Are Digital Transformation Projects Special?

Completed Research Paper

Philipp Barthel   **Thomas Hess**

Abstract

The digital transformation disrupts companies across all industries, forcing them to rethink and adjust their products, services, processes, and business models. The necessity to adapt to a digital future seems clear; however, many companies still struggle with the question "How do we transform?" While existing literature demonstrates how a strategy for digital transformation can be developed, we know little about how it is implemented. We argue that projects play a crucial role here. Therefore, we want to develop a sound understanding of such digital transformation projects. To do so, we first draw insights regarding projects from literature and then combine this knowledge with findings from four qualitative empirical case studies. We contribute to literature by elaborating a solid characterization of digital transformation projects. In addition, we offer valuable insights to practitioners regarding how digital transformation projects can be recognized and managed.

Introduction

Over the past decade, digital transformation has disrupted whole industries such as media (Karimi and Walter 2015), automotive (Chanias and Hess 2016) or telecommunication industry (Schmitz et al. 2019). This digital transformation (DT) can be seen as major organizational change induced by digital technologies (Gerster 2017; Wiesböck 2018). In the course of this change, organizations have to rethink their products, services, operations, business models, and organizational structure (Berghaus and Back 2017; Kohli and Melville 2019; Yoo et al. 2012). Not only are they forced to handle new digital technologies, but also new competitors from different industries, with different business models (Downes and Nunes 2013). This disruption is seen as both an existential risk and a rewarding opportunity (Chanias and Hess 2016; Sebastian et al. 2017). Being able to manage the digital transformation process becomes a key factor in surviving, or even profiting from, the digital disruption (Karimi and Walter 2015; Matt et al. 2015).

Although the urgency of responding to digital change seems clear, many companies do not know how to adapt and cope with the disruption (Gimpel et al. 2018; Kohli and Melville 2019). Many questions arise on how companies should achieve transformation. How can digital transformation strategies be enacted (Berghaus and Back 2017; Chanias and Hess 2016)? How should companies organize themselves to generate digital innovation (Nambisan et al. 2017; Yoo et al. 2012)? How should leadership be organized and shared in the new environment (Haffke et al. 2016; Tumbas et al. 2018)?

While extant research already covers many of these questions, it remains unanswered whether projects implemented in the course of a company's digital transformation, i.e. *digital transformation projects*, are different to traditional information technology (IT) projects.

The outcome of digital transformation projects can differ from the output we expected from traditional IT projects (Gothelf and Seiden 2017). Thus, the "definition of done" might have to be rethought for digital transformation projects. This is in line with the premise that DT projects represent a form of digital innovation project, and the outcome of such innovation projects is mostly unclear at the beginning. This has implications for the planning, controlling, and execution of projects (Berghaus and Back 2017). Also, it has been observed that the respective projects often bypass the company's IT department and are directly implemented by the business departments (Haffke et al. 2016). Traditionally, the execution of IT-related projects has been the responsibility of the chief information officer (CIO) (Weill and Woerner 2013). IT projects' aims (Fonstad and Robertson 2006; Wiener et al. 2016), control measures (Gregory and Keil 2014), success factors (Aladwani 2002) and integration (Bygstad et al. 2010) are well studied. However, in recent years, IT has been expected to shift its focus from a pure technology-centered view toward a digital (business) strategizing view (Gerster 2017).

Existing scientific literature in the field of digital transformation covers aspects strongly related to the management of DT projects. For instance, different aspects of the role and formation of DT strategies are investigated (Matt et al. 2015). Some argue that these DT strategies can be realized by means of projects (Chanias and Hess 2016). The role of the chief digital officer (CDO) has been actively discussed in recent research (Haffke et al. 2016; Singh and Hess 2017). CDOs are expected to play an active role in initiating and shaping DT projects. Their digital perspective is quite different from the classic IT logic, comprising a strong focus on new, experimental initiatives, enhancement of revenues, and customer orientation, *ergo* a distinct value orientation (Bharadwaj et al. 2013; Tumbas et al. 2018). More recently, research also addresses dedicated organizational units that implement DT projects (Fuchs et al. 2019). Related literature covers organizations' activities in the digital transformation (Berghaus and Back 2017; Gimpel et al. 2018), the scope of digital transformation (Bilgeri et al. 2017), and the management of digital innovation (Holotiuk and Moormann 2018; Nambisan et al. 2017; Wiesböck 2018). However, very little scientific research exists that is specifically dedicated to DT projects (Henriette et al. 2015). While we can gain important insight regarding DT projects from related research, we still lack a clear picture of the projects *per se*.

Our research question is therefore: *How can digital transformation projects be characterized?* In addition, we want to gain insight on how DT projects' nature affects applied project management approaches. To pursue answering this question, we first derive an initial definition of DT projects from the literature, differentiating them from other project types. Following this, we present four qualitative case studies to demonstrate how DT projects are designed and managed in practice.

Underlying Research Foundation

Traditional IT Projects and Project Management

Research on IT projects has a longstanding tradition and offers valuable insight for all kinds of technology-enabled or technology-triggered projects. IT projects can be described as temporal organizations that aim to contribute to an organization's success by means of improved technological functionality and reliability, and by lower operational costs, while not changing the organization's operations themselves. Their focus is primarily on the technological solution (Markus 2004; Wiener et al. 2016).

Project management in the IS context acts as an aligning mechanism between technology, organization, and people, in order to achieve the outcome of organizational adoption. The alignment is enacted by means of planning, coordinating, and controlling complex and diverse activities (Holotiuk and Moormann 2018). Project management is seen as a critical competence for engagement between IT and non-IT decision makers. Successful project management methodologies are expected to have well-defined process steps, clear deliverables, and metrics for gate reviews (Fonstad and Robertson 2006).

The project alignment perspective describes the extent to which a project's deliverables are consistent with the project's objectives as they have been shaped by the organizations' (IT) strategy (Jenkin and Chan 2010). This is closely linked to the integration of IT projects. The premise prevails that the IT project and the organization/business are two distinct streams. Usually following its completion, the project must be integrated into the organization, in order to become effective. Different approaches and patterns can be observed for this integration process (Bygstad et al. 2010).

From IT Projects to Technochange Management

Already in 1994, Venkatraman stated that benefits from the deployment of IT cannot be fully realized, if organizational conditions are not taken into account (Venkatraman 1994). While IT can act as a key trigger or enabler of organizational transformation, existing methodologies have particular limitations when applied to projects involving significant change to the organization (Markus 2004; Ward and Elvin 1999). Although the traditional view on IT projects and project management offers many valuable insights, it is also prone to focus too heavily on a technical solution only. This potentially leads to situations, where critical aspects of organizational change are not addressed properly. Elaborating her concept of technochange management, Lynne Markus argued in 2004 that if IT use triggers major organizational changes, 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 consider aspects of organizational change, nor by change management, as it does not reflect unique aspects of IT-driven change. A simple additive combination does not yield optimal results, thus a different approach is required (Markus 2004). This leads to project management that significantly differs from the traditional isolated approach of IT project management, going beyond the simultaneous but separated execution of IT and organizational change projects (Table 1). To effectively govern the technochange, an integrated approach that encompasses both IT and organizational change is required (Harison and Boonstra 2009).

Table 1. Technochange, IT and organizational change projects (adapted from Markus (2004))

	IT projects	Technochange projects	Organizational change projects
Target outcome	Technology performance, reliability, and costs	Organizational performance	Organizational culture and/or performance
Solution	New IT solutions	New IT applications plus complementary organizational changes	Interventions focused on people, organizational structure, and culture
(Human) Resources	Central role of IT, support by external partners	Central role of IT, in cooperation with organizational managers and change specialists	Central role of organizational managers in cooperation with HR and change specialists
Basic approach	IT project that produces outcome, meeting specifications and budget in time	Program of change initiatives consisting of IT project and organizational change measures	Collection of change methodologies targeting several elements of the organization

Technochange Management and Digital Transformation

Digital transformation describes the use of digital technologies to enable or trigger major business change (Singh and Hess 2017). These digital technologies simultaneously present a high-rewarding 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, digital transformation can be seen as a specific type of organizational transformation based on digital

innovation (Berghaus and Back 2017). In our understanding, digital innovations are innovations that integrate a (digital) technological solution, as well as a (digital) business solution (Wiesböck 2018).

These innovations that constitute an essential element of an organization's digital transformation, hold the potential to completely change value creation in organizations and whole markets (Nambisan et al. 2017). They comprise the activities of initiation, development, implementation, and exploitation (Kohli and Melville 2019). The organizational context, e.g. business strategies, culture, and routines can have a significant impact on these activities. Additionally, the organization itself can be shaped by digital innovation (Holotiuk and Moormann 2018). As digital innovations lead to a shift in an organization's innovation process, e.g. toward more distributed, open, or network-centered approaches (Nambisan et al. 2017), they can induce new forms of project management (Yoo et al. 2012). The outcome of innovation projects is most often unclear at the beginning. Digital transformation can be seen as a new kind of innovation process, and the same is implied for respective projects (Berghaus and Back 2017).

The very nature of digital innovations, encompassing both a technological and a business solution, has a strong resemblance to the previously described technochange situations. Thus, projects aiming at digital innovations require managing organizational or business change besides the management of technology. While Markus (2004) largely addressed traditional IT implementation projects with an internal focus (like the implementation of an ERP system), we argue that the same holds true for projects aimed at digital innovation with an external orientation (like the development of new digital products and services). Digital transformation 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). It requires firms to adapt their strategy, structure, and culture to the requirements of a digital age (Matt et al. 2015). IT strategy, especially, needs to turn from a primarily functional view to a holistic business value perspective (Bharadwaj et al. 2013).

The assumption prevails that companies' strategies are, to a degree, enacted by projects (Grundy 1998). Therefore, the next logical step in digital transformation strategy research appears to be a study on projects that can enact DT strategies (Chanias and Hess 2016). These projects are likely to involve strategic change (Berghaus and Back 2017; Henriette et al. 2015) and therefore require a strategic perspective (Tumbas et al. 2018). This strengthens the argument that in the context of the digital transformation existing assumptions regarding project design and management will be reassessed. For information systems research, understanding how the DT affects traditional topics like IT project management, is highly relevant (Gerster 2017).

To satisfy this strategic demand, mobilizing the whole company can often be necessary (Singh and Hess 2017; Tumbas et al. 2018). In addition, linkage to ongoing (IT) projects and other digital initiatives, from a holistic and connected perspective appears to be crucial (Berghaus and Back 2017; Bharadwaj et al. 2013; Gimpel et al. 2018). In order to meet these demands, companies apply integration patterns that tightly connect stakeholders and various business components, as well as IT (Bygstad et al. 2010). Instead of aligning over time, both sides progress integratedly on a common path, fostering the projects' cross-functional nature (Gimpel et al. 2018).

Initial Definition of DT Projects

As argued, in the context of a digital transformation process, the nature of projects and therefore also the project management requirements differ from those traditionally associated with IT projects. We see these DT projects as similar to 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. Although, as yet, not much research has been dedicated primarily to DT projects, related research can teach us something about how these projects are managed. Before developing an initial working definition of DT projects, we shall sum up what we already know. By bringing isolated insights together, we aim to create a more holistic picture of DT projects.

Digital transformation projects aim to develop digital innovation, which applies to products and services, processes and business models (Kohli and Melville 2019; Nambisan et al. 2017). They often fall within the responsibilities of a special executive role, e.g. of the CDO (Singh and Hess 2017; Tumbas et al. 2018). Further, they could be implemented by dedicated organizational units (Fuchs et

al. 2019), and can bypass a company's internal IT organization (Haffke et al. 2016). Just as DT itself, the projects can emerge top-down, bottom-up, or in a hybrid form (Chanias and Hess 2016; Holotiuk and Moormann 2018).

The implementation of DT projects is likely to require new capabilities and new forms of project organization (Henriette et al. 2015; Wiesböck 2018). Teams might be smaller, with mixed competencies and a special set of skills (Tumbas et al. 2018). Project teams can, to some degree be empowered to operate autonomously, which calls for a mission command leadership style (Gothelf and Seiden 2017). To complement missing capabilities, cooperation with internal and external partners could be necessary (Berghaus and Back 2017).

DT projects 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 and Back 2017; Gerster 2017). 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. To conclude, we define digital transformation projects as *projects that initiate, develop, implement, and exploit digital innovations, aiming to advance organizational digital transformation.*

Method

Across most management-related disciplines a wide range of works describe, categorize, and analyze projects. The dimensions used to study projects vary greatly even within a single discipline.

First, based on established advancements of Markus (2004), we deduced an initial framework for DT projects. We chose this approach, as it is well-published, well-received, and constitutes a main pillar of our research. This initial frame was subsequently adjusted, merged, and extended, based on insights from the empirical-to-conceptual iteration.

Second, we adopted a phenomenon-based, exploratory research methodology to assess the nature of DT projects. 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). 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).

In conducting four case studies on projects in the scope of an organizational DT process, the case selection was guided by our initial understanding of DT projects. Therefore, a criterion sample logic was used to search for projects focusing on digital innovation to advance in their DT process. As unit of analysis, one specific project in each organization (case site) was analyzed. We considered different industries in order to obtain a broad overview. In addition, we considered case sites that differ regarding market focus in terms of business-to-business (B2B) or business-to-consumer (B2C), as well as size, age, and experience with digital transformation activities. All the selected companies are German-based. Table 2 gives an overview of the four case sites.

Data collection took place between July and December 2018, 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. Due to several different stakeholders being involved in the two larger companies (TelCo and MediaCo), a higher number of interviews was conducted for them. 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. Inter alia, questions covered topics regarding the project team (e.g. "From which departments were team members staffed?"), the methods used (e.g. "How was project success tracked?"), budget allocation and project integration. All

interviews were recorded and transcribed verbatim (Miles et al. 2013), excepting 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".

Table 2. Overview of the case sites

	Case A - TelCo	**Case B - PlantCo**	**Case C - MediaCo**	**Case D - AccesCo**
Industry Focus	Telecommuni-cations provider	Plant construction	Media group	Automotive accessories
Market	B2B/B2C	B2B	B2B/B2C	B2B
Revenue (2017)	> €7 bn.	> €0.3 bn.	> €2.5 bn.	> €0.2 bn.
Employees (2017)	> 10,000	> 2,000	> 10,000	> 500
Number of Interviews	9	3	9	3

Within-Case Analysis

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 digital transformation 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 the 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 initial idea put forward by a software developer in the web department was not embraced by the higher management and business departments. Nevertheless, a small team unofficially developed a prototype. Therefore, the initial impulse can be described as bottom-up. Integration into TelCo's official digital transformation 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.

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 digital transformation 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.

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. 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. 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. 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.

Case B – PlantCo Project

Target and solution – In the past, PlantCo, a medium-sized, family-owned company specializing in plant construction components, saw the digital transformation 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.

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 aims 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 is, on the one hand, an application on the customer's device, and sensors in the plant components, on the other. 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 digital transformation program, was a technology-driven idea initiated by a business department.

Resources - The board provided the project with a high level of resources, from a financial as well as from an HR perspective. 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. In this way, new projects can start fast-paced during the year.

The project team was staffed interdisciplinarily, 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.

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 departments 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 a rather 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.

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, as well as the holistic perspective on actively triggered organizational change as main success factors.

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 on to the chances and risks of digital transformation. Therefore, MediaCo launched multiple initiatives and projects to transform from a provider of analogue media to a heavily diversified group with a strong focus on digital products and services. While the industry is relatively far advanced in the digital transformation, 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 idea for 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.

Resources - The project was abundantly provided with MediaCo's internal 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 user experience/interfaces (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.

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.

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 relatively high level of autonomy and had to adhere to only a few requirements. 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. 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 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 completed 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 relatively high, project monitoring and reporting 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. After the *go-live*, actual user numbers and revenue were the most important aspects of success measurement and monitoring. The successful utilization of the MediaCo's distributed knowledge and the strong technical expertise of the product owner are considered main success factors.

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 digital transformation 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 beginners in digital transformation. AccesCo sees digital transformation 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 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 further data-based business models. Further, AccesCo aims to trigger 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 department (R&D) 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.

Resources – As R&D is responsible for the development of new products, the project team was mainly staffed from R&D 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 itself did not have, experts from outside the company were hired. Further, external partners were engaged for app development and UX/UI design, as AccesCo lacked the respective competences to achieve state-of-the-art results.

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

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. 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. In the development phase, similarly, 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. This way, the company could focus intently on the end user, thus exceeding the traditional consultancy mode of the sales department. Here, new, innovative techniques, like design thinking were utilized. 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 the main success factors.

Cross-Case Analysis

Based on the four cases, we are able to extend our initial frame (based on Markus (2004)) to digital transformation projects (Table 3). Further, we adjusted and detailed the frame to be helpful for cross-case analysis, in order to better identify and understand differences and similarities between the cases.

Table 3. Overview of DT projects

	Case A - TelCo	Case B - PlantCo	Case C - MediaCo	Case D - AccesCo
Target outcome and solution	Transformation of sales process by process innovation; bottom-up & technology-driven	Transformation of product offering and added services by product & service innovation; top-down & technology-driven	Development of new digital business field by business model innovation; top-down & market-driven	Transformation of product offering by product innovation; top-down & market-driven
	Major organizational transformation by means of digital innovation			
(Human) Resources	IT & business department, large scale external experts	IT & business department, partly external experts	Digital subsidiary, new hires & internal partners	R&D, business departments & new hires
	Cross-functional teams, equal importance of business and digital technology experts			
Basic approach	Hybrid project method; initialized at IT, then shifted to business department	Agile project method; in responsibility of IT, strong involvement of business departments	Agile project method; initialized at digital subsidiary, then integrated to core organization	Hybrid project method; in responsibility of R&D and business development department
	Project with integrated technological and business perspective			

Target and solution - While the overall *target outcome* in all cases represents an organization's advancement in digital transformation, the projects' specific solutions, or *objectives,* represent different types of digital innovation. Further, the innovation process *scope* within the project appears to be a relevant aspect. Also, we identified different *drivers* for these objectives. Regarding our *ex-ante* assumptions derived from the literature, we found that DT projects are in fact used to achieve organizational transformation via digital innovations. However, the extent of transformation can vary from department-level to the entire organization.

Resources – As we assumed, the provision and deployment of *human resource*s, including staff, knowledge, and management support, is seen as a major project management factor in all cases. Besides this, unsurprisingly, project *finances* also appear to be a decisive criterion for projects' ability to operate. We found the aspect of cross-functional human resources in each case. The importance of technological and business expertise varies, although both are present and seen as crucial in each case.

Approach - One could argue that this category represents the "heart" of project management. It shows, e.g. in the alignment of factors such as technology, people, and organization (Holotiuk and Moormann 2018). Therefore, as expected, we found a categorization that differentiated between *project method*, *leadership,* and *organizational integration* to be helpful. Again, we found different foci in each case, some leaning more toward a technological perspective, the other more toward the business side. Nevertheless, across all cases the vital importance of integrating technology and business is stressed.

Based on this framework, we conducted a cross-case analysis. We found that, in fact, all projects aim to *advance companies' digital transformation* via generating *digital innovations*. However, the type of innovation can be quite diverse and can occur in the form of process (case A), product (case B & D), service (case B), or business model (case C) innovation. Our findings imply that the specific type of digital innovation will influence the project's character and determine suitable project management methods. We found that all observed DT projects cover the activities of *initiation*, *development*, and *implementation*, while *exploitation* only happens in one case (case C). Also, in this case, exploiting innovations was increasingly transferred back into the line organization. This is in agreement with Kohli and Melville (2019), who state that digital innovation efforts do not need to cover every activity. We therefore conclude that exploitative activities are not the primary focus of DT projects. However, we also observe that development and implementation activities can continue after exploitation has already started, which is particular to DT projects.

Regarding *advancing of organizational digital transformation*, we found that all projects are embedded into a large-scale transformation process. In three cases (cases B, C, and D), the projects were initiated top-down, resulting from the companies' digital transformation strategy. This supports our premise that digital transformation projects are in fact used to implement digital transformation strategy (Chanias and Hess 2016; Schmitz et al. 2019). As seen in case A, digital transformation projects can also be initiated bottom-up, and are then integrated into the digital transformation strategy in the course of the project. However, as implied by Chanias and Hess (2016), projects emerging bottom-up might have a limited strategic impact. We share this perspective, as the effects of case A's project on organizational parts directly involved (e.g. sales), are rather limited. In the other three cases, we found that the DT projects triggered large-scale organizational change. In case B, this 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 organization change with employees from different departments working together in digital transformation projects and subsequently carrying innovative and agile practices back into their respective departments.

Another finding is related to the nature of digital transformation as a partly fuzzy innovation process, which has implications for applied project methods. 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. Case A started in a relatively experimental agile mode; however later on a plan-based frame was set to approach process change. This link between initially indistinct innovation projects and agile project methods has been observed before (Berghaus and Back 2017).

Further, in all cases, we observed an integrated view on business and (information) technology, which characterizes digital transformation. This integrated view is pronounced to different extents: in cases B and C technology and business are viewed as inseparable; in case 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. We see an ongoing discussion on whether existing IT departments, new digital units, or other players are the driving force behind the DT and resulting projects (Fuchs et al. 2019; Haffke et al. 2016; Weill and Woerner 2013). Based on evidence found in the literature and in our case studies, we argue that diverse options are possible; however, specific approaches will certainly be preferred in a given context.

Implications, Limitations, and Future Research

To contribute to the literature, we address our research question – *How can digital transformation projects be characterized?* – by developing a theoretically sound and empirically assessed initial characterization of digital transformation projects. Based on four case studies, we are able to expand research insight regarding the importance of different project characteristics and the respective project contexts. We see this study as an important step toward understanding "how" digital transformation is implemented in organizations. In addition, we demonstrate the ways in which digital transformation projects are set up and how they are managed in practice.

This study makes two major theoretical contributions. First, we derive an initial characterization of digital transformation projects from the literature. We define them as *projects that initiate, develop, implement, and exploit digital innovations, aiming to advance organizational digital transformation.* Based on our empirical findings, we are able to verify this initial definition. We find that digital transformation projects are utilized to advance organizations' digital transformation, by means of digital innovations. The type of innovation can vary, and not all projects necessarily need to involve every aspect of initiation, development, implementation, and exploitation. Exploitation appears to be relatively unusual in these projects' scope. This characterization can serve as a basis for further research. Second, we derive and adapt a framework for DT project analysis from Markus (2004). We inductively adjusted and extended this framework, based on the four case studies. As demonstrated, the underlying principles of technochange management are reflected in current DT projects. Going beyond Markus' focus on internal change (e.g. implementation of ERP systems), we demonstrate that similar observations can be made with projects with a stronger external focus (like product innovation). We identify target and solution, resources, and basic approach as main characteristics for project analysis. Besides structuring our own research, further studies can also utilize this framework analyzing digital transformation projects. This could be especially helpful for research focusing on comparison between different projects, or on analyzing multi-project situations.

Regarding practical implications, our aim is to enable practitioners to identify digital transformation projects and to differentiate them from other project types, such as 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 DT projects. Nevertheless, based on our empirical findings, we find it provides a helpful initial frame that allows for subsequent adjustments.

Second, our findings are based on four cases 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. Third, we include a range of different project types (process, product, service, and business model innovation) to demonstrate the variety of digital transformation focuses. As we assume that the specific type of DT project 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 DT project types could be a suitable starting point for this. While we focus on describing how DT projects *are* managed, further research could more intently address the question on how they *should* be managed. With this study, we do not claim to provide a complete and final conceptualization of digital transformation projects. Rather, we hope that our first understanding of DT 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 what a digital transformation project is, and which characteristics make them special. Building up on existing literature, we adapt Markus' (2004) concept of technochange as a starting point for research on DT projects. Furthermore, we combine this knowledge with insights from four qualitative case studies. We describe the initiation, development, implementation, and (partly) exploitation of digital innovations as the core activities of DT projects. In the cases, different types of digital innovations and corresponding 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 DT projects, such as the project staff, integration and method. Also, the extensive possible organizational change related to DT projects is demonstrated. These findings can serve as a valuable guideline for practitioners responsible for the management of DT projects as well as for researchers aiming to conduct more in-depth studies in this field.

References

Aladwani, A. M. 2002. "An Integrated Performance Model Information Systems Projects," *Journal of Management Information Systems* (19:1), pp. 185-210.

Benbasat, I., Goldstein, D. K., and Mead, M. 1987. "The Case Research Strategy in Studies of Information Systems," *MIS Quarterly* (11:3), pp. 369-386.

Berghaus, S., and Back, A. 2017. "Disentangling the Fuzzy Front End of Digital Transformation: Activities and Approaches," in *Proceedings of ICIS*, Seoul, South Korea, pp. 1-18.

Bharadwaj, A., El Sawy, O., Pavlou, P., and Venkatraman, N. 2013. "Digital Business Strategy: Toward a Next Generation of Insights," *MIS Quarterly* (37:2), pp. 471-482.

Bilgeri, D., Wortmann, F., and Fleisch, E. 2017. "How Digital Transformation Affects Large Manufacturing Companies' Organization," in *Proceedings of ICIS*, Seoul, South Korea, pp. 1-9.

Bygstad, B., Nielsen, P. A., and Munkvold, B. E. 2010. "Four Integration Patterns: A Socio-Technical Approach to Integration in IS Development Projects," *Information Systems Journal* (20:1), pp. 53-80.

Cao, L., Mohan, K., Ramesh, B., and Sarkar, S. 2013. "Adapting Funding Processes for Agile IT Projects: An Empirical Investigation," *European Journal of Information Systems* (22:2), pp. 191-205.

Chanias, S., and Hess, T. 2016. "Understanding Digital Transformation Strategy Formation: Insights from Europe's Automotive Industry," in *Proceedings of PACIS*, Chiayi, Taiwan, pp. 1-15.

Downes, L., and Nunes, P. 2013. "Big Bang Disruption," *Harvard Business Review* (91), pp. 44-56.

Fonstad, N. O., and Robertson, D. 2006. "Transforming a Company, Project by Project: The IT Engagement Model," *MIS Quarterly Executive* (5:1), pp. 1-14.

Fuchs, C., Barthel, P., Herberg, I., Berger, M., and Hess, T. 2019. "Characterizing Approaches to Digital Transformation: Development of a Taxonomy of Digital Units," in *Proceedings of International Conference on Wirtschaftsinformatik*, Siegen, Germany.

Gerster, D. 2017. "Digital Transformation and IT: Current State of Research," in *Proceedings of PACIS*, Langkawi, Malaysia, pp. 1-12.

Gimpel, H., Hosseini, S., Huber, R., Probst, L., Röglinger, M., and Faisst, U. 2018. "Structuring Digital Transformation: A Framework of Action Fields and its Application at ZEISS," *Journal of Information Technology Theory and Application* (19:1), pp. 31-54.

Gothelf, J., and Seiden, J. 2017. "You Need to Manage Digital Projects for Outcomes, Not Outputs." Retrieved 10.12.2018, 2018, from https://hbr.org/2017/02/you-need-to-manage-digital-projects-for-outcomes-not-outputs

Gregory, R. W., and Keil, M. 2014. "Blending Bureaucratic and Collaborative Management Styles to Achieve Control Ambidexterity in IS Projects," *European Journal of Information Systems* (23:3), pp. 343-356.

Grundy, T. 1998. "Strategy Implementation and Project Management," *International Journal of Project Management* (16:1), pp. 43-50.

Haffke, I., Kalgovas, B., and Benlian, A. 2016. "The Role of the CIO and the CDO in an Organization's Digital Transformation," in *Proceedings of ICIS*, Dublin, Ireland, pp. 1-20.

Harison, E., and Boonstra, A. 2009. "Essential Competencies for Technochange Management: Towards an Assessment Model," *International Journal of Information Management* (29:4), pp. 283-294.

Henriette, E., Feki, M., and Boughzala, I. 2015. "The Shape of Digital Transformation: A Systematic Literature Review," in *Proceedings of MCIS*, Samos, Greece, pp. 431-443.

Holotiuk, F., and Moormann, J. 2018. "Organizational Adoption of Digital Innovation: The Case of Blockchain Technology," in *Proceedings of ECIS*, Portsmouth, UK, pp. 1-16.

Jenkin, T. A., and Chan, Y. E. 2010. "IS Project Alignment – A Process Perspective," *Journal of Information Technology* (25:1), pp. 35-55.

Karimi, J., and Walter, Z. 2015. "The Role of Dynamic Capabilities in Responding to Digital Disruption: A Factor-Based Study of the Newspaper Industry," *Journal of Management Information Systems* (32:1), pp. 39-81.

Kohli, R., and Melville, N. P. 2019. "Digital Innovation: A Review and Synthesis," *Information Systems Journal* (29:1), pp. 200-223.

Markus, M. L. 2004. "Technochange Management: Using IT to Drive Organizational Change," *Journal of Information Technology* (19:1), pp. 4-20.

Matt, C., Hess, T., and Benlian, A. 2015. "Digital Transformation Strategies," *Business & Information Systems Engineering* (57:5), pp. 339-343.

Miles, M. B., Huberman, A. M., and Saldana, J. 2013. *Qualitative Data Analysis: A Methods Sourcebook*. Thousand Oaks, California: SAGE Publications.

Nambisan, S., Lyytinen, K., Majchrzak, A., and Song, M. 2017. "Digital Innovation Management: Reinventing Innovation Management Research in a Digital World," *MIS Quarterly* (41:1), pp. 223-238.

Schmitz, M., Dietze, C., and Czarnecki, C. 2019. "Enabling Digital Transformation through Robotic Process Automation at Deutsche Telekom," in *Digitalization Cases,* N. Urbach and M. Röglinger (eds.). Berlin/Heidelberg, Germany: Springer, pp. 15-33.

Sebastian, I. M., Ross, J. W., Beath, C., Mocker, M., Moloney, K. G., and Fonstad, N. O. 2017. "How Big Old Companies Navigate Digital Transformation," *MIS Quarterly Executive* (16:3), pp. 197-213.

Singh, A., and Hess, T. 2017. "How Chief Digital Officers Promote the Digital Transformation of their Companies," *MIS Quarterly Executive* (16:1), pp. 1-17.

Tumbas, S., Berente, N., and vom Brocke, J. 2018. "Digital Innovation and Institutional Entrepreneurship: Chief Digital Officer Perspectives of their Emerging Role," *Journal of Information Technology* (33:3), pp. 188–202.

Venkatraman, N. 1994. "IT-Enabled Business Transformation: From Automation to Business Scope Redefinition," *Sloan Management Review* (35:2), pp. 73-73.

Ward, J., and Elvin, R. 1999. "A New Framework for Managing IT-Enabled Business Change," *Information Systems Journal* (9:3), pp. 197-221.

Weill, P., and Woerner, S. L. 2013. "The Future of the CIO in a Digital Economy," *MIS Quarterly Executive* (12:2), pp. 65-75.

Wiener, M., Mähring, M., Remus, U., and Saunders, C. S. 2016. "Control Configuration and Control Enactment in Information Systems Projects: Review and Expanded Theoretical Framework," *MIS Quarterly* (40:3), pp. 741-774.

Wiesböck, F. 2018. "Thinking Outside the IT Capability Box," in *Proceedings of AMCIS*, New Orleans, USA.

Yin, R. K. 2014. *Case Study Research: Design and Methods*. Thousand Oaks, California: SAGE Publications.

Yoo, Y., Boland Jr, R. J., Lyytinen, K., and Majchrzak, A. 2012. "Organizing for Innovation in the Digitized World," *Organization Science* (23:5), pp. 1398-1408.