel & Hess 2019) and it has substantially profited from the feedback of the PACIS 2019 conference participants and the anonymous reviewers, who we would like to thank for their support.

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