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Managing Digital Transformation

How organizations turn digital transformation into business practices

by

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Abstract

Title:

Managing Digital Transformation: How to turn digital transformation into business practices

Purpose:

In recent years, digital transformation has emerged from an abstract concept into a ground-breaking impact factor transforming organizations and their business models. The purpose of this research study comprises a theoretical and practical objective. This research study contributes to the conceptualization of digital transformation by reviewing and assessing the current state of literature. The practical purpose aims to examine the impacts of digital transformation and strives to understand how the concept of digital transformation can be turned into business practices.

Method:

This research study follows a qualitative approach in the form of a multiple case study design by concentrating on eight case companies operating across various industries. The empirical data is collected through semi-structured interviews. Based on the reviewed literature, the researchers developed a conceptualizing framework which is validated and revised by applying the empirical data from the multiple case studies.

Findings:

The findings of this research study display that the phenomenon of digital transformation is an undefined concept for organizations. Further, the results identify customer centricity as key objective for digital transformation. In addition, digital transformation leverages data-driven and service-related business models. Moreover, the findings indicate that effective digital transformation strategies build an integral part of overarching corporate strategies. Lastly, the researchers identify the following key success factors that are crucial to turn digital transformation into business practices: (1) top management support, (2) flatter hierarchies and cross-functional collaborations, (3) intensified people management, (4) utilizing data and digital technologies, and (5) customer-centric key performance indicators.

Keywords:

Digital Transformation, Digital Transformation Strategies, Business Model Transformation, Strategy Implementation, Digitalization, Digital Trends

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Lund, June 3rd, 2019

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List of Abbreviations

Application Programming Interface = API

Artificial Intelligence = AI

Business-to-Business = B2B

Business-to-Customer = B2C

Digital Transformation = DT

Enterprise Resource Planning = ERP

Information Technology = IT

Internet of Things = IoT

Key Performance Indicators = KPIs

Key Success Factors = KSFs

Social, Mobile, Analytics, and Cloud = SMAC

Volatility, Uncertainty, Complexity, and Ambiguity = VUCA

1 Introduction

The following introduction provides a detailed background of this research study. It outlines the underlying problematization and research purpose, introduces the addressed research questions, and provides an outline of this thesis.

1.1 Background

Digitalization is a subject matter that increases in its importance not only in terms of technological evolution but most notably, in today's business environment. Over the last decades, digitalization has evolved from an abstract concept into a ground-breaking impact factor transforming organizations and their business models (Zammuto, Griffith, Majchrzak, Dougherty & Faraj, 2007). Since its emergence, the transformative impact has continuously been accelerating and disrupting business environments (Schwab, 2017). Organizations that are able to adapt to transformational changes have the potential to gain rapid market share, which does not stop at conventional industry boundaries. A popular example of mastering business model adaptations is Netflix. The company managed to disrupt its initial core business, shipping DVDs via mail, by establishing the well-known streaming platform. With extensive use of big data, Netflix even outperformed the traditional demographic clusters of the entertainment industry by so called 'taste clusters' (Taylor, 2018). Nowadays, the streaming provider is shifting its focus again by producing various entertainment contents and aims to shape 'what' customers watch, rather than just 'how' they watch it (Taylor, 2018). Nevertheless, transforming a business digitally is a challenge that can lead to costly failures causing businesses to struggle. For instance, GE invested millions of dollars in its 2015 created business unit 'GE Digital' to become a more technologically focused enterprise (Toesland, 2018). However, as the concepts and initiatives from the separated business unit could not be transformed into business practice, GE 'Digital' ultimately failed and GE's struggling stock price further declined (Toesland, 2018).

Besides a few pictural case examples, the high relevance of digital transformation (hereafter, DT) is witnessed by the recent emergence of numerous academic studies (Morakanyane, Grace & O'Reilly, 2017). Additionally, the topic has a high practical relevance, as the vast amount of

related consultancy reports indicates (e.g., Deloitte, 2016; McKinsey&Company, 2015; PwC, 2018). Beyond that, the increasing importance of DT for organizations is also depicted by the annual increase in global spending on information technology (hereafter IT) (e.g., Gartner, 2018; IDC, 2018; Statista, 2019). From a societal viewpoint, the term 'Digital Transformation' has evolved as a common buzzword from 2015 onwards (Google Trends, 2019).

By condensing the relevance and actuality of the topic, it can be derived that organizations are heavily affected and challenged by DT. Consequently, organizations yield efforts to develop strategies that enable them to overcome those challenges and to redefine their business models. Both, the topicality of DT and its caused practical implications motivated our research study to contribute to this particular field. While exposing the problematization of DT, we pursued a twofold research objective, as thematized in the following section.

1.2 Problematization and Research Purpose

The purpose of our research study comprises both a theoretical and practical objective. With regards to the literature, we dedicate our research study to contribute to the conceptualization of DT by reviewing and assessing the current state of literature. In the literature, different attempts were made to conceptualize the phenomenon of 'Digital Transformation' (Berman, Korsten & Marshall, 2016; Bowersox, Closs, & Drayer, 2005; Corver & Elkhuizen, 2014; Matt, Hess & Benlian, 2015; Nylén & Holmström, 2015; Wade, 2015; Westerman, Calmejane & Bonnet, 2011). In addition, several studies focus on the impact of DT on organizations and their business models (Berman & Marshall, 2014; Li, 2015; Loebbecke & Picot, 2015; Lucas, Agarwal, Clemons, El Sawy & Weber, 2013; Matt et al. 2015; Piccinini, Gregory & Kolbe, 2015; Westerman et al. 2011). The different and partially contradictory approaches to conceptualize DT reflect the complexity and make the concept difficult to grasp. Therefore, the theoretical purpose of our research study is to provide an overview and a better understanding of the different concepts of DT as well as its influences.

Our practical purpose is to examine the impacts that DT has on organizations and which strategies they use to turn those into business practices. Different studies examine the interplay of DT in organizations. For instance, Li (2015) analyzes how digital technologies are changing business models in the creative industry by addressing customer insights, customer relations, and new revenue models. Furthermore, the meta-study of Piccinini et al. (2015) examines how

customer-organization relations are affected by DT and technologies. Generally, internal effects on organizations and their business models are often not the primary focus of studies and are relatively unknown. Exceptions are, for example, the study of Loebbecke and Picot (2015), which examines the potential effects of DT on employment. A frequently cited study conducted by Westerman et al. (2011) analyzes the influences of DT on different organizational levels from a holistic viewpoint. Numerous studies that examine DT with a more encompassing view agree that DT impacts organizations across industries and on a global scale (Bharadwaj, El Sawy, Pavlou, Venkatraman, 2013; Bughin & Zeebroeck, 2017; Fitzgerald, Kruschwitz, Bonnet & Welch, 2013; Matt et al. 2015; Schwab, 2017; Tolboom 2016; Weill & Woerner, 2015; Zammuto et al. 2007). Furthermore, several authors study the impacts of DT as well as key success factors (hereafter KSFs) for managing those (Bowersox et al. 2005; Matt et al. 2015; Westerman et al. 2011). In contrast, only a few studies address the outcomes of strategies and initiatives executed by organizations to turn DT into business practices.

While our theoretical objective aims to provide a structured understanding of existing concepts, our practical purpose contributes to the understanding of how DT impacts organizational environments. Most notably, the latter purpose serves to shed light on how DT is managed and turned into business practices. To reach this objective, our research study first examines strategies organizations implemented to overcome challenges and to benefit from DT. Second, this research study focuses on related KSFs validated by the experience of our case companies that followed DT initiatives for several years. To gather relevant empirical data, we chose a qualitative approach and conducted interviews with international organizations, operating in different industries. Our insights are set in context with relevant literature and strives to augment, confirm, or challenge the current state of the literature. The conclusions, drawn from this research study, support managers in developing DT strategies and assessing potential outcomes of various initiatives to digitally transform their businesses.

With the above described purpose, our research objectives are condensed in the following main and sub-research questions:

How can organizations turn the concept of digital transformation into business practices?

- In what way are organizations engaged in digital transformation influenced?
- Which strategies do organizations use to drive digital transformation initiatives?
- What are the factors for a successful digital transformation process?

1.3 Outline of the Thesis

To answer our research questions and to outline the applied research approach, this research study is structured in the following chapters: ‘Literature Review,’ ‘Methodology,’ ‘Description of Case Companies,’ ‘Presentation of Empirical Findings,’ ‘Discussion and Analysis,’ and ‘Conclusion.’

Following the introduction, the second chapter reviews the current state of research in the field of DT. It provides an overview and summarizes findings of existing studies. Furthermore, the literature review provides essential background knowledge, which is deployed and assessed in the discussion chapter. To begin with, we specify the interlinked research fields of digitization, digitalization, and digital transformation to generate a common understanding throughout this research study. The following sections aim to conceptualize DT. After reviewing the impacts of DT, we present an overview of several recent frameworks describing the concept of DT. Subsequently, we review the role of DT on organizational strategies and display respective KSFs identified in previous research. Lastly, we summarize the research-based concepts by providing a causal framework to better understand organizational drivers, impacts, and requirements of DT.

The third chapter presents the qualitative research approach that was followed to collect empirical data and elucidates the used data analysis method to answer the research questions. In the fourth chapter, we provide a brief overview of the case companies. Subsequently, chapter five presents the findings of our empirical data analysis. We begin by reviewing how organizations understand the concept of DT and proceed by displaying changing customer perspectives in organizations. Further, we elucidate the impacts on organizational business models and present findings that reveal practical insights about DT strategies as well as experience-based KSFs. Based on the findings of the empirical data analysis, chapter six analyzes and discusses the findings by contextualizing insights from the literature review and by applying the elaborated literature-based framework of DT. The objective of this chapter is to identify managerial implications and subject matters for further research that would contribute to a better understanding of DT. Lastly, we adjust the conceptualizing framework of DT by integrating our empirical findings. To summarize this research study, our findings are condensed in the concluding chapter.

2 Literature and Theoretical Review

The primary scope of this literature and theoretical review is to display an in-depth, objective as well as critical analysis of relevant research studies and literature. Therefore, this literature review is structured and categorized by adopting a concept-centric approach, in line with Webster and Watson (2002). In this context, we followed a structured procedure to identify academic journals, articles, and books of high relevance. Particularly, we critically reviewed the references of each article used and made use of online library platforms.

To begin with, the literature is analyzed from a broad viewpoint towards a more detailed understanding of the concept of DT. Hence, the literature review first provides a brief overview of the history of digitalization and DT. The subsequent section contrasts various definitions of digitization, digitalization, and DT and synthesizes respective definitions this research study is based upon. In the following, the impacts of DT on organizations are outlined and discussed in more detail. The chapter proceeds by discussing the strategic implications of DT and continues by comparing common conceptualizing frameworks of DT. It follows a section that reviews organizational KSFs to turn DT into business practices. The final section provides a summary of the literature review and proposes a condensed framework for conceptualizing DT.

2.1 Evolution of Digital Technologies

The history of DT started with the integration of computer hardware and software in the 1950's (Gibe & Kalling, 2019). In the 1960's, the first mainframes were introduced. At the very beginning, the results of IT infrastructure were equivocal, mainly due to a productivity paradox debate. Nevertheless, several studies investigated the effects of IT investment and digitalization on organizations, since its appearance in the 1960's (Brynjolfsson & Hitt, 1998; Brynjolfsson, Malone, Gurbaxani & Kambil, 1994; Real, Leal & Roldan, 2006; Sambamurthy, Bharadwaj & Grover, 2003).

In the 1980's, DT processes across industries and societies received public attention as IT fused with digital communication technologies (Gibe & Kalling, 2019). Additional stages of DT were introduced with the worldwide expansion of the internet in the mid-1990's, followed by the launch of mobile internet in 1998 as well as massive innovations in hardware, software,

services, and new business models (Gibe & Kalling, 2019; Westerman, Bonnet & McAfee, 2014). Previous literature claims that the past decades established an exceptional progress in digital technologies with the implementation of the 'World Wide Web 2.0' in 2004 (e.g. Bharadwaj et al. 2013; Fitzgerald et al. 2013; Frank, Roehrig & Pring, 2014; Westerman et al. 2014). First, digitalized companies and platforms such as Facebook, Wikipedia or Twitter were born in the mid-2000's with strong democratization of content creation and disruption potential of traditional business models (Gibe & Kalling, 2019). Second, new innovative computing devices challenged the dominant position of the personal computer. For instance, Apple introduced the iPhone in 2007 followed by the iPad in 2010, whereby, the organization started a new era of dominance in mobile computing devices. Third, the implementation of new and innovative technologies simultaneously impacted the private and organizational environment.

Nowadays, scholars such as Brynjolfsson and McAfee (2014) emphasize a new innovation era facilitating the use of smarter machines called 'the Second Machine Age,' also termed 'Artificial Intelligence,' (hereafter AI). In this vein, Westerman et al. (2014) argue that: "the last time there was this much technological innovation hitting the business world was the first time. It was the Industrial Revolution when new machines bent the curve of commerce, capitalism, and, indeed, human history" (p. 2). In addition, Vogelsang (2010) highlights that a few pioneers in IT innovation and the digital environment unlocked the path for numberless technological innovations defining the age of information, today's fifth wave. In the first place, the term 'digital divide' arose due to the sharp increase in IT in the 1990's. In recent years, it was used to describe distinctions in information inequality (Yu, 2006).

Contrary, Frank et al. (2014) debate that industry and society are still at the intersection between the fourth and fifth wave of organizational IT. More specifically, the fifth wave is referred to as social, mobile, analytics, and cloud (hereafter SMAC) technologies (Udhas, Sridharan, & Raman, 2015). It is estimated that connected devices will grow tenfold in each IT wave leading to a minimum of 25 billion mobile instruments by 2020 (Gartner, 2014). General agreement in literature exists that SMAC technologies are the most influential digital technologies in business innovation equally disrupting social and economic life (Bharadwaj et al. 2013; Cole, 2013; Fitzgerald et al. 2013; Frank et al. 2013; Parker, Baya & Morrison, 2012; Udhas et al. 2015).

At the macro level, George and Lin (2017) argue that digital technologies are fundamentally challenging organizational processes, routines, capabilities, and structures. Thereby, digital

technologies offer a number of advantages: (1) stronger experimentation potential, (2) more dispersed technological innovation and (3) higher level of business model innovation (Arora & Gambardella, 1994; Baldwin, Hienerth & von Hippel, 2006; Baldwin & von Hippel, 2011; Markides, 2013; Markides & Oyon, 2010; Markides & Sosa, 2013).

At the micro level, the contemporaneous implementation of Big Data Analytics, AI, 5G, Blockchain, Internet of Things (hereafter IoT) and Digital Platforms contest traditional organizational competencies and skills (Baralou & Tsoukas, 2015; Dougherty & Dunne, 2012; Yeo & Marquardt, 2015). As mentioned in several studies, digital innovations and technologies can reshape and merge industry boundaries (Barrett, Davidson & Vargo, 2015; Lyytinen, Yoo & Boland, 2016; Yoo, Henfridsson & Lyytinen, 2010). Furthermore, digital innovations have the potential to combine previously distinguished user experiences and industries, reprogram products and most importantly, to digitize non-digital products and services (Yoo, Boland, Lyytinen & Majchrzak, 2012; Yoo et al. 2010). An essential part of this recent development refers to the digital disruption of industries (Nunes & Downes, 2013). By focusing on technological development and simple attributes of digital innovations, new entrants, regardless of size, have been able to rapidly disrupt and reshape traditional industry boundaries (Christensen, 1997; Lyytinen & Rose, 2003; Schwab, 2017).

For instance, Uber, the world's largest taxi service organization, owns no vehicles and Airbnb, the biggest accommodation provider in the world, owns no real estate. Similarly, tech-savvy companies such as Facebook, Google, or Amazon established entire business models around digital and disruptive innovations. In contrast, Dell, Nokia, or Kodak underestimated innovative technologies and changing business circumstances (Keen & Williams, 2013; Weill & Woerner, 2015). Hence, the overall understanding of digitalization shifted from solely working with computer hardware to digital technologies reshaping how companies operate in business-to-business (hereafter B2B) and business-to-customer (hereafter B2C) circumstances (Loonam, Eaves, Kumar & Parry, 2018). This means that organizations are confronted to either adapt to a new digital paradigm or risk competitive obsolescence (Fitzgerald et al. 2013).

Ultimately, organizations around the world are in the process of change from computing architecture to data as a new form of capital assets (Westerman et al. 2014). An underlying cause is the fast-paced development of cloud computing. Thus, organizations and individuals do not have to own technologies such as operating systems, applications, or servers to use them. Data is considered as an asset which is based on technological improvements that have

consequences on organizational structures, strategies, and business models (Brynjolfsson, 2016; Kane, Palmer, Phillips & Kiron, 2015). Yet, Bharadwaj et al. (2013) argue that an increased amount of data generated by digitalization, transforms information availability.

2.2 Definitions of Digital Business Environment

Over recent decades, the concept of digitalization has evolved from a generic and futuristic trend into a transformational paradigm. Thereby, the digital business environment redefines economic landscapes across industries and disrupts traditional business models globally (Bughin & Zeebroeck, 2017; Schwab, 2017; Weill & Woerner, 2015; Zammuto et al. 2007).

In this regard, the terms ‘digitization’, ‘digitalization’ and ‘digital transformation’ are often used contemporaneously. Therefore, the upcoming paragraphs present various definitions to generate a detailed understanding of each concept. Thereafter, definitions of each concept are synthesized from the literature and adopted throughout this research study.

2.2.1 Digitization

Feldman (1997) argues that digitization is the “basic conversion of information from physical or analog to [a] digital format” (p.3). Likewise, Gassmann, Frankenberger, and Csik (2014) define digitization as “ability to turn existing products or services into digital variants, and thus offer advantages over tangible products” (p.6). Similarly, various scholars emphasize the strong technical aspect of converting analog signals into a digital form (Negroponte, 1995; Tilson, Lyytinen, & Sorensen, 2010; Yoo et al. 2010). Consequently, digitization is defined throughout this research study as a technical process of transforming and converting analog information into a digital format.

2.2.2 Digitalization

In contrast, digitalization is an ongoing and continuously changing concept that has not yet been fully defined by scholars and industries (Fors, 2009). However, digitalization is often referred to as a paradigm shift penetrating traditional businesses and societies as a whole (Gimpel & Röglinger, 2015; Ng, Tan & Lim, 2018; Sambamurthy et al. 2003). From an economic

perspective, Brennen and Kreiss (2014, n.p.) define digitalization as “the adoption or increase in use of digital or computer technology by an organization, industry or country." In the manufacturing industry, digitalization is referred to as “designing products in a digital form, to virtually compose and exercise components before producing the product, and to maintain the relationship between a sold or rented product, its users, and the producing company” (Gray & Rumpe, 2015, p.1319). In the business environment, Gartner (2016, n.p.) describes digitalization as “the use of digital technologies by a company to change its business model and move towards a digital business." Additionally, from an organizational viewpoint, digitalization is often referred to as digital technologies modifying organizational cultures, business models, infrastructural processes and products (Fichman, Dos Santos & Zheng, 2014; Tilson et al. 2010; Xin & Ojanen, 2018). Accordingly, this research study specifies digitalization as the use of digital technologies changing organizational products, processes, structures, as well as business models.

2.2.3 Digital Transformation

‘Digital Transformation’ is a buzzword in today's society. Patel and McCarthy (2000) identify the concept of DT, however, they do not conceptualize the term in more detail. Again, a universal definition has not yet been established. From an economic and business standpoint, Lucas et al. (2013) define DT as “fundamentally altering traditional ways of doing business by redefining business capabilities, processes, and relationships” (p.372). Similarly, various scholars characterize DT as changes in digital technologies influencing the environment of humans as well as organizational circumstances (Piccinini et al. 2015; Stolterman & Croon Fors, 2004). Built on the technological perspective of DT, Liu, Chen, and Chou (2011) underline “the integration of digital technologies into business processes” (p.1728). In addition, Fitzgerald et al. (2013) emphasize that digital technologies facilitate substantial business improvements. Moreover, Schuchmann and Seufert (2015) describe the technical aspect of DT as the “realignment of technology to more effectively engage digital customers at every touchpoint in the customer experience lifecycle” (p.31). From an organizational perspective, Bharadwaj et al. (2013) refer to it as “an organizational strategy formulated and executed by leveraging digital resources to create differential value” (p.472). Furthermore, Mithas, Tafti, and Mitchell (2013) and Westerman et al. (2014) underscore the IT activity of DT within companies to improve organizational performance. In addition, Hess, Benalin, Matt, and Wiesböck (2016) are “concerned with the changes digital technologies can bring about in a

company's business model, which result in changed products, organizational structures or in the automation of processes" (p.124). Ultimately, this research study defines DT as a corporate process formulated to integrate digital technologies by simultaneously reshaping organizational products, processes, structures, and business models.

2.3 Impacts of Digital Transformation on Organizations

DT impacts organizations in different ways. According to Zysman (2006), it "changes the character of products, processes, marketplaces, and competition throughout the economy" (p.13). In fact, multiple studies focus on organizational and consumer impacts of DT and their interrelation. Besides, studies found that organizations are impacted by DT independently of the industry (Bughin & Zeebroeck, 2017; Tolboom 2016, Weill & Woerner, 2015). Organizations face pressure from customers, employees, and competitors to begin or accelerate their journey of DT (Westerman et al. 2011). Shirky (2008) states that the impact of the transformation will be greater ''the more an institution or industry relies on information as its core product" (p.107). Westerman et al. (2011) find that "major DT initiatives are centered on re-envisioning customer experience, operational processes and business models" (p.5). A more recent quantitative research of Tolboom (2016) underlines that the greatest impacts are expected to be on "the organization's value proposition, the customer segments they can identify and serve, the way organizations reach their customers, and the resources they use" (Tolboom, 2016, p.7). Consequently, the author argues that products and services are expected to be impacted in terms of "customization, performance, accessibility and convenience" (Tolboom, 2016, p.7).

The following sections describe the impacts of DT on organizations by combining the findings of recent literature in this field. After reviewing the literature, the impact factors could be clustered into four main topics. The first topic, 'Impacts on Customer and Customer Relations', examining the changing interplay of consumers and sellers and recognizes the external influence of the customer-side. The second topic, reviews impacts from a business environment viewpoint by focusing on value creation and business models. The third and fourth topic take an internal viewpoint, analyzing employment and organizational structures as well as impacts on processes and efficiency.

2.3.1 Impacts on Customers and Customer Relationships

Digital technologies affect consumer behaviour, which in turn is a significant driver for DT in organizations and impacts their interaction with customers (Lucas et al. 2013; Piccinini et al. 2015). Consumers increasingly integrate digital technologies in their lives resulting in a higher degree of digital density (Piccinini et al. 2015). As an effect thereof, consumers have more information about the spectrum and attributes of different products and services (Hennig-Thurau, Malthouse, Friege, Gensler, Lobschat, Rangaswamy, & Skiera, 2010; Lucas et al. 2013; Piccinini et al. 2015). This enables them to solve problems and fulfill their needs with certain products or services without consulting an intermediar (Piccinini et al. 2015). In return, organizations can advertise their offerings to potential customers anywhere in the world and are less restricted by market boundaries (Lucas et al. 2013).

Furthermore, an increase in interactions between customers and products or services can be evidenced (Piccinini et al. 2015). To enhance this interaction, companies use multiple channels (Westerman et al. 2011). Furthermore, consumers can easily exchange information among each other and can directly respond to the producer, for example, by rating products and using feedback options (Lucas et al. 2013; Piccinini et al. 2015). In response, producers have changed their product and service offerings towards becoming "more individually customized and hyper differentiated" (Piccinini et al. 2015, p.1643). This entails that products are increasingly oriented to meet specific customer preferences (Li, 2015). To make offerings more customer-centric, organizations focus on customer experience, quick responses to customer needs as well as co-creation for new products or services (Piccinini et al. 2015). Consequently, the launch-cycle of new products and services shortens (Fitzgerald et al. 2013).

Similarly, companies gain benefits from an in-depth understanding of customer needs and market segmentation. For instance, through direct interaction with customers via social media, organizations learn about their customers' satisfiers and dissatisfiers, which enables them to provide specific offerings for different segments (Li, 2015; Westerman et al. 2011). In this regard, customer data become an increasingly valuable good for companies (Westerman et al. 2011). Customer data and predictive technologies to process data enable organizations to improve marketing strategies for an enhanced customer engagement and more precise targeting (Kurniawati, Bekmamedova & Shanks, 2013; Westerman et al. 2011). Moreover, technologies are used to enhance sales growth, for example, an insurance company uses mobile tools that

help sales people to engage customers in analytic-based planning methods (Westerman et al. 2011).

Overall, the increased availability and accessibility of information lead to more transparent markets with well informed customers sharing and democratizing information about products and services. Simultaneously, organizations have new possibilities to collect and use customer data, which enables them to improve their market segmentation with individualized and consumer-centric product and service offerings.

2.3.2 Impacts on Value Creation and Business Models

The use of new technologies that accompany DT often implies a change in value creation affecting organizations' supply chains and shifting the focus to digital activities that deviate from traditional and often analog core businesses (Matt et al. 2015). In addition, new technologies, for example, advanced data interfaces, lead to a higher interdependency of organizations within a supply chain (Bharadwaj et al. 2013). Berman and Marshall (2014) argue that new technologies make firms' value chains more transparent and easier to decompose, which implies that value chain disruptions occur within more specific elements and functions. As DT increases the degree of specialization, organizations seek growth opportunities in their specialized functions across industries (Berman & Marshall, 2014).

Furthermore, DT impacts organizations' business models (Westerman et al. 2011). Companies modify their businesses digitally, whereof the growing importance of online stores is a common example (Westerman et al. 2011). Moreover, companies complement their offerings with new digital products or services, for example, a sports apparel manufacturer selling digital tracking devices for workouts (Westerman et al. 2011). Organizations increasingly exploit new revenues models and ways to create value (Li, 2015). In particular, licensing or pay-per-usage models are increasingly popular alongside a higher online interaction between customers and sellers (Li, 2015).

Furthermore, business models advance from being digitally globalized by gaining "global synergies while remaining locally responsive" (Westerman et al. 2011, p.23). According to the research of Westermann et al. (2011), DT enhances global shared services promoting efficiency and global flexibility. Local managers gain benefits from utilizing centralized data and are empowered to adapt their businesses more freely to local needs but have the responsibility to

act upon superior organizational goals (Westerman et al. 2011). In consequence, the approach leads to “fewer mandates from headquarters, but more guidelines” (Westerman et al. 2011, p.23).

2.3.3 Impacts on Employment and Organizational Structures

Loebbecke and Picot (2015) examine potential effects of DT on employment and required skill sets by considering the underlying mechanisms, namely digitalization and big data analytics, driving business transformation. Big data analytics can be described as a “focus on very large, unstructured and fast-moving data” (Davenport, 2014, p.10). Taking a business process viewpoint, digitization, and big data analytics are described as an autonomous action of processing information which were typically performed by the firm's knowledge workers (Loebbecke & Picot, 2015, p.153). Due to DT, traditional hierarchical structures become increasingly flexible as departments and teams are incrementally organized across locations and collaborate in network structures (Zammuto et al. 2007). Consequently, the traditional workplace resolves and a growing share of tasks is accomplished remotely, which can ultimately lead to a “mobile enterprise” (Stieglitz & Brockmann, 2012).

Furthermore, Loebbecke and Picot (2015) indicate that many established jobs and industries will change and may not survive the impacts of DT. This is due to the fact that digitalization and big data analytics are likely to impact knowledge-based, cognitive jobs even faster than non-knowledge based, manual jobs as digitization “reduces transaction costs for collecting information, communication and controlling activities” (Loebbecke & Picot 2015, p.151). Nevertheless, this skill-set shift will also create new job opportunities for both employed or freelance contracts (Loebbecke & Picot, 2015). In particular, competencies that digitalized and autonomous systems cannot perform will be increasingly required, such as “specific manual or intellectual expertise (tacit knowledge), social interaction and compassion, teamwork and conflict management, ethical judgment and responsibility, self-management, historical consciousness, and cultural understanding” (Loebbecke & Picot, 2015, p.154). In addition, advanced automation gives firms the opportunity to refocus their employees on more strategic tasks, for example, HR-self-services free resources and staff from doing administrative work, allowing a stronger focus on employee development (Westerman et al. 2011).

2.3.4 Impacts on Internal Processes and Operational Efficiency

Literature shows that operational processes are increasingly standardized due to DT (Agarwal & Dhar, 2014; Berman & Marshall, 2014; Bharadwaj et al. 2013). Furthermore, DT enables firms to realize strong benefits in internal processes (Westerman et al. 2011). Historically, enterprise-resource-planning (hereafter ERP) systems allowed firms to increase the quality and efficiency of processes (Westerman et al. 2011). Nowadays, organizations have the possibility to use infrastructure and software as a service, resulting in a decrease of physical resources (Bharadwaj et al. 2013). Further, cloud solutions can be cost-effective and enable economies of scale by replacing time-consuming and costly infrastructure installations (Bharadwaj et al. 2013). Beyond that, DT resolves the limits of one-way communication and knowledge sharing by enabling broad and unrestricted collaborations independent of locations (Westerman et al. 2011). Performance management can be refined due to increasingly transparent performance data. Moreover, DT enables executives to gather extensive and significant information leading to strategic planning sessions that include insights from many business units rather than the isolated view of top management (Westerman et al. 2011).

2.4 Strategic Implications of Digital Transformation

DT affects organizational strategies. The literature often describes the effects with the terms ‘digital business strategy’ or ‘digital strategy’.

McAfee and Brynjolfsson (2008) find that the power of investments in IT makes an increasing difference in organizations’ competitive advantages. Hence, organizations across industries have started to invest in digital technologies and digitally transformed businesses which force competitors to respond (Fitzgerald et al. 2013). Bharadwaj et al. (2013) investigate how digital technologies transform businesses across industries. External digital trends (e.g. pervasive connectivity and cloud computing) and organizational shifts (e.g. trans-functional role of IT and limitation of traditional business models) are drivers for the aspects of digital business strategy (Bharadwaj et al. 2013). Key themes are the scope-, scale-, and speed of digital business strategy as well as the source of value creation and capture (Bharadwaj et al. 2013). In this context, Bharadwaj et al. (2013) explain that digital business strategy is a “fusion between IT strategy and business strategy into an overarching phenomenon” (p.472). Furthermore,

digital business strategies enforce the role of organizations IT departments and affect organizational structures (Bharadwaj et al. 2013)

Multiple scholars argue for an independent view on digital strategies. It is broadly supported that digital strategies should not be part of an IT strategy on a functional level and rather be treated as a stand-alone strategy on a corporate level (Hess et al. 2016; Matt et al. 2015; McDonald, 2012; Westerman et al. 2011). Implementing modern IT systems and investing in digital technologies is not enough to mature digitally (Manyika, Ramaswamy, Khanna, Sarrazin, Pinkus, Sethupathy & Yaffe, 2015). Matt et al. (2015) describe that DT strategies encompass operational and functional strategies of organizations. They further outline that "strategic planning refers to the process of defining a strategy as well as deciding on the resources that are allocated to pursue a strategy" (Matt et al. 2015, p.340). Frequently, IT strategies treat technology in an insulated way. Yet, to generate value and revenue, a digital strategy must integrate technology and business processes (McDonald, 2012).

According to Berman and Marshall (2014), digitalization increases the specialization of businesses. Further, specialization will drive industry convergence as competition expands among specific common value chain functions. It can be expected that many organizations will pursue dual strategies: (1) continuing the focus on core business in their primary industries and (2) seeking growth opportunities in their chosen specialized functions across other industries (Berman & Marshall, 2014). To successfully implement a DT strategy, Matt et al. (2015) emphasize the importance of clear responsibilities and the necessity of top management support along the process. To sustain the strategic implementation holistically, DT must be driven by top-down communication and governance (Westerman et al. 2011). Typically, DT strategies face high uncertainties regarding their underlying assumptions, since digital technologies are exposed to changing diffusion (Matt et al. 2015). The high level of complexity and uncertainty regarding DT can be supported by the case studies of three, German-based, media-firms by Hess et al. (2016). To formulate a DT strategy, Hess et al. (2016) point out that strategic goals, customer interfaces, future business scopes, responsibilities, operational changes, and the required knowledge have to be considered.

2.5 Digital Transformation Frameworks

The following subsection reviews various conceptual and theoretical frameworks related to the field of DT. The frameworks were selected by considering their relevance regarding DT and their richness in terms of research-based description and conception. The frameworks were mapped against each other, which exhibited three different viewpoints on the concept of DT. In this regard, the discussed DT concepts are clustered and organized as follows: (1) holistic organizational viewpoint, (2) operational and processual viewpoint, and (3) innovation and reinvention viewpoint.

2.5.1 Holistic Organizational Viewpoint

Digital Transformation Framework (Matt et al. 2015)

The Digital Transformation Framework proposed by Matt et al. (2015) tackles specific corporate DT dynamics. The entire framework is based on the concept that DT conduces as a cornerstone in organizations. Hence, the conceptualization of DT interlinks the outright integration, prioritization and consultation of digitalization initiatives across companies.

Accordingly, Matt et al. (2015) identify four key elements of DT, which are independent of any industry: (1) use of technologies, (2) changes in value creation, (3) structural changes, and (4) financial aspects (Matt et al. 2015). First, the use of technologies refers to an organizational mindset and interest regarding the exploitation of new technologies and capabilities. Thus, a company has to determine whether to become an industry leader and pioneer by defining technological standards, or whether to keep and use traditional implemented market standards to accomplish business operations (Matt et al. 2015). In addition, being a dominant technological firm in an industry can lead to a sustainable competitive advantage, in line with Barney (1991). Second, using new technologies frequently signifies adjustments in value creation. On the one hand, DT strategies affect organizational value chains. On the other hand, digital technologies enlarge the product- and service portfolio of a company (Matt et al. 2015). Third, structural changes are routinely required after the adjustment of new organizational technologies and diverse manifestations of value creation. In this vein, structural changes refer to modifications in an organizational architecture. Nevertheless, a more detailed analysis is required to identify crucial adjustments in either products, processes or skills (Matt et al. 2015).

Fourth, the financial aspect, which is at the core of this DT framework. It comprises the priority on the basis of declining core business and the capability to finance a DT proposition (Matt et al. 2015).

Ultimately, a detailed alignment of the four DT elements is required to receive complete exploitation of the aspired effects (Matt et al. 2015). This Digital Transformation Framework established a basic comprehension of digitalization by describing four essential dimensions. Nevertheless, it is also relevant to highlight that while this digitalization framework was designed and suggested in an academic scope, it has not yet been officially trialed or validated as a convincing concept (Nwaiwu, 2018).

Digital Enterprise Integrative Management Framework (Bowersox et al. 2015)

Bowersox et al. (2005) suggest the Digital Enterprise Integrative Management Framework. This model is based on a supply chain excellence viewpoint. Accordingly, the authors argue that "true supply chain excellence will only come from making a digital business transformation" (p.22). To exploit the full potential of the framework, it is proposed to replace traditional organizational charts based on line- and command functionalities with an incorporated supply chain pattern (Bowersox et al. 2005). The framework is built on three key dimensions: (1) enterprise core processes, (2) real-time connectivity and responsiveness, and (3) operational excellence (Bowersox et al. 2005).

First, conventional departments and organizational entities are redesigned by five pivotal organizational processes: (a) human resource development; (b) financial stewardship; (c) integrated operations; (d) customer accommodation as well as (e) measurement and metrics (Bowersox et al. 2005). These key processes are required within each enterprise to primarily avoid stagnation and simultaneously obtain a sustainable profitable progression. Second, real-time connectivity and responsiveness relates to an enterprise structure that is oriented towards rapidly and correctly identifying customer demand and fulfilment initiatives. Thereby, using real-time information connectivity underscores the movement from traditional business structures to agile and response-based configurations that frequently respond to demand specifications. Third, digital transformation relates to the obligation to accomplish operational excellence. From the authors' perspective, this means enhancing customer value through uninterrupted superior service performance by keeping promises to clients and adapting to altering customer preferences. Lastly, it is necessary to indicate that this framework perceives

the supply chain as an ecosystem of interconnected organizations. These enterprises are both stakeholders and participants with the objective to accomplish and retain customer centricity. Consequently, this framework uses digital business transformation procedures to accomplish superior supply chain achievements through in-depth linkages with external cross-enterprise partners.

This framework redesigns traditional organizations into integrated companies by adapting three crucial components: (1) enterprise core processes, (2) real-time connectivity and responsiveness, and (3) operational excellence (Bowersox et al. 2005). However, this framework has its major shortcomings in not being a validated and fully tested concept grounded on empirical evidence and feasibility (Nwaiwu, 2018).

Digital Transformation Framework (Westerman et al. 2011)

This DT framework describes and visualizes the comprehension of organizational initiatives towards DT, developed by Westerman et al. (2011). The authors conceptualized this framework in cooperation with Capgemini Consulting and 157 executives across 50 large traditional firms. It is surrounded by the following four external layers: (1) transformative digital vision, (2) digital governance, (3) iterative transformation roadmap, and (4) digital engagement (Westerman et al. 2011). First, organizational leaders analyze the expected value of already established corporate assets and design a vision for the DT approach. Second, impactful communication and governance ensure that the company is heading in the right direction. Third, the iterative transformation roadmap combines previous elements with permanently communicating and listening to superior forms of DT. Fourth, digital engagement is the process of adapting a corporate culture resting upon the DT approach.

In contrast, the inner-circle of the framework is built on three core themes: (1) strategic assets, (2) digital building blocks, and (3) digital investments (Westerman et al. 2011). In this context, Westerman et al. (2011) identify powerful strategic assets to gain a sustainable competitive advantage throughout the DT process: sales force, point of sale, and distribution channels, products and content, product innovation, partnership network, brand, customer knowledge, and culture (Westerman et al. 2011). Furthermore, specific digital building blocks are identified: (1) customer experiences, (2) operational processes, and (3) business models (Westerman et al. 2011). Thereby, each pillar concentrates on various elements within the transformational process and further consists of sub-building blocks. Additionally, digital

investments strongly relate to the capital required to invest in digital infrastructure (e.g. ERP, cloud platforms, data analytics). Correspondingly, the scholars recommend integrating a three-step iterative tactic that senior-executives should follow to successfully guide their organizations throughout the DT process: (1) introduce the digital future, (2) invest in digital transformation, and (3) top-down organizational structures (Westerman et al. 2011).

The Digital Transformation Framework by Westerman et al. (2011) displays a very detailed overview of digital transformation within organizations. The authors identified specific external and internal core layers. Nevertheless, a detailed processual guideline throughout the framework is absent. Moreover, the concept is not empirically validated and tested across industries. Lastly, the framework is based on a highly pragmatic approach without the use of scientific or academic data.

Cognizant's Digital Transformation Framework (Corver & Elkhuizen 2014)

The Digital Transformation Framework by Corver and Elkhuizen (2014) is based on four main building blocks: (1) customer, (2) product, (3) processes and systems, and (4) organization. The authors argue that customers build the cornerstone in DT. Furthermore, customers are the core stakeholder within every enterprise and should be treated accordingly. The first building block is divided into several sub-themes: (a) customer insight; (b) omni-channel, and (c) digital marketing (Corver & Elkhuizen, 2014). It is reasoned that organizations can better communicate with customers and analyze their specific preferences by using digital technologies such as CRM, data analytics systems or social media platforms, in line with Corver and Elkhuizen (2014). The second element is further grouped into three sub-sections: (a) connected products; (b) pay per use, and (c) predictive usage (Corver & Elkhuizen, 2014). In this regard, the main objective of digitizing products and services is an impactful customer experience and journey, which can be installed by collecting and analyzing data. Moreover, the increased intelligence of products and services leads to additional product offerings or predictive maintenance services. The third component of the framework is also clustered into three sub-categories: (a) customer-centric and standard platforms; (b) agile approaches to work, and (c) anytime, anywhere and any device. Advanced digital technologies, supported by the SMAC approach have the potential to enhance organizational business processes (Corver & Elkhuizen, 2014). Lastly, the fourth aspect of the framework is again classified into sub-components: (a) dynamic partner ecosystems; (b) digital skills and virtual workforce, and (c) digital collaboration and innovation (Corver & Elkhuizen, 2014). It is debated that

interconnected value chains across businesses enable end-to-end service offerings to customers as well as the integration of larger ecosystems.

Overall, Corver and Elkhuizen (2014) believe that that conceptualized framework supports the DT process of organizations by developing a digital vision based on new commercial models that are grounded on digital opportunities. Furthermore, the framework concentrates on the development of digital visions and business models grounded on digital capabilities. However, a precise guideline throughout the framework is missing. Additionally, the framework pursues a programmatic method without the use of academic data.

2.5.2 Operational and Processual Viewpoint

Digitisation Piano – Digital Business Transformation (Wade, 2015)

Wade (2015) proposes the Digitization Piano in an official report in cooperation with the Global Center for Digital Business Transformation. The author separates the organizational value chain into seven distinct categories that define the core of digital business transformation: (1) business model, (2) structure, (3) people, (4) processes, (5) IT capability, (6) offerings, and (7) the engagement model (Wade, 2015). The framework describes that successful DT is linked with organizational change and enhanced performance based on a conjunction that combines digital technologies and advanced business models (Wade, 2015). More specifically, the underlying theoretical assumption of this concept refers to the utilization of digital technologies (e.g. mobile tools, online platforms, social media) with the objective of a prosperously organizational and business model transformation.

The Digitization Piano integrates an encompassing organizational strategy by making use of digital technologies. Nevertheless, the framework purely focuses on the enterprise without analyzing external organizational impacts and variables (Nwaiwu, 2018).

Digital Orchestra Framework (Wade et al. 2017)

The Global Center for Digital Business Transformation suggested the Digital Orchestra Framework as an official replacement for the Digital Piano Framework (Wade, Noronha, Macaulay & Barbier, 2017). This framework is grounded in the understanding that digital orchestras must first define: (1) the strategic direction (‘music’) and (2) specific strategies (‘orchestration’). Additionally, the so-called “players” need to have musicianship to provide a

fascinating performance. In this regard, a company's leadership is crucial in setting the strategic direction, developing the required skills and orchestrating an encompassing range of symphonies (Wade et al. 2017).

The Digital Orchestra is organized as follows: (1) go-to-market, (2) engagement, (3) operations, and (4) organisation, whereby each category is further clustered into subitems (Wade et al. 2017). The first building block is separated into: (a) offerings and (b) channels (Wade et al. 2017). The second element is divided into three sub-categories: (a) customers, (b) partners, and (c) workforce (Wade et al. 2017). The third module is clustered into: (a) processes, and (b) IT capability (Wade et al. 2017). Ultimately, the last aspect is classified into the sub-components: (a) structure, (b) incentive, and (c) culture (Wade et al. 2017). Consequently, the authors argue that all four sections of the Digital Orchestra have to operate in concert to utilize DT within organizations.

The Digital Orchestra Framework by Wade et al. (2017) offers an immense scope of enterprise-wide procedures and guidelines for the reinvention approach of digital business transformation. The framework is based on four core groups that cover ten sub-themes. Moreover, the concept provides useful instructions throughout an organizational transformation. Nevertheless, the framework misses empirical and scientific data.

2.5.3 Innovation and Reinvention Viewpoint

A third group of frameworks in the field of DT is focusing on digital innovation and reinvention processes.

Digital Reinvention Framework (Berman et al. 2016)

Berman et al. (2016) propose the Digital Reinvention Framework in collaboration with the IBM Institute for Business Value. The framework is based on the argument that “for successful digital reinvention, organizations need to pursue a new strategic focus, build new expertise and establish new ways of working” (Berman et al. 2016, p.9). The work builds upon the concept of digital reinvention, which was introduced in a previous IBM sponsored study by Berman et al. (2014). Digital reinvention is described as “fundamental ground-up reinvention of strategy, operations, and technology” (Berman et al., 2016, p.7), which has “an overarching focus on experience rather than production” (Berman et al., 2016, p.7). The described phenomenon of

digital reinvention proposes a path to achieve the goal of a digitally transformed organization. Berman et al. (2016) argue for three organizational focus areas that act as digital drivers for building "the deep, compelling experiences customers desire" (Berman et al. 2016, p.11) and allowing the organization to adopt an experience-first approach. The organizational priorities are: (1) to pursue a new focus, (2) to build new expertise, and (3) to establish new ways of working (Berman et al. 2016). Nevertheless, this framework is limited as it is solely based on theories and does not describe how it can be implemented in practical operations. Furthermore, its hypothesis has not been tested with empirical data.

Digital Innovation Strategy Framework (Nylén & Holmström, 2015)

Nylén and Holmström (2015) suggest the Digital Innovation Strategy Framework to diagnose and advance digital innovation. The framework builds on previous research illustrating how digital technologies lead to vast potential for product and service innovations in organizations. By managing digital innovations, organizations are challenged regarding "their product and service portfolio, their digital environment, and ways of organizing innovation work" (Nylén & Holmström, 2015, p.57). The scholars address this issue with a framework that provides a holistic view and supports organizations to motivate and to keep track of their digital innovation efforts. To implement this framework, managerial decisions have to cut across three organizational dimensions impacted by digital innovation uncertainties: (1) products, (2) digital environment, and (3) organizational properties. Investigating these three dimensions, Nylén and Holmström (2015) propose five key areas that contribute and enable digital innovation: (1) user experience, (2) value proposition, (3) digital evolution scanning, (4) skills, and (5) improvisation. To make the framework more applicable, the key areas are described in their scope and their elements. For example, the user experience of digital products and services must offer "high levels of usability, possess carefully designed aesthetic properties, and evoke engagement" (Nylén & Holmström, 2015, p.61). To enhance the framework's practicality, Nylén and Holmström (2015) provide an additional diagnostic tool to rate organizations' current activities among the five key areas. Yet, this framework is limited as it focuses exclusively on the newly identified key areas ignoring other factors that are generally important for innovation (e.g. political policies). Furthermore, it does not consider internal process innovations, which could be enabled by digital technology.

Comparison of Digital Transformation Frameworks

This paragraph compares the analyzed digital transformation frameworks on the basis of industry-wide applicability and implementation, as displayed in *Table 1*. As mentioned before, the respective frameworks were selected by considering their relevance regarding digital transformation and their richness in terms of research-based description and conception. Furthermore, the frameworks were mapped against each other to identify patterns and interfaces based on defined criteria. First, an organization's capability to support the conceptualization of the actual point of origin in the digital transformation path. Second, an explanation and comparison of individual processual steps that elaborate and define key transformational areas. Third, a characterization of organizational initiatives on how to accomplish digital transformation. Hence, the discussed digital transformation frameworks are clustered and organized as follows: (1) holistic organizational viewpoint, (2) operational and processual viewpoint, and (3) innovation and reinvention viewpoint.

The first cluster summarizes digital transformation frameworks that share holistic organizational viewpoints. In this regard, it is pivotal to notice that the origin of the frameworks is equally separated between business and academia. Furthermore, most of the theoretical concepts tackle the current era of digitalization, except for the Digital Enterprise Integrative Management Framework. In addition, the most comprehensive coverage in terms of outlined processual steps is displayed within the Digital Transformation Framework that equally prioritises internal and external factors (Westerman et al. 2011). However, detailed processual guidelines are absent among three out of four frameworks, which minimizes their practicality. The second cluster recapitulates digital transformation frameworks that encompass operational and processual viewpoints. Both frameworks have a strong business-related background. Nevertheless, the Digital Orchestra Framework outlines concise steps and provides detailed processual guidelines and got entitled as the official successor of the Digitization Piano. The third cluster encapsulates digital transformation frameworks that comprise innovation and reinvention viewpoints. Once again, the origin of the theoretical concepts is divided into business and academia. Whilst both frameworks have their unique strengths, a detailed processual guideline is mutually absent. Moreover, the Digital Innovation Strategy Framework concentrates entirely on digital products and services, thereby ignoring the strategic aspect. Lastly, none of the listed frameworks is scientifically validated.

Table 1: Overview of Digital Transformation Frameworks

Conceptual Framework	Author(s) & Year	Origin of Framework	Evaluates the current era of digitalization?	Detailed description of the process?	Number of processual steps/items	What to transform?	How to transform?	Framework scientifically validated?
Holistic Organizational Viewpoint								
Digital Transformation Framework	Matt et al. 2015	Academia	Yes	No	4	Use of technologies, changes in value creation, structural changes, financial aspects	DT initiatives are placed as a core concept – focusing on integration, alignment, and privatization	No
Digital Enterprise Integrative Management Framework	Bowersox et al. 2005	Academia	No	Yes	5	Enterprise core processes, real-time connectivity, and responsiveness, operational excellence	Digital business transformation concentrating on organizational supply-chains by connecting the achievement of 'true collaboration'	No
Digital Transformation Framework	Westerman et al. 2011	Business	Yes	No	7	External layers: transformative digital vision, digital governance, iterative transformation roadmap, digital engagement Internal layers: strategic assets, digital building blocks, digital investments	DT focusing on internal and external aspects that guide the transformational procedure	No
Digital Transformation Framework	Corver & Elkhuizen, 2014	Business	Yes	No	4	Customer, product, processes and systems, organization	DT focusing mainly on the customers followed by the other three cornerstones	No
Operational and Processual Viewpoint								
Digitization Piano	Wade, 2015	Business	Yes	No	7	Business model, structure, people, processes, IT capability, offerings, engagement model	DT processes lead to company-wide structural adaptations and expansion of organizational agility	No
Digital Orchestra Framework	Wade et al. 2017	Business	Yes	Yes	6	Value drivers, strategy, go-to market, engagement, operations, organization	The corporate leadership (e.g. top-executives) have to determine the organizational value as well as the strategic aspects for reaching it	No
Innovation and Reinvention Viewpoint								
Digital Reinvention Framework	Berman et al. 2016	Business	Yes	No	3	New expertise, new focus, new ways to work	An organization has to concentrate on a bottom-up approach to achieve digital reinvention	No
Digital Innovation Strategy Framework	Nylén & Holmström, 2015	Academia	Yes	No	3	Product, environment, organization	This frameworks purely emphasizes digital products and services – a detailed strategy is missing	No

2.6 Key Success Factors for Digital Transformation

This chapter reviews and compares various KSFs that support the organizational DT journey. An in-depth description of several KSFs and frameworks is presented and connections to the previously described DT frameworks are identified. Furthermore, defined parameters and criteria are used to develop a summary of clustered KSFs.

The Six 'Fs' of going Digital (Bowersox et al. 2005)

Bowersox et al. (2005) describe the Six 'Fs' of going digital that underline the Digital Enterprise Integrative Management Framework. In this regard, the authors emphasize the importance of six paradigms that shape organizational standards by concentrating on digital mindsets, which executives embrace to reshape enterprises (Bowersox et al. 2005). Accordingly, the Six Fs are structured as follows: (1) fact-based management, (2) flexible, (3) focus on cash, (4) fast return on investment, (5) fungible, and (6) frugal (Bowersox et al. 2005). The first refers to an obligation to create detailed information on every organizational aspect. The second is driven by facts that display the ability to quickly adjust operations to pursue a redefined approach. Third, organizations should always remember that cash reserves are inevitable. Ultimately, "the focus must be cash first, cash second, and cash always" (Bowersox et al. 2005, p.25). Fourth, every firm needs to routinely invest into organizational infrastructure (e.g. products, technologies, and facilities). In addition, an organization has to receive suitable financial returns in conjunction with short payback periods corresponding to cash initiatives. Fifth, the term 'fungible' is linked towards business processes, which are "modular in design with maximum interchangeability" (Bowersox et al. 2005, p.25). For instance, operational attributes such as sustainability, scale, scope, responsiveness, agility, and flexibility are ingredients of a fungible operating firm (Bowersox et al. 2005). Lastly, frugal companies are described by a flat organizational hierarchy, cash speediness, capital investment, and funneled human resource activities resulting into a lean attitude with streamlined processes that form individual corporate building blocks (Bowersox et al. 2005).

Strategic Assets (Westerman et al. 2011)

Westerman et al. (2011) identify eight strategic assets that form the cornerstone of the DT Framework established in cooperation with the MIT Center for Digital Business and Capgemini Consulting in 2011. The authors' research study displays that large traditional firms, which differ enormously from digital entrants, are beginning to take the road of DT. Furthermore, the study highlights that successful DT is not exclusively about implementing new technologies, but implies the redesign or modification of assets and the motivation of employees (Westerman et al. 2011). Additionally, the research endorses the hypothesis that successful DT is not bottom-up driven, but should be executed top-down (Westerman, et al. 2011). Hence, the authors formulate the subsequent strategic assets: (1) sales force, (2) point of sale and distribution channels, (3) products and content, (4) product innovation, (5) partnership network, (6) brand, (7) customer knowledge, and (8) culture (Westerman et al. 2011). First, a robust customer loyalty base is the foundation of relationships rarefied by stable sales personnel. Second, point of sale and distribution channels, as well as powerful warehouses and supply chain competencies can lead to location-based advantages. Third, product and content utilization enables personalized digital proposals across industrial sectors. Fourth, digitalized product innovation leads to a higher degree of connectedness among global manufacturers and niche markets. For instance, knowledge distribution through online platforms provides an opportunity to enhance unique expertise. Fifth, partnership networks are powerful tools to share impactful know-how and design new operating models leading to key transformational levers. Sixth, enterprises are able to enhance the value of their brands and establish supplementary contact points with customers throughout the integration of mobile web services or social media initiatives. Seventh, today's organizations are able to personalize products and services or improve customer relationships due to gathered and analyzed data. Lastly, a firm's culture can be utilized as an impactful instrument. For example, "executives in a manufacturing firm found that the company's historically entrepreneurial culture made DT easier" (Westerman et al. 2011, p.49).

Elements and Success Patterns (Matt et al. 2015)

Matt et al. (2015) emphasize six procedural aspects linked to the aforementioned DT Framework. The procedural aspects are structured in the following approach: (1) assign adequate and clear responsibilities, (2) sufficient transformational experience, (3) top management support, (4) transformational leadership skills, (5) defined procedures and

processes, and (6) continuous re-evaluation of digital transformation strategies (Matt et al. 2015). First, based on the framework, it is important to allocate considerable responsibilities to define and integrate a DT strategy. Second, the assigned project leader needs to have sufficient experience in transformational procedures (e.g. Chief Digital Officer). Third, top management support is crucial throughout each stage of a transformation project. Fourth, transformational leadership skills are required to proactively deal with situations of resistance. In particular, this means a constant involvement of different stakeholders impacted by the transformation. Fifth, firms have to establish precise guidelines to articulate, integrate, assess and customize DT strategies. Sixth, DT initiatives should be continuously evaluated and assessed based on previously defined intervals and criteria (Matt et al. 2015). This approach unfolds potential thresholds and identifies organizational turnarounds.

The Six Keys to Success Framework (Kavadias et al. 2016)

Kavadias, Ladas, and Loch (2016) establish the Six Keys to Success Framework that combines technology trends and market needs. In this regard, the framework's underlying assumption is that "no new technology can transform an industry unless a business model can link it to an emerging market need" (Kavadias et al. 2016, p.93). The authors conduct both a detailed analysis of 40 companies implementing new business models across industries and evaluate published industrial reports of major expert commissions such as McKinsey Global Institute, PwC, EY, and the Economist Intelligence Unit. Thereby, the authors arrive at the following six keys to success linking technology and the market: (1) a more personalized product or service, (2) a closed-loop process, (3) asset sharing, (4) usage-based pricing, (5) a more collaborative ecosystem, and (6) an agile and adaptive organization (Kavadias et al. 2016). First, to generate competitive advantage, organizations offer more personalized products and services. Second, a closed-loop process refers to the usage of recycled products, which decreases resource costs. Third, asset sharing tackles traditional business models by unlocking value for both customer and supplier (e.g. Uber or Airbnb). Fourth, usage-based pricing means that customers are paying 'on-demand' without owning or investing in the product upfront. Fifth, the utilization of new technologies enhances the collaboration with external supply chain partners and distributes organizational risks, leading to a better collaborative ecosystem. Finally, innovative technology is used to redesign traditional hierarchical models to integrate a more agile mentality that supports real-time adaptations and faster decision-making activities.

The Keys to Success (de la Boutetière et al. 2018)

De la Boutetière, Montagner and Reich (2018) define five specific keys to success in a global survey on DT. The identified keys to success are categorized into: (1) having the right, digital-savvy leaders in place, (2) building capabilities for the workforce of the future, (3) empowering people to work in new ways, (4) giving day-to-day tools a digital upgrade, and (5) communicating frequently via traditional and digital methods (de la Boutetière et al. 2018). First, it was identified that almost 70 percent of all respondents highlight that the firm's top management had been replaced with digital-savvy leaders during a transformation project. Second, the results further indicate that internal skill development is a fundamental component for traditional transformation and are crucial in a digital change process. Third, DT involves certain cultural and behavioural changes. One aspect of the global survey emphasizes the reinforcement of new behaviors and operational methods through formal procedures. Another approach towards the empowerment of employees is that leaders with key responsibilities are a core ingredient in amplifying change. Fourth, giving day-to-day tools a digital upgrade comprises three core elements: (a) integrate digital tools (b) implement digital self-serve technology, and (c) adjust regular operating processes (de la Boutetière et al. 2018). Fifth, clear and precise communication is needed during a successful DT process. For instance, critical variables are problem-free communication methods as well as facilitating the significance of a change story through the voice of corporate leaders.

Comparison of Key Success Factors

This subsection compares the analyzed KSFs on the basis of industry-wide applicability and implementation. The respective KSFs were selected by considering their relevance regarding DT and their richness in terms of research-based description and conception. Furthermore, the KSFs were mapped against each other to identify patterns and interfaces based on defined criteria: (1) an organization's capability to support the conceptualization of the actual point of origin in the digital transformation path, (2) an explanation and comparison of individual processual steps that elaborate and define key transformational areas, (3) the identification of potential linkages between the evaluated KSFs and DT frameworks. The discussed KSFs are clustered and organized in *Table 2*.

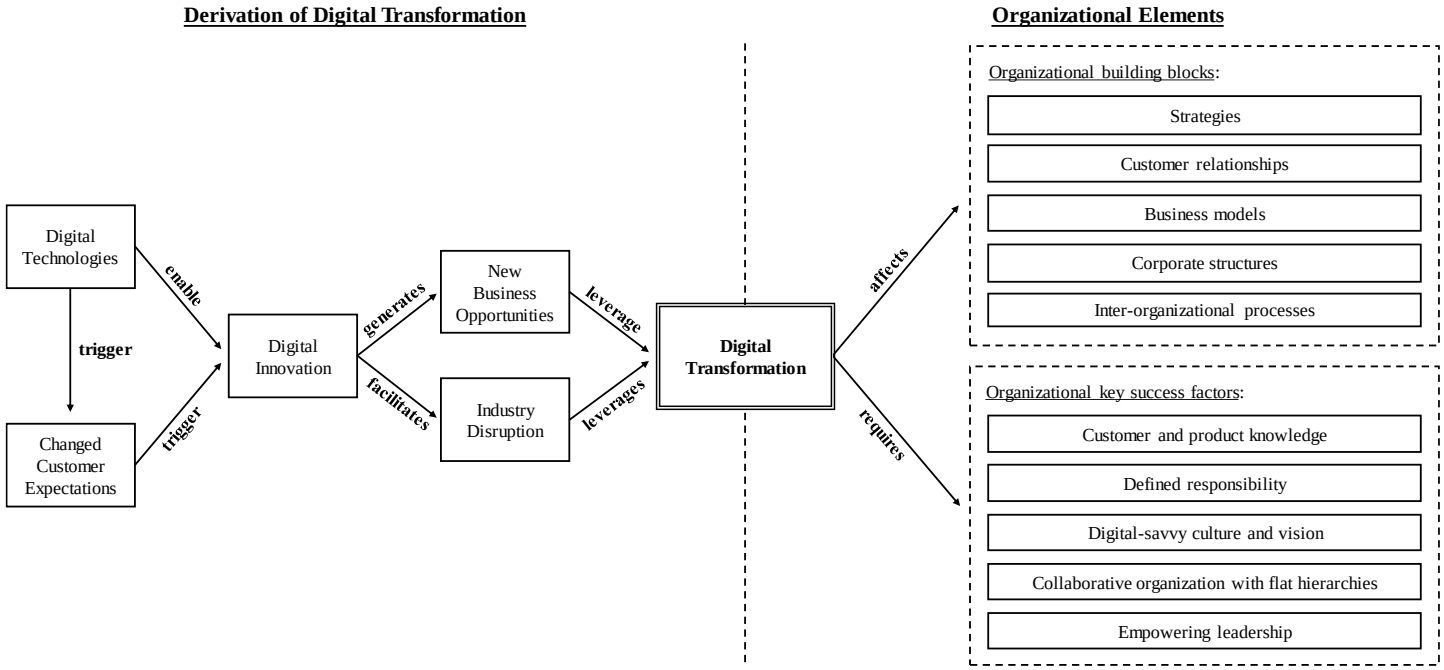
Table 2: Overview of Key Success Factors

KSFs / Framework	Author(s) & Year	Origin of Framework	Focus area of KSFs	Detailed description of the process?	Number of processual steps/items	List of KSFs	Linked to Digital Transformation Frameworks?	KSFs scientifically validated?
The Six'Fs' of going Digital	Bowersox et al. 2005	Academia	Firm perspective & mindset of leaders	Yes	6	Fact-based management, flexible, focus on cash, fast return on investment, fungible, frugal	The Digital Enterprise Integrative Management Framework – *Bowersox et al. 2005*	No
Strategic Assets	Westerman et al. 2011	Business	Assigning structural assets & motivating employees	No	8	Sales force, point of sale and distribution channels, products and content, product innovation, partnership network, brand, customer knowledge, culture	Digital Transformation Framework – *Westerman et al. 2011*	No
Elements and Success Patterns	Matt et al. 2015	Academia	Digital strategy & technology	No	6	Assign adequate and clear responsibilities, sufficient transformational experience, top management support, transformational leadership skills, defined procedures and processes, continuous re-evaluation of DT strategies	Digital Transformation Framework – *Matt et al. 2015*	No
The Six Keys to Success Framework	Kavadias et al. 2016	Academia	Corporate business models & technology trends	Yes	6	Personalization, closed-loop, asset sharing, usage-based pricing, collaborative ecosystem, agility	-	No
The Keys to Success	de la Boutetièreet al. 2018	Business	Digital strategy & technology	Yes	5	Digital savvy-leaders, building capabilities for the workforce of the future, empowering people, giving day-to-day tools a digital upgrade, communicating frequently via traditional and digital methods	-	No

2.7 Summary of the Literature Review

Derived from the analyzed literature, *Figure 1* presents a flowchart that describes the drivers and influential factors of DT on organizations. Agreement in the literature exists that digital technologies trigger changed customer expectations (Lucas et al. 2013; Piccinini et al. 2015). Further, digital technologies enable digital innovation (Berman et al. 2016; Kavadias et al. 2016). Simultaneously, changing customer expectations trigger digital innovation (Berman et al. 2016; Nylén & Holmström, 2011; Westerman et al. 2011). In turn, digital innovation generates new business opportunities (Berman & Marshall 2014; Bharadwaj et al. 2013; Hess et al. 2016; Li, 2015; Matt et al. 2015) and facilitates industry disruption (Christensen, 1997; Lyytinen & Rose, 2003; Schwab, 2017). Besides, new business opportunities and industry disruption leverage DT (Hess et al. 2016; Shirky, 2008). Additionally, DT affects organizational building blocks (Bughin & Zeebroeck, 2017; Schwab, 2017; Tolboom 2016; Weill & Woerner, 2015; Zammuto et al. 2007) and requires organizational KSFs (Bowersox et al. 2005; de la Boutetière, 2018; Kavadias et al. 2016; Matt et al. 2015; Westerman et al. 2011).

Figure 1: Digital Transformation Framework



3 Methodology

This chapter outlines the research methodology made use of in this research study. To begin with, the research approach describes the methodological choice as well as the underlying philosophical worldview. Next, the research design tackles concrete directions and defines the research strategy. The subsequent section continues with the description of the data collection method and the data analysis strategy. Thereafter, this chapter turns to the description of validity and reliability.

3.1 Research Approach

Creswell and Creswell (2018) refer to research approaches as practices and plans that outline specific actions from loose presumptions to precise directions of "data collection, analysis, and interpretation" (p.3). The research approaches are classified into qualitative, quantitative, and mixed methods. The discussion of the problem description outlined in Chapter 1, combined with the analytical approach of the specified objectives of this research study, punctuated towards the need of an in-depth understanding as well as empirical interpretation (Bryman & Bell, 2015; Creswell & Creswell, 2018). In fact, the nature of corporate DT processes recommends that a fundamental understanding is required to compose suitable theoretical and practical results. Therefore, we considered the qualitative approach as most suitable "for exploring and understanding the meaning [of] individuals or groups ascribe to a social or human problem" (Creswell & Creswell, 2018, p.4). As a qualitative method aims to understand beliefs, actions and behaviours based on an extensive collection of data, it facilitates the use of contextual viewpoints (Bryman & Bell, 2015; Creswell & Creswell, 2018).

Consequently, the epistemology underlying our research approach is inspired by the constructivist philosophy, also referred to as social constructivism (Creswell & Creswell, 2018). This worldview "believe[s] that individuals seek understanding of the world in which they live and work" (Creswell & Creswell, 2018, p.8). As individuals generate subjective connotations of specific objectives based on their personal experiences, multiple and different perceptions of reality exist (Bryman & Bell, 2015; Creswell & Creswell, 2018; Easterby-Smith, Thorpe, Jackson, & Jaspersen, 2018). Considering our choice of a qualitative research approach

and the constructivist worldview philosophy, the literature suggests adopting an inductive research approach by targeting a 'bottom-up' technique in building theory (Creswell & Creswell, 2018; Bryman & Bell, 2015). In return, the literature argues that the deductive approach is typically implied within quantitative research strategies challenging relevant theories or hypothesis rooted in analyzed theoretical data 'top-down' (Bryman & Bell, 2015). In this vein, Bryman and Bell (2015) debate that both approaches pursue the same objective to generate conclusions and establish theories. Accordingly, this research study is predominantly grounded in qualitative research design and adopts an inductive approach. Nevertheless, our research study also displays attributes of a deductive approach, as the relevance of the condensed digital transformation framework is tested against empirical data.

For this purpose, we first reviewed and analyzed relevant literature and then collected primary data. Bryman and Bell (2015) describe this proceeding as an iterative approach, as it "involves weaving back and forth between data and history" (p.25). Within the scope of a detailed data analysis technique, we were in the position to inductively build complex themes by interpreting the significance of our data.

3.2 Research Design

Creswell and Creswell (2018) describe research designs as concepts that provide certain courses of action using techniques in a research study. For this reason, the chosen research design should be in line with the research question (Bryman & Bell, 2015; Yin, 2018). For the selection of appropriate design options for this qualitative research study, we utilized Yin's (2018) method by considering three specific conditions: (1) a study's research question formulated by the researchers, (2) whether the research issue concentrates on a contemporary or historical occurrence, and (3) the degree of control by the researchers concerning the events. First, our research questions are based on 'how,' 'what,' and 'which' elements. Second, by investigating organizational DT processes and strategies across various industries, we mainly concentrate on historical occasions. Third, form a researchers viewpoint, we have no influence or control over corporate incidents occurring in the enterprises being studied. Altogether, the described preconditions and characteristics are in line with Yin's (2018) description of a case study. Consequently, we adopted the case-study method grounded on an in-depth examination of

several organizations throughout this research study (Bryman & Bell, 2015; Creswell & Creswell, 2018; Easterby-Smith et al. 2018;Yin, 2018).

Creswell and Creswell (2018) define the case study approach as “cases bounded by time and activity, and researchers collect detailed information using a variety of data collection procedures over a sustained period of time” (p.14). In turn, Schramm (1971; in Yin 2018, p.14) outlines a different perspective “to illuminate a decision or set of decision: why they were taken, how they were implemented, and with what result." Hence, the selected research approach is in line with the ‘how technique’ of our main research question that evaluates how organizations turn the concept of DT into business practices. It is critical to establish a detailed general understanding of this concept in order to academically and theoretically contribute to the outlined research objective.

Yin (2018) argues that a case study is highly appropriate when investigating a real-world scenario. Thereby, contextual conditions require an in-depth understanding of the case. On the contrary, a survey method is substantially more restricted predominantly due to a lesser extent of context exploration, which, however, is particularly needed for the objective of this research study. Scholars further indicate that a case study is able to accomplish settings with supplemental variables of interest that frequently arise in situations of organizational transformation (Easterby-Smith et al. 2018; Saunders, Lewis & Thornhill, 2015). In general, the investigation of a small number of cases is often referred to as beneficial. In this vein, Stake (2006) distinguishes between instrumental and expressive studies. The former approach evaluates specific types of cases to draw generalized assumptions. In contrast, the latter explores cases due to unique attributes that “may or may not be generalizable to other contexts” (Easterby-Smith et al. 2018, p.117). Furthermore, Siggelkow (2007) provides additional arguments for the use of multiple cases by pointing out the importance of “inspiring new ideas and for illustrating abstract concepts” (Easterby-Smith et al. 2018, p.117). Nevertheless, using a small number of cases has several drawbacks such as: (1) the limitations of generalizability, and (2) huge piles of data resulting in diverse interpretations (Bryman & Bell, 2015; Easterby-Smith et al. 2018; Yin, 2018).

Regarding the first, the aim of a case study approach is not to universalize and be practicable to diverse examinations, but to broaden and identify theories, often highlighted as an analytic generalization – contrary to statistical generalization (Yin, 2018). Regarding the second, adopting a multiple-case study method results in compiling a high number of secondary and

primary data. In this regard, it is of utmost importance to adopt a transparent data collection and analysis method, which is further explained and outlined in *Chapter 3.4 & 3.5*. The objective of this research study is to identify a better understanding of impacts, challenges, and capabilities for processual solutions in the area of organizational DT through empirical argumentation. Concerning this matter, the chosen case study technique supports research by adopting a more functional standpoint towards the determined case companies.

Moreover, the distinction between the types of generalizations as well as the overall research objective leads towards an exploratory and descriptive case study, consistent with Saunders et al. (2015). On the one hand, case studies are explorative when generating insights about a situation or topic as well as explaining variables and relationships (Bryman & Bell, 2015). On the other hand, our research objective follows a descriptive approach "to gain an accurate profile of events, persons or situations" (Saunders et al. 2015, p.175). Ultimately, this research study aims to develop analytical generalizability supported by specific design options that facilitate the purpose of this research study, in accordance with Yin (2018). Conclusively, we adopt a multiple-case study research design focusing on enterprises operating across several industries to identify impacts and challenges of organizational DT.

3.3 Selection of Case Companies

The selection of case industries and companies was grounded on the definition of appropriate criteria and parameters necessary to receive the objective of this study. In this regard, it was our aim to select polar types of case companies across several industries resulting in a maximum number of useful input, consistent with Saunders et al. (2015) and Yin (2018). In addition, Eisenhardt (1989) recommends investigating four to ten case studies in order to establish a stable foundation for analytical generalization. In the beginning, we conducted initial interviews with leading consultancies in the field of organizational DT: (1) to explore the research topic in more detail and (2) to identify key organizational characteristics to select suitable enterprises for the purpose of this research study. Accordingly, we selected several B2B and B2C case companies based on the main parameters shown in *Table 3.*

Table 3: Defined Parameters for the Selection of Case Companies

Number	Term	Parameter	Description
1	Number of employees	>1,000	To consider more complex corporations rather than SMEs
2	Annual revenue	>50 Mio €	To ensure economic relevance
3	Digitalization projects	Investment efforts	Approved budget, newly established departments
3.1	Digitalization projects	Organizational impact	Product or service, business model
3.2	Digitalization projects	Digitalization strategy	Historic 5-10-year plan
4	Age of the organization	>25 years	To exclude start-ups and newly established companies that are rather in a creation than a transformation process
5	Organizational scope	Internationality	To ensure complexity of the organization

Hereafter, pseudonyms are used to ensure the anonymity of the case companies. The chosen case companies are displayed in *Table 4-6.* Nevertheless, a more detailed description is provided in *Chapter 4.*

Table 4: Overview of Consultancies – Initial Interviews

Characteristic	Consultancy I	Consultancy II
Number of interviews	1	1
Duration (minutes)	60	60
Interview medium	Telephone	Telephone
Position of interviewee	Manager Digital Business Transformation	Consultant Digital Business

Table 5: Overview of Selected Case Companies & Case Data – B2B Organizations

Characteristic	Truck&Trailer	Tyre&Technology	Sensor&Health	Wind&Power
Market	B2B	B2B	B2B	B2B
Interviews	1	1	1	1
Duration (minutes)	60	60	45	60
Interview medium	Skype	Telephone	Skype	Telephone
Position of interviewee	Head of Product Informatics & Development	Head of Digital Solutions	Vice President Digital Business Development	Product Developer (Service Business)
Public data	Annual reports Media articles Press releases Company website	Annual reports Media articles Press releases Company website	Annual reports Media articles Press releases Company website	Annual reports Media articles Press releases Company website

Table 6: Overview of Selected Case Companies & Case Data – B2C Organizations

Characteristic	Car&Company	Merchant&Company	Platform&Service	Sportswear
Market	B2C	B2C	B2C	B2C
Interviews	1	1	1	1
Duration (minutes)	60	60	60	45
Interview medium	Telephone	Skype	Telephone	Telephone
Position of interviewee	Head of Product & Portfolio Management – Connected Car	Principal Business Development & Platform Business	Account Manager Digital Business	Director Business Strategy
Public data	Annual reports Media articles Press releases Company website	Annual reports Media articles Press releases Company website	Annual reports Media articles Press releases Company website	Annual reports Media articles Press releases Company website

3.4 Data Collection Method

The upcoming section explains the adopted data collection method for this research study. To begin with, the process of empirical data collection is introduced. Next, the data collection method of secondary data is explained in more detail.

3.4.1 Primary Data Collection

This research study adopted a qualitative research approach to investigate organizational DT processes and strategies. To accomplish this objective, organizational insights and contextual understanding are required. In this regard, the use of qualitative interviews served as a main source of primary data collection. In general, interviews facilitate a more precise investigation of the studied research topic due to in-depth and detailed responses of participants (Bryman & Bell, 2015; Easterby-Smith et al. 2018). Additionally, qualitative interviews are referred to as being more flexible due to the possibility to address additional topics raised by interviewees, generating novel and unexpected insights. Another advantage of using qualitative interviews relates to the adjustment of interview questions. On the one hand, it enables for follow-up questions focusing entirely on the studied subject. On the other hand, interviewees are encouraged to express themselves freely. Moreover, researchers can adjust the wording or even entire questions, which supports the purpose of gathering powerful information (Bryman & Bell, 2015; Creswell & Creswell, 2018). The general flexible structure of a qualitative research approach is supportive as it obtains comprehensive insights leading to relevant and important data of interviewees (Easterby-Smith et al. 2018).

Overall, qualitative interviews can be organized in an unstructured, semi-structured or structured approach (Creswell & Creswell, 2018). The first relates more to a conversation and is frequently grounded on a unique subject matter or issue that is further investigated by the researcher during the course of the discussion (Bryman & Bell, 2015). The second, is defined as "a list of themes and possibly some key questions to be covered [by the researcher], although their use may vary from interview to interview" (Saunders et al. 2015, p.391). The third refers to fixed and predefined set of questions the researcher does not divert from. Accordingly, with a straightforward research objective, a predefined interview structure is beneficial when covering certain topics and to accumulate as much useful data as possible (Bryman & Bell, 2015; Creswell & Creswell, 2018). However, as we adopted an inductive research approach,

we set out to enable our interviewees to discuss topics they deemed relevant, to post follow-up questions and to generate new and additional insights, thereby. For this purpose, a semi-structured interview technique is most eligible (Saunders et al. 2015).

Our interviews were guided by two distinct questionnaires for the respective interview groups: (1) initial interviews with consultancy firms and (2) case organizations, shown in *Appendix A & B*. Both questionnaires were structured along key theoretical topics of organizational DT to form a clear overview of core areas being asked. Since this research project follows a multiple case study design analyzing organizations operating in different industries, it was pivotal to formulate a coherent set of broad interview questions which both would ensure the relevance of questions asked in all organizations and the comparison of generated results (Bryman & Bell, 2015). Nevertheless, the interview guide was partly adjusted, due to the following reasons: (1) to gather a wide breadth of data and (2) to tailor certain questions to the function of the interviewee. In addition, each interviewee received the interview guide via email upfront. This procedure secured safe reading and allowed interviewees to seek clarification of unspecified subject areas in advance, consistent with Creswell and Creswell (2018).

As stated in the previous subsection, we started the data collection process by interviewing consultants operating in cross-industry DT projects. Our aim was (1) to explore the research topic in more detail and (2) to identify key organizational characteristics to select suitable enterprises for the objective of this research study. Afterwards, we began the process of conducting interviews along the chosen B2B and B2C case companies. The selection process of finding suitable interviewees was guided by the research objective. Hence, we followed a purposive sampling strategy (Easterby-Smith et al. 2018). It was important for us as researchers to interview respondents possessing expert knowledge in the field of organizational DT. In other words, to fulfill the purpose of this research study, we consulted interview participants who were able to provide additional information and organizational viewpoints towards the outlined research questions (Easterby-Smith et al. 2018).

Each interview was conducted either via telephone or skype due to physical distances and time constraints. Nevertheless, this approach assists the researchers to keep concentrated towards the main topics of the underlying research purpose (Creswell & Creswell, 2018; Saunders et al. 2015). In addition, the conceptualization of an interview guide underpinned key subthemes in the field of organizational DT. This approach supported us in: (1) staying focalized throughout the interview conversations, (2) covering required viewpoints, and (3) allowing for a certain

degree of flexibility to tackle supplementary subjects. Furthermore, we also utilized the 'laddering technique'. In this regard, we laddered up ('why') or laddered down ('providing examples') questions to receive a more precise understanding from initial questions (Easterby-Smith et al. 2018). As such, we were able to gather an encompassing insight of main- and sub-themes related to the study's objective.

Moreover, we collected additional data and information through public domains (Creswell & Creswell, 2018). For instance, annual reports, media articles, and press releases intensified the primary data collection technique. We used this data to contrast it against the empirical data previously collected to find out whether interviewees confirmed or contradicted their organizations' official statements.

3.4.2 Secondary Data Collection

The conducted literature review resulted in in-depth insights and understandings of academic knowledge in the field of organizational DT. Thus, a systematic analysis of publicly accessible academic knowledge supported us in defining the objective of this research study, consistent with Creswell and Creswell (2018).

We searched for academic articles, journals, and books by making use of online databases such as LUBSearch and Google Scholar. Thereby, we utilized the upcoming key words/phrases:

- Organizational digitalization
- AND/OR Digital transformation
- AND/OR Digital transformation strategies/processes
- AND/OR Digital transformation impacts/challenges
- AND/OR Digital business strategies

To begin with, we filtered the databases for peer-reviewed academic articles, journals, and books in English to ensure reproducibility (Easterby-Smith et al. 2018). Next, we conducted a systematic analysis by carefully reading abstracts and conclusions, in accordance with Saunders et al. (2015). Overall, it was pivotal for the purpose of this research study to apply a conscientious and critical mindset, mainly rooted in: (1) a relatively unstudied field of business research, (2) inconsistent definitions, and (3) varying research incentives (Bryman & Bell, 2015). Hence, we pursued a straightforward literature review technique and incorporated those

articles, journals, and books that were in accordance with the objective of our research study. Ultimately, it was our aim to identify relevant secondary data enhancing both the significance of this research study and the suitability of the theoretical frameworks chosen.

Nevertheless, the process of finding relevant and appropriate literature has its limitations. In this line, Bryman and Bell (2015) argue that conducting a thorough literature review is complicated as business research is permanently expanding. Allocating and identifying appropriate literature could have been disrupted based on: (1) the chosen keywords, (2) incoherent tiles of academic journals or articles and (3) suitable research studies published in mediums or released in languages other than English and German.

3.5 Data Analysis

For analyzing the empirical data, we chose an open coding approach. In this regard, Easterby-Smith et al. (2018) point out that "open codes are used to break up long texts and complex pictures into manageable chunks" (p.246). Following an inductive approach, codes are used as a first step to develop categories and concepts (Easterby-Smith et al. 2018). To organize our transcribed interviews and additionally collected information from the case companies in an explorative way, we started to categorize the empirical data into codes that represent common themes. To identify relevant themes, we searched for contextual iterations in our empirical data, as described by Ryan and Bernard (2003). The goal of this first-cycle coding was to gather descriptive codes that organize our data collection (Easterby-Smith et al. 2018). The first-cycle coding was carried out independently by both researchers. To promote an explorative coding approach, no preliminary clusters were defined. Our coding results were further merged in a discussion meeting. Most codes from the dual coding approach were content-wise in line with each other. In the case of divergent codes, we pondered the transcript-based argument for different coding outcomes and reworked the codes. However, divergent outcomes are possible because coding is an interpretive exercise and requires a certain degree of subjectivity (Easterby-Smith et al. 2018). The decisive factor to decide on a final code was its frequency. Additionally, to decide upon codes with fewer repetitions we included two qualitative factors that considered the 'relevance for the research objective' and 'contextual contradiction.'

To condense our codes into systematic categories we continued with a focused coding approach, which was conducted by both researchers. Furthermore, focused coding builds "on the previous coding cycle and aims to develop a sense of the categorical and conceptual order arising from the open codes" (Easterby-Smith et al. 2018, p.246). The codes that arose in the second-cycle coding stage were elaborated by comparing the first-cycle codes with each other to advance theory-building and develop a cognitive map of the research study (Easterby-Smith et al. 2018). Hence, second-cycle codes are more abstract as they result from a synthesis of descriptive first-cycle codes (Easterby-Smith et al. 2018). While comparing the codes, we further categorized and reduced the number of themes to focus on the most relevant themes that would provide answers to our research questions. Therefore, we identified patterns among codes by searching for similarity, difference, frequency, sequence, correspondence, and causation (Hatch, 2002). Even though we followed a structured coding process, interpretivism was a necessity to synthesize the in-depth qualitative analysis into systematic themes (Saunders et al. 2015). The collected secondary empirical data from conducting consultancies in the field DT was used to support and to review our identified themes from the two-staged coding process.

3.6 Research Limitations

The chosen approach and design of this research study is not free of limitations. By analyzing the case companies, we aimed for a detailed description of how DT influences organizations and what experiences organizations have had by following certain DT strategies. Our analysis did not attempt to investigate the frequency of the phenomenon. Therefore, our findings cannot be generalized with the same certainty. Moreover, the research process was limited due to time constraints and obtaining access to relevant data. An increased number of case companies would have contributed to the reliability of our data analysis and might reveal additional findings. In addition, the data collection process might be affected by biases of both interviewees and interviewers. Besides, situational factors within a case company can influence the interview results. When repeating the interview, other situational factors might influence the outcome. In this regard, the 'interviewer bias' further interferes with the reliability of our research findings. As described by Saunders et al. (2015), the interviewees' responses might be influenced unintentionally by tone, comment, or other behaviors. The 'interviewer bias' implies interviewers imposing their own beliefs by framing the questions in a certain way (Saunders et al. 2015). Related to this is the 'response bias,' which considers the interview as an intrusive

process (Saunders et al. 2015). Especially in the case of in-depth or semi-structured interviews, the interviewee might react sensitive to the unstructured exploration or not feel empowered to reveal and discuss a specific aspect (Saunders et al. 2015).

3.7 Validity and Reliability

To address the described research limitations, the following section evaluates the validity and reliability of this qualitative research study. In this regard, Bryman and Bell (2015) highlight four tests to increase the degree of trustworthiness of a qualitative research study: (1) credibility, (2) transferability, (3) dependability, and (4) confirmability. All four criteria are evaluated hereafter.

First, credibility refers to the consistency of the researchers' empirical observations and the gathered theoretical implications (Bryman & Bell, 2015; Creswell & Creswell, 2018). In our research study, we have ensured a high degree of credibility by interviewing consultancies, multiple organizations across several industries, and collected valuable information by analyzing annual reports, press releases, and corporate websites. In this vein, the literature argues that using multiple corroborating sources enlarges a study's quality and trustworthiness (Bryman & Bell, 2015; Yin, 2018). Yet, another crucial component tackles the ability to draw conclusions and to establish causal relationships when adopting a case study design (Yin, 2018). In this research study, we used an all-encompassing data analysis technique to discover relationships and define inferences rooted in the gathered data. Conclusively, Yin (2018) further suggests integrating a chain of evidence. Hence, we recorded and transcribed each interview and partly included quotes to allow for a personal assessment.

Second, transferability parallels with external validity and describes the generalizability of findings (Bryman & Bell, 2015; Yin, 2018). In general, case study designs are often criticized due to their restricted generalizability. Concerning this matter, we utilized the analytic generalization technique to enhance and generalize DT theories through the adaptation of a limited multiple-case study method. This means that a higher conceptual level of generalization modifies or increases theoretical assumptions throughout the finalization of this research study, consistent with (Bryman & Bell, 2015; Yin, 2018).

Third, dependability describes the reliability as well as a study's degree of replicability (Bryman & Bell, 2015; Yin, 2018). Relating thereto, we documented and disclosed the selected research design and strategy throughout this chapter, thereby, providing transparency towards the decisions undertaken. For instance, we outlined the process of transcribing and recording empirical data, enabling other researchers to draw their own personal conclusions.

Fourth, confirmability characterizes the objectivity of a research study (Bryman & Bell, 2015; Yin, 2018). In this regard, we applied the concept of triangulation by using more than one source of data, which is frequently acknowledged throughout our research study (Saunders et al. 2015; Yin, 2018). Moreover, adopting a chain of evidence supported verification, enhanced transparency as well as cross-referencing (Yin, 2018).

4 Description of Case Companies

The following section displays a short background of the consultancies and the chosen case companies as well as their current stance towards digitalization topics. To guarantee the anonymity of the selected consultancies and case companies, we can only enclose a limited amount of information.

Consultancy I

Consultant 1: Manager Digital Business Transformation

Consultancy II

Consultant 2: Consultant Digital Business

Both consultants have conducted major organizational DT projects across various industries. Among other digital service offerings, they dispose of in-depth knowledge in areas such as ’Industry 4.0’, ’AI’, or ’Smart Manufacturing.’ Hence, the conducted initial interviews supported us to explore the research topic in more detail and to identify organizational characteristics for the selection of suitable case companies.

Car&Company

Interviewee: Head of Product & Portfolio Management - Connected Car

Car&Company is a premium car manufacturer located in Germany. This B2C organization operates globally and is currently in the midst of transforming its products, services, and processes, in line with present industry trends such as digitalization, e-mobility, and autonomous driving. For instance, ’On Demand Car Functions’ or ’Smart Manufacturing’ are significant digitalization projects.

Merchant&Company

Interviewee: Principal Business Development & Platform Business

Merchant&Company is an international e-commerce company with a focus on fashion, lifestyle, furniture, and technology products. The German-based company has a B2C focus and experienced different digitally-driven business model transformations. The company transformed the core business from being a stationary merchant towards a leading online-based

retail business. In recent years, Merchant&Company pursued a strategy to develop a platform-based business model.

Platform&Service

Interviewee: Account Manager Digital Business

Platform&Service is a digital-born e-commerce company, with a B2C orientation, headquartered in the United States of America. Since its foundation, this organization has a digital 'DNA' as it offers innovative digital solutions to millions of customers. For instance, digital offerings comprise an e-commerce platform, online advertisements, and specialized cloud technologies.

Sensor&Health

Interviewee: Vice President Digital Business Development

Sensor&Health is an international manufacturer that develops equipment and solutions in the field of medical, safety, and sensor technology. The company has a strong B2B focus and is based in Germany. The traditional core competencies of Sensor&Health were grounded in engineering and sales. As a result of DT, data-driven and service-oriented business models become increasingly important.

Sportswear

Interviewee: Director Business Strategy

Sportswear is a producer of sportswear and fitness accessories. The company operates internationally and is based in Germany. Sportswears' product offering has a distinct B2C focus. Driven by DT, the company uses data analytics to enhance customer centricity and to transform traditional organizational steering processes.

Truck&Trailer

Interviewee: Head of Product Informatics & Development

Truck&Trailer is a leading trailer manufacturer based in Germany. This enterprise is renowned in the automotive industry as an innovative family-owned business that operates globally by offering individualized B2B products and services. Among other digital technologies, the firm makes use of digital product life-cycle management systems, smart manufacturing techniques, and telematics solutions.

Tyre&Technology

Interviewee: Head of Digital Solutions

Tyre&Technology is a leading supplier for industrial organizations headquartered in Germany. The core focus of this organization lies on B2B products and services. This firm as well competes internationally and adapts its products, services, and processes towards industry trends such as digitalization, e-mobility, or autonomous driving. For example, digital offerings include sensors, electronics, and software products.

Wind&Power

Interviewee: Product Developer (Service Business)

Wind&Power is a German-based producer of wind turbines with international clients and production facilities. The engineering-focused company reacted to the increasing demand from B2B customers to share data points and to provide data-driven services. In particular, expiring regulatory subventions for wind-powered electricity fortify the need to utilize advanced data analysis for efficient and cost-saving operations.

5 Presentation of Empirical Findings

In this chapter, we present the empirical findings of our research study which results from studying eight case companies that have experienced DT for several years. The case companies are represented by the experience of our interviewees. Accordingly, this chapter displays the empirical data based on individual interviews. Analyzing our empirical data, we structured main findings along the condensed DT framework: (1) digital transformation has various understandings, (2) digital transformation alters the customer perspective of organizations, (3) digital transformation as promoter for business model changes, (4) digital transformation strategies, and (5) key success factors.

5.1 Digital Transformation has Various Understandings

During our data analysis, we observed how organizations grasp the concept of 'digitalization' and 'digital transformation.' The results show that none of the case companies have a systematic understanding of DT, nor do they differentiate between digitalization and DT. However, employees who are engaged with DT within organizations are aware of the concepts' building blocks. Nevertheless, a transparent organizational definition is missing. For example, Sensor&Health stated:

> *"A transparent definition of what digital transformation means for our organization is missing, but we see that digital transformation influences our organization holistically in terms of product portfolio, customer interfaces, processes, and hierarchies."*

5.2 Digital Transformation Alters the Customer Perspective of Organizations

Even though the case companies have no definitional understanding of the concept, they are aware of the influences of DT on business environments and business models, when asked more specific and contextual interview questions. An outstanding point, that was named as one of the main influential factors by all case companies, was 'customer centricity.' Truck&Trailer stated:

> "*With the new possibilities how we can collect and utilize the gathered data, we reconsidered the way how to interact with the customer world."*

Furthermore, Platform&Service incorporated customer centricity as part of their *"organizational vision."* By analyzing how customer centricity is translated into a business context, we discovered different aspects by clustering the case companies in B2B and B2C categories (*Table 5&6*). Organizations with a B2C focused business model translate customer centricity into the improvement of *"customer journey"* (Merchant&Company, Sportswear, Platform&Service) as well as *"flexible and individualized products and services"* (Car&Company). Merchant&Company explained that:

> *"Digital technologies and access to data make customer markets transparent. To differentiate we are focusing on shopping experiences, optimal service quality, and personalized offerings. Thereby, customer and market data are the main resources."*

Utilizing market data allows organizations to *"improve business segmentations"* (Merchant&Company, Sportswear). Car&Company described that digital technologies and data analytics allowed them to put customer needs increasingly as a determinant factor of their product development, which resulted in highly individualized and flexible product offerings:

> *"Today, we can offer functions on demand and allow customers to personalize cars even after the point of sale."*

While the studied B2C case companies collect and analyze data for improving customer experience, segmenting markets, and providing individualized products and services, B2B case companies use data in particular to intensify customer interfaces and to create services that extend or complement their core products. Sensor&Health stated that traditionally salesmen were the "*master of knowledge"*, who educated customers and focused on one-time contract-closing for selling an asset. Our findings showed that nowadays, DT enhances data-exchange and interrelations between various stages of value chains. As a result, particularly the interviewed B2B case companies enhance their focus on *"recurring business"* relationships (Sensor&Health, Wind&Power, Truck&Trailer). Sensor&Health underlined the changing customer expectations:

> *"Blue Chip customers expect that we can create APIs with their purchasing systems to take orders automatically."* Additionally, "*customers demand that our data-points, for example, from our stationary pressure sensors, are compatible with their control systems for process management."*

Similarities were found in the wind power industry where operators of power plants have an *"increasing demand for participating in the gathered data of our turbines*" (Wind&Power). The findings suggest that the possibilities of data collection and utilization become increasingly important for customers' purchasing decisions. Besides, customers' demand for raw data, B2B case companies use data analytics and predictive algorithms to offer additional digital services proactively. For instance, Wind&Power provides data as a service that, in combination with software, forecasts future power generation and predicts wear-out failures. The B2B case companies increase their customer centricity by changing their mindset from offering certain products to become a service provider. In this regard, Truck&Trailer stated:

> *"...our mentality and mindset changed a lot. Instead of just selling trailers, we care about offering transport capacity at the right place to the right time."*

5.3 Digital Transformation as Promoter for Business Model Changes

Our analysis shows that data utilization and mindset shifts give organizations the possibility to expand or disrupt their business models. Advancing the business model can increase value for customers and for the organization to secure or gain market share. By examining business model changes driven by DT, we observed two main distinctions. Different approaches are taken by organizations that offer physical and analog products and services compared to organizations that offer intangible and digital products and services.

Organizations with a physical product line are still selling 'traditional' goods, but use digital capabilities to complement their offerings with a distinct service or service-oriented product. Examples thereof are functions on demand (Car&Company), power generation and wear-out forecasting (Wind&Power), or cargo-loading optimization (Truck&Trailer). Tyre&Technology utilizes data to develop a data-driven business model that leverages its existing analog business model. The case company introduced telematic devices that analyze and consolidate various data points to *"optimize traffic flow, facilitating maintenance, or measuring driving performance for efficient fleet management."* Our empirical data further indicate that organizations have to change their business models to remain profitable. In the case of Sensor&Health, revenue growth and profitability were slowly decreasing. The case company

noticed that facilitating traditional engineering and product development structures are insufficient (Sensor&Health):

> *"The customer wants to pay less for the traditional hardware such as measuring devices or anesthesia machines. However, they are willing to pay more for intelligent services and machines that can utilize data with intelligent algorithms."*

Insights from Wind&Power support the customer-trend of increasing demand for data:

> "*Competition is increasing and the EEG subsidy for renewable energy is coming to an end. Operators become more price sensitive and the use of data and digital technology is increasingly important to increase the efficiency of wind turbines and to provide intelligent power generation for the electricity grid."*

While organizations expand their traditional business models by exploring service and data-driven opportunities, they face new competition from well-established digital players as well as start-ups that try to find a niche between analog products and digital technologies. By providing telematics and other connectivity functions and services in the mobility industry, Tyre&Technology faces competition from global corporates, such as Google or Bosch but also from newly established startups. In addition, Sensor&Health competes with Google or IBM when it comes to *"optimizing workflows in hospitals by using data and digital technologies."* Furthermore, Wind&Power states that startups like Greenbyte developed software that analyzes and visualizes raw data from wind turbines to support wind park operators to forecast and plan revenue and profit margins.

Our results clearly indicate the need for manufacturing companies to adapt their business models digitally. The case companies whose core business relate to digital service offerings are even more affected by DT. In the case of Merchant&Company and Platform&Service, DT is not a matter of expanding the existing business models. It rather concerns a disruption or change of the current business models. Merchant&Company was a traditional mail-order company that changed from analog to fully digitalized customer channels. This step was described as the *"race of dinosaurs"* to survive the disruption resulting from the internet. Over recent years, DT has led to an even bigger business model change for Merchant&Company. While the online business and e-commerce industry is still growing, Merchant&Company is in the process of further disrupting its business model:

> *"The e-commerce market and our revenues as merchant are still growing but new digital capabilities allowed our competition to grow much faster. To act upon and to stay relevant in the long-run we developed a strategy to change the business model from an e-commerce company to a platform provider."*

As a platform provider, Merchant&Company takes a gatekeeper function and opens its selling platform for other merchants and direct sellers. This business model increases traffic, visibility, product range, and generates new revenue streams from fee- and service-charges. Such business model adaptations challenge the organization holistically, which can be seen in the following statement (Merchant&Company):

> "*The challenge is to develop the necessary digital capabilities and to reconfigure the organizational structure according to the new business model."*

The second case company with a digital core business advances its business model by taking into account upcoming digital trends. Platform&Service started as an e-commerce company but transformed its business by developing various digital capabilities:

> *"We foster digital innovation and continual business transformation."*

Additionally, embedded corporate leadership principles such as 'invent and simplify' or 'customer obsession' support transformative thinking of the company (Platform&Service). By following this explorative approach of business development, Platform&Service builds mature business models in digital advertising and cloud technology, while advancing its e-commerce business simultaneously.

5.4 Digital Transformation Strategies

The findings display that DT strategies have both similarities and discrepancies within and across B2B and B2C markets. Most of the case companies in B2B markets have not developed corporate DT strategies yet, in point of fact, *"functional business unit strategies"* are executed (Tyre&Technology, Sensor&Health, Wind&Power). Accordingly, our analysis reveals that functional business unit DT strategies are not represented within corporate strategies. Nevertheless, the interviewees highlighted that *"corporate digital transformation strategies"* are preferred in the future (Tyre&Technology, Sensor&Health, Wind&Power). In contrast, B2C case companies execute unified corporate DT strategies. Furthermore, B2C case

companies partially established corporate structures aiming to align *"group-wide resources"* to collaboratively tackle DT initiatives (Truck&Trailer, Car&Company, Merchant&Company). The results further point out that digitalization concepts are a combination of unique patterns. This becomes evident in the upcoming statement (Truck&Trailer):

> *"We use a mix of several initiatives to structure our digitalization efforts. First, we arrange strategy workshops and steering groups with the top management in our organization. Second, we observe the market and competitors to identify digital transformation strategies. Third, we constantly receive data and information from external parties."*

In addition, the interviewee claimed that "*a long-term strategy is unrealistic mainly due to a highly uncertain environment"* (Truck&Trailer). Thus, the *"ideal [digital transformation] strategy"* has not yet been identified, rather, a functional business unit strategy is executed (Tyre&Technology, Sensor&Health, Wind&Power). In contrast, case companies in B2C markets demonstrated a somewhat contradicting strategic approach. On the one hand, Platform&Service highlighted that "*a digital transformation strategy is part of a long-term organizational strategy."* On the other hand, Car&Company pointed out that a long-term strategy i*s "unrealistic."* Comparing these statements, it becomes clear that strategic timelines differ both within and across B2B and B2C sectors.

Nevertheless, similarities of DT strategies arose when analyzing B2C case companies across industries. For instance, Car&Company and Merchant&Company follow identical approaches, as exemplified in the following statements:

> *"At present, our parent company attempts to combine group-wide resources to strengthen the significance of digitalization efforts."*

> *"The current group-wide strategy combines resources to forcefully push forward digitalization initiatives."*

Even though the selected case companies operate in diverse B2C markets, they individually combine group-wide resources to handle corporate DT efforts successfully. Moreover, the analyzed empirical data uncovers that DT strategies follow a threefold approach, namely: (1) novel organizational structures, (2) process-related modifications, and (3) data management and analysis.

5.4.1 Novel Organizational Structures

Overall, our empirical data analysis reveals that changes in organizational structures are a core building block within DT strategies. The interviewed case companies adjusted organizational structures and traditional workflows, for example, by enhancing top-level support for DT or implementing centralized digitalization teams.

General agreement across the case companies exists that top-level support is necessary to establish the required amount of relevance for DT, especially through the hierarchy. In this regard, Sensor&Health summarized that *"the top management must clearly and transparently communicate digital transformation, otherwise – no chance."* However, Merchant&Company added that *"processual experts are usually located at lower hierarchical levels in an organization."* Therefore, the findings support the impression that DT strategies among B2B and B2C case companies are initiated 'top-down' and executed 'bottom-up.'

Furthermore, we discovered that most case companies integrated centralized digitalization teams, which structure, organize, and design DT initiatives. Albeit, the primary focus distinguishes to some extent within B2B and B2C case companies. Truck&Trailer mentioned that they *"established a centralized team focusing entirely on digital services, processes, and mindsets."* In this vein, another interview partner at Car&Company highlighted that *"one single team cannot handle corporate digital transformation projects."* When further talking about the structure of the teams, the interviewee described an interdisciplinary team structure by outlining a concrete example (Car&Company):

> *"Within the project of 'On Demand Car Functions' we established an interdisciplinary team structure, whereby experts of various departments led the topic and reported directly to the committees. As a result, we finished this project successfully and quickly at the same time."*

In this context, Tyre&Technology pointed out that the company introduced digital solution teams, which are closely connected to the top management. More specifically, Sensor&Health underlined the significance of centralized digitalization teams by displaying another core objective. According to the interviewee, digitalization teams establish flatter hierarchies and agile working methods such as design thinking, rapid prototyping, or scrum. The shift from a *"classical pyramid structure"* towards a more flexible form of organization is *"inevitable"* as the environment in B2B markets changes rapidly (Sensor&Health).

Contradicting to the aforementioned industries, our interviewee at Merchant&Company mentioned that the organization implemented a decentralized digital transformation team with intimate connections to the top management. However, the transformation team has "*no authority to give instructions, which creates challenges as conflicts of objectives arise"* (Merchant&Company). Furthermore, the principal focus lies on the expansion of digital services towards stronger customer centricity and organizational-wide transparency of processes.

In addition, the findings reveal that independent business units or innovation contests are used to drive DT initiatives. In this context, the analyzed case companies utilize cross-functional steering groups across various hierarchical levels. For instance, Sensor&Health compiles "*content-driven steering groups that are independent of organizational structures to develop products based on start-up concepts."* However, we further investigated similarities between companies rooted in various sectors and diverse business relationships. In this vein, Car&Company and Platform&Service developed similar innovation contests, as they execute *"Think-Big"* competitions and *"Think-Tanks"* with a strong focus on customer centricity.

5.4.2 Process-related Modifications

The findings further unveil that process-related modifications are a core ingredient of DT strategies. In this regard, we detected two aspects: (1) lean processes and (2) enhanced cross-organizational collaborations.

In terms of lean processes, we identified that the analyzed case companies modify and adjust their inter-organizational processes to react more rapidly to a fast-changing environment, enhance transparency among business units and integrate customer-centric procedures. The interview participants in B2B case companies characterized that digital technologies lead to the implementation of novel IT systems and redesigned processual techniques. This becomes explicitly apparent in the following statement (Sensor&Health):

> *"Nowadays, we cannot plan a multi-year project in detail, because the environment changes too quickly. Hence, we use the VUCA-Method to design new products and services. Basically, this means that we build a product or service without knowing the exact outcome."*

The interviewees further exhibited that advanced IT technologies in combination with the VUCA-Method lead to increased transparency among business units and departments. In this light, Tyre&Technology underlined this perspective by stating that *"digital technologies are used to outline organizational processes transparently."* In contrast, Car&Company slightly shifted the perspective away from processual transparency towards more diversified skill sets of employees. Accordingly, the interview partner noticed that "*job specifications move towards quality assurance and customer centricity"* (Car&Company). Furthermore, the case companies in B2C relationships equally punctuated towards the design of new sales channels that primarily concentrate on customer centricity. In this context, Merchant&Company established sales channels explicitly developed to improve customer centricity. Nevertheless, the usability of digital technologies results in intensified competition, as aptly demonstrated in the upcoming statement (Merchant&Company):

> *"For instance, our customers, for example, Adidas or Nike established their own online stores. Thus, we are in direct competition in selling products and collecting customer data."*

Our findings also suggest that both B2B and B2C case companies enhance their cross-organizational collaborations. Firms operating in B2B markets equally indicated that in-depth understanding of customer processes and value-chain collaborations with suppliers is a main objective for DT strategies. This becomes noticeable in the following statement (Truck&Trailer):

> *"The organizational value-chain transforms enormously due to digital technologies and enhanced customer centricity. This means that we have to invest more resources to understand the business processes of our customers and suppliers alike."*

Additionally, we further identified improved value-chain collaborations between B2B and B2C case companies across industries. For instance, Car&Company, Tyre&Technology and Wind&Power and constantly extend their cooperation through newly-designed IT systems and digital interfaces. Besides, the e-commerce case companies operating in B2C environments already established advanced customer-related processes and mindsets. Therefore, Platform&Service referred to *"refined value-chain collaborations with suppliers to surround customer experiences and optimized online sales channels".* Oppositional, Car&Company is in the process of transforming products and services towards a stronger customer-centric orientation. In this line, our interviewee especially outlined intensified collaborations with

cross-industry enterprises. For example, *"IT companies such as Microsoft support us in developing digital solutions"* (Car&Company).

5.4.3 Data Management and Analysis

The findings also uncover that data management and analysis influence DT strategies. In particular, we discovered three dimensions that need further consideration: (1) data gathering and analysis, (2) realignment of departments and positions as well as (3) data security and legal provisions.

In general, consistency among case companies exists in terms that DT requires the collection of data from various customer interfaces, as explained in the following statement (Truck&Trailer):

> *"Customers can now evaluate machine-data to identify profitability loopholes. Our clients can further use gathered data for cost-compliance reasons and legal fulfillments."*

Furthermore, another interviewee at Platform&Service demonstrated that by utilizing advanced digital technologies we *"offer personalized products and services."* In this vein, Tyre&Technology underlined this viewpoint, as the interview partner referred to *"data-driven business models."* Sportswear displayed that collecting and analyzing customer data is key *"for offering the right products for the right market segments."* In addition, unanimity consists among interview participants that advanced data management and analysis result in readjustments of inter-organizational departments and the creation of newly designed positions. More precisely, Car&Company, as a premium automobile manufacturer, established particular divisions concentrating entirely on digital technologies, data management and analysis as well as IT infrastructure. Our interviewee pointed out that "*positions as Chief Digital Officer or Chief Software Officer"* are newly introduced into the firm (Car&Company). Lastly, interviewees across B2B and B2C case companies consistently recognized the universal trend of data security and legal provisions. In detail, this means that corporates around the world have to deal with a growing tendency of legal foundations targeting data and data security, as exemplified by Platform&Service:

> *"Currently, digital transformation projects focus primarily on processes and cultures. In the future, data gathering, data analysis, and data security will receive higher attention."*

This finding overlaps with the results of the initial interviews conducted with leading consultants in the field of DT.

5.5 Key Success Factors for Digital Transformation

This subchapter displays the findings of our empirical data analysis that reveal KSFs for turning DT into business practices. Particularly, we identified five categories across the analyzed B2B and B2C case companies, namely: (1) top management support, (2) flatter hierarchies and cross-functional collaborations, (3) intensified people management, (4) utilizing data and digital technologies as well as (5) customer-centric key performance indicators (hereafter KPIs).

5.5.1 Top Management Support

To start with, our interview partners across the selected case companies consistently emphasized the relevance of top management support throughout diverse business units and various hierarchical levels. In this vein, Car&Company stated:

> *"The top management needs to be aware of the significance of this subject to ensure the necessary assistance. Managers in leading positions have to understand external contributing factors."*

Furthermore, Sensor&Health underlined the above statement by outlining that *"the top management needs to define priorities and strategic guidelines to organize digital transformation initiatives."* The same interview participant further pointed towards DT procedures as *"highly emotional"* mainly due to changing job specifications, which can lead to *'turmoil'* among employees (Sensor&Health). Additionally, Sportswear experienced that various DT initiatives "*did not stick*" until a new CEO recognized the importance and supported them on a top-level basis. In this context, Platform&Service and Car&Company referred to *"top-level support"* and *"a certain degree of flexibility,"* which relates back to interdisciplinary team structures. As the interviewee at Car&Company accurately summarized:

> *"We have to make those involved concerned and vice versa."*

5.5.2 Flatter Hierarchies and Cross-Functional Collaborations

In regards to organizational KSFs, our findings disclose that flatter hierarchies and cross-functional collaborations are integral parts of DT among the chosen case companies. In particular, case companies operating in B2B markets are in the midst of adjusting their traditional organization and governance structures to a stronger customer-centric orientation.

As an example, our interviewee at Sensor&Health referred to *"informal content-driven"* team structures, which are functioning independently from *"classical organizational charts."* Another interview partner at Truck&Trailer underlined this viewpoint and outlined the *"changing modes of operations."* Accordingly, experts from various departments are *"consolidated"* into project teams to execute intensified *"short-term sprints,"* thereby, exercising cross-functional competencies.

Contrary, Merchant&Company, recently converted its core business focus from being an online retailer towards a platform provider. In this context, the organization transformed the predominant *"silo-thinking"* into a *"value-stream orientation."* Moreover, Platform&Service, as a worldwide leading online-retailer, embedded cross-functional working approaches, and value-stream designs into its organizational *"leadership principles."*

5.5.3 Intensified People Management

Our findings show that the interview participants across B2B and B2C case companies revealed people management as a crucial factor. In this context, Platform&Service established a *"failure culture,"* which is displayed in the following statement:

> *"We prefer to start ten projects in the hope to develop one successful product or service. Thus, we accept to have nine unsuccessful projects."*

The interviewee further explained that a *"digital mindset"* combined with *"lean management"* leads to empowerment of employees. In this light, Tyre&Technology highlighted that *"employees across departments have to be encouraged and supported during digital transformation projects."* Furthermore, another interview respondent at Truck&Trailer clearly stated that:

> *"People need support during digital transformation projects. As a company, we have to take away anxiety. Digitalization is commonly seen as dangerously."*

Additionally, insights from Car&Company and Platform&Service point towards innovation contests such as *"Think-Big competitions"* or *"innovation workshops"* that strengthen digitalization initiatives and involves the participation of employees from diverse business units.

5.5.4 Utilizing Data and Digital Technologies

Another finding displays that data management and digital technologies are equally utilized throughout B2B and B2C case companies and strongly facilitate DT. For instance, Platform&Service and Merchant&Company gather customer data through e-commerce, online advertising, or cloud technology to advance and personalize their offerings. In contrast, Tyre&Technology and Truck&Trailer collect vehicle data by using sensors and advanced telematics systems. Wind&Power utilizes data from various sensors in wind turbines. In combination with weather forecast and data from the electricity grid, turbine-operations become more effective and also financial planning can be optimized for the operating companies. In the case of Sensor&Health, data analytics is crucial to improve the "*service factor*" of products resulting in "*differentiation and advanced value for customers*." For example, anesthesia machines that can measure and analyze medical data-points to better inform anesthetists and to predict critical situations. Hence, capabilities for utilizing data are a key factor for organizations to complement their products with intelligent services and to offer products and services that are tailored for distinct customer needs.

In addition, our analysis shows that digital technologies are another main component in DT projects. As such, Truck&Trailer implemented *"augmented-reality glasses"*, which are a supportive instrument for employees in manufacturing processes. Furthermore, Sensor&Health incorporated APIs to be connected with the purchasing systems of corporate clients. Lastly, Platform&Service, Wind&Power, and Car&Company make use of *"AI"*, *"Robotic Process Automation"* or *"IoT"* to optimize inter-organizational processes and to enhance the connectivity with suppliers or customers. The usefulness of advanced technologies becomes apparent in the statement below (Car&Company):

> *"First, the utilization of digital technologies enhances lead times and the transparency of processes. Second, increased performance results in higher output, which, in turn, improves the revenue."*

5.5.5 Customer-centric Key Performance Indicators

The findings also exhibit that B2B and B2C case companies do not measure the process of DT. Instead, the selected case companies explore novel opportunities in evaluating the entire enterprise based on digital technologies. In this vein, Truck&Trailer and Sensor&Health integrated new KPIs such as fixed-term contracts, extensions of contracts, or number of cancellations that primarily concentrate on customer-oriented services. Furthermore, the organizations measure the realized turnover due to the utilized digital technologies. Contrary, Platform&Service, as a leading online-based retailer, encourages the employees to submit novel innovative ideas with the overall objective of enhanced customer centricity. The submitted and realized ideas are counted and evaluated in terms of turnover and newly gained customers. In addition, Sportswear uses data analytics to measure a net-promoter score, which indicates the customer willingness to recommend the companies' products. The overall objective is to enhance the customer journey and customer experience by shifting the focus away from short-term financial measures. Therefore, managers on different levels are incentivized with the net-promoter score.

5.6 Summary of Findings

Our empirical data presentation displays the five main findings of this research study: (1) digital transformation has various understandings, (2) digital transformation alters the customer perspective of organizations, (3) digital transformation as promoter for business model changes, (4) digital transformation strategies, and (5) key success factors for digital transformation.

The first finding uncovers that none of the case companies possess a systematic definition, nor a distinction between digitalization and DT. In this line, digitalization was commonly applied interchangeably with DT. Nevertheless, the analyzed interview statements displayed that the case companies are well-informed about the overall subject area. In particular, employees that are assigned with organizational DT are aware of the conceptual building blocks.

The second finding reveals that the interviewed case companies are aware of the influences of DT. Both B2C and B2B case companies constantly mentioned 'customer centricity' as a key objective to act upon. On the one hand, B2C case companies collect and analyze data to improve customer experiences, segment markets, and offer personalized products or services. On the

other hand, B2B case companies exploit data interfaces with customers to offer advanced customer-centric services that complement their existing range of products. In this vein, B2B case companies concentrate increasingly on recurring business relationships.

The third finding unravels that DT promotes business model changes. In this regard, organizations offering a physical product range utilize digital technologies and capabilities to complement their existing business model. Frequently, business model adaptations comprise a service-related component that is based on advanced data analytics and aims to enhance the customers' value. In particular, driving factors of business model adaptations are changed customer expectations and increased competition, forcing companies to act to remain competitive in a digitalized business environment. Contrary, case companies with digital business models are even more affected by DT. Evolving digital trends and technologies have a disrupting impact on case companies with a digital business model. As a result, the case companies experienced vigorous organizational transformation by disrupting or leveraging its core business model. Accordingly, DT requires digital service-oriented companies to adjust their traditional business models towards optimized digital-savvy solutions.

The fourth finding displays that DT strategies vary within and across B2B and B2C case companies. Companies operating in corporate groups combine group-wide resources to establish unified DT strategies. Furthermore, our analysis shows that three out of four B2B case companies have not implemented a corporate DT strategy and rather execute a functional business unit strategy. Contrary, B2C case companies prefer to integrate corporate DT strategies. In addition, we discovered that the case companies integrated various inter-organizational adjustments such as top-level digitalization support, centralized digitalization teams as well as strategy workshops and innovation contests. With regards to process modifications, the analysis unveiled that B2B case companies utilize digital technologies to broaden collaborations with suppliers and to establish a stronger customer-centric processual viewpoint. In contrast, B2C case companies make use of digital technologies to optimize value-chain collaborations and to develop newly designed online sales channels that strengthen customer experiences. Lastly, intensified data management and analysis also influence DT strategies. In this vein, organizations design individualized products and services based on analyzed data and realign departments as well as positions that tackle the growing tendency of legal foundations towards data security.

The fifth finding shows that the analyzed B2B and B2C case companies concentrate on similar KSFs to turn DT into business practices. Albeit, the primary focus distinguishes to some extent within the B2B and B2C case companies. First, top management support was mentioned as a crucial component. In this context, the case companies referred to defined c-level guidelines and priorities as well as organizational flexibility. Second, another KSF relates to flatter hierarchies and cross-functional collaborations. The case companies strive to dissolve organizational silos and reporting structures to promote agility, speed, and flexibility and to enhance the effectiveness of digital and collaborative work methods. Third, our analysis displays that intensified people management is a further unified KSF. In this context, the chosen case companies referred independently from each other to organizational workshops, innovation contests, digital mindsets, and lean management procedures. Fourth, we discovered that utilizing data and digital technologies underpin DT initiatives. Each case company exploits data to offer personalized products and services. In addition, making use of advanced digital technologies results in enhanced lead times, higher outputs and improved processual transparency. Finally, our research study indicates that organizations do not measure the DT process. Instead, they integrate customer-centric KPIs. Hence, while B2B case companies adjust their inter-organizational KPIs towards a stronger customer-centric orientation, B2C case companies focus on KPIs that assess the customer experience.

A detailed overview of the findings is displayed in *Table 7&8.*

Table 7: Summary of Findings – B2B Case Companies

Case company:	**Truck&Trailer**	**Tyre&Technology**	**Sensor&Health**	**Wind&Power**
Customer focus: Core products & services: Industry classifications:	B2B Analog products Automotive	B2B Analog products Auto Parts and Equipment	B2B Analog products Medical and Safety Equipment	B2B Analog products Power Generation Equipment
1. Digital transformation as an undefined concept	• No clear organizational definition • Understanding: technology utilization process automatization, customer focus	• No clear organizational definition • Change from analog towards digital business models	• No clear organizational definition • Influences product portfolio, customer interface, processes and hierarchies	• No clear organizational definition • Data utilization • Data-driven services
2. Digital transformation alters the customer perspective of organizations	• Enhanced customer centricity by utilizing digital technologies • Enhanced product personalization	• Enhanced customer centricity by utilizing digital technologies	• Enhanced customer centricity by utilizing digital technologies	• Enhanced customer centricity by utilizing digital technologies
3. Digital Transformation as promoter for business model changes	• Focus on service-related and data-driven business models • Cargo-loading optimization	• Focus on service-related and data driven business models • Telematics	• Focus on service-related and data driven business models • Intelligent and connected equipment	• Focus on service-related and data driven business models • Smart power generation and wear-out forecasting
4. Digital transformation strategies	• Corporate DT strategy • Utilizing group-wide resources • Long-term DT strategy is unrealistic	• Ideal DT strategy not yet identified • Functional business unit DT strategy • Corporate DT strategy is preferred	• Ideal DT strategy not yet identified • Functional business unit DT strategy • Corporate DT strategy is preferred	• Ideal DT strategy not yet identified • Functional business unit DT strategy • Corporate DT strategy is preferred
Novel organizational structures	• Centralized DT team • Digital services • Digital processes • Digital mindsets	• Centralized digital solution team • Closely connected to C-Level	• Top management support • Top-down DT communication • Flatter hierarchies • Content-driven steering groups	• Functional teams for DT initiatives
Process-related modifications	• Redesigned processual techniques • Utilizing advanced IT technologies • Transparency of processes • Intensified value-chain collaborations • Understanding customer processes	• Utilizing advanced IT technologies • Transparency of processes • Intensified value-chain collaborations • Understanding customer processes	• Redesigned processual techniques • VUCA-Method • Utilizing advanced IT technologies • Transparency of processes • Intensified value-chain collaborations • Understanding customer processes	• Redesigned processual techniques • Utilizing advanced IT technologies • Transparency of processes • Intensified value-chain collaborations • Understanding customer processes
Data management and analysis	• Data gathering and evaluation • Personalized products and services • Newly designed divisions and jobs	• Data gathering and evaluation • Personalized products and services • Newly designed divisions and jobs	• Data gathering and evaluation • Personalized products and services • Newly designed divisions and jobs • Data security and legal provisions	• Data gathering and evaluation • Newly designed divisions and jobs
5. Key Success Factors				
Top management support	• Organizational flexibility	• Defined priorities and guidelines	• Defined priorities and guidelines	• Organizational flexibility
Flatter hierarchies and cross-functional collaborations	• Changing modes of operations	• Interdisciplinary team structures	• Informal team structures	• Changing modes of operations
Intensified people management	• Taking away digital anxiety	• Encouragement of employees	• Innovation contests	• Organizational workshops
Utilizing data and digital technologies	• Personalized products & services • Enhanced lead times • Higher output	• Personalized products & services • Improved processual transparency	• Personalized products & services • Enhanced lead times • Higher output	• Personalized products & services • Improved processual transparency
Customer-centric key performance indicators	• Not measuring DT • Fixed-term contracts • Extensions of contracts • Number of cancellations	• Not measuring digital Transformation	• Not measuring DT • Fixed-term contracts • Extensions of contracts • Number of cancellations	• Not measuring DT

Table 8: Summary of Findings – B2C Case Companies

Case company:	**Car&Company**	**Merchant&Company**	**Platform&Service**	**Sportswear**
Customer focus: Core products & services: Industry classifications:	B2C Analog products Automotive	B2C Digital services E-Commerce	B2C Digital services E-Commerce	B2C Analog products Apparel
1. Digital transformation as an undefined concept	• Focus on digital products and services • Transparency and collaboration	• No clear organizational definition • Business model transformation • Customer focus	• Defined in organizations' leadership principles and embedded in vision • Customer focus • Digital business models	• No clear organizational definition • Customer focus
2. Digital transformation alters the customer perspective of organizations	• Enhanced customer centricity by utilizing digital technologies • Transport capacity at the right place to the right time instead of asset sale	• Enhanced customer centricity by utilizing digital technologies • Focus on customer journey and experience	• Enhanced customer centricity by utilizing digital technologies • Customer centricity as part of organizations vision	• Enhanced customer centricity by utilizing digital technologies • Customer centric steering KPIs and incentives
3. Digital Transformation as promoter for business model changes	• Advancing the core business model • Enhanced connectivity • On Demand Car Functions	• Transformation the core business model • Platform business model	• Leveraging the core business model • Advertising and cloud-related business models	
4. Digital transformation strategies	• Corporate DT strategy • Utilizing group-wide resources • Long-term DT strategy is unrealistic	• Corporate DT strategy • Utilizing group-wide resources	• DT strategy part of long-term strategy	• Corporate DT strategy
Novel organizational structures	• Centralized DT team • Interdisciplinary team structures • Innovation contests • Think-Big competitions • Think-Tanks	• Decentralized DT team • Processual experts at lower hierarchical levels • Bottom-up DT design • No authority to give instructions	• Centralized DT team • Innovation contests • Think-Big competitions • Think-Tanks	• Innovation contests • Think-Big competitions • Think-Tanks
Process-related modifications	• Altering job specifications • Quality assurance • Customer centricity • Refined value-chain collaborations • Cross-industry cooperations	• Refined value-chain collaborations • Design of new online channels • Customer centricity	• Refined value-chain collaborations • Design of new online channels • Customer centricity	• Refined value-chain collaborations • Design of new online channels • Customer centricity • Customer-testing
Data management and analysis	• Data gathering and evaluation • Personalized products and services • Newly designed divisions and jobs • Data security and legal provisions	• Data gathering and evaluation • Personalized products and services • Newly designed divisions and jobs	• Data gathering and evaluation • Personalized products and services • Newly designed divisions and jobs • Data security and legal provisions	• Data gathering and evaluation • Personalized products and services • Newly designed divisions and jobs
5. Key Success Factors				
Top management support	• C-Level involvement • Organizational flexibility	• Failure culture	• Failure culture • Organizational flexibility	• C-Level involvement
Flatter hierarchies and cross-functional collaborations	• Cross-functional project teams	• Value-stream design	• Cross-functional project teams	• Cross-functional project teams • Value-stream design
Intensified people management	• Innovation contests	• Digital mindset & lean management • Failure culture	• Digital mindset & lean management • Failure culture	• Organizational workshops
Utilizing data and digital technologies	• Personalized products & services • Utilization of advanced technologies	• Personalized products & services • Utilization of advanced technologies • Enhanced lead times	• Personalized products & services • Utilization of advanced technologies • Enhanced lead times	• Personalized products & services • Utilization of advanced technologies
Customer-centric key performance indicators	• Not measuring DT	• Not measuring DT • Number of customer contact points • Customer journey	• Not measuring DT • Number of novel digitalization projects	• Not measuring DT • Number of customer contact points • Customer journey

6 Discussion and Analysis

In the following chapter, we aim to set our empirical findings in relation with the discussed literature to provide an in-depth analysis on how organizations turn DT into business practices. Therefore, we are applying research-based findings and the condensed framework from the literature review. The objective of our discussion is to provide insights to turn DT into business practices.

6.1 Digital Transformation as an Undefined Concept

The results of the interviews show that none of the case companies established an organization-wide unified understanding of the concept of DT nor the distinction between digitalization. This outcome is not surprising since the concepts are relatively new for organizations and gained momentum in the last decade. Also, the analysis of the literature displayed that scholars have a variety of understandings while describing the concept of DT. Nevertheless, organizations are aware of specific building blocks and the impacts of DT. Most of the case companies are aware that DT redefines the traditional way of doing business, as highlighted by Lucas et al. (2013). Especially, the definition of Hess et al. (2016), which underlines the influence on business models, resulting in “changed products, organizational structures or in the automation of processes” (p.124) is in line with our empirical findings. By taking into consideration academic definitions and the conducted interviews with the case companies as well as consultancies, we suggest to define DT as follows: “digital transformation is about the utilization of digital technologies and data in order to advance organizational products, services, and internal processes that impact strategies, business models and hierarchical structures."

The importance of approaching DT holistically and having a defined understanding underpinned with a digital vision is highlighted by Westerman et al. (2011). Also, Bowersox et al. (2005) state that an overarching understanding is important in order to exploit the full potential of DT. When generalizing the finding that DT is an undefined concept for most organizations, it becomes apparent that organizations are likely to benefit from communicating a unified definition in combination with a vision and specified practical implications of DT.

6.2 Customer Centricity as Key Objective of Digital Transformation

Our empirical data shows that customer centricity is a key objective for organizations that act upon DT. The general importance of customer centricity within the concept of DT is also supported by a variety of scholars and is particularly displayed in the studies of Li (2015), Piccinini et al. (2015) and Westerman et al. (2011). However, to understand the components and effects of customer centricity within the concept of DT, we begin this subchapter by discussing fundamental factors explaining why customer centricity is a key objective. To connect our empirical findings with the literature, we apply our DT framework, which is based on previous studies and condenses common concepts of DT (*Figure 1*).

The framework proposes that digital technology is a basic factor that triggers changed customers expectations. In accordance with Lucas et al. (2013) and Piccinini et al. (2015), customers increasingly integrate digital technology in their daily lives. As a result of a higher digital density, customers become more informed, connected, and flexible, which increases market transparency. Our empirical findings support this notion. In particular, the B2B and B2C case companies recognized that digital technologies increase market transparency and democratize information among customers. This enables customers to assess a firm's offering more easily and to expect a higher and more differentiated value when purchasing a firm's product or service. In the following, changed customer expectations trigger digital innovation. Most notably, organizations react to changed customer expectations by reinventing customer relationships that are based on digital innovation, as described by Westermann et al. (2011) and further specified by Berman et al. (2016) and Nylén and Holmström (2011). The empirical findings confirm that organizations strive for digital innovation in order to react upon changed customer expectations. Thus, the results indicate that B2C case companies focus on enhanced customer experience and personalization, while B2B case companies concentrate on advanced services by utilizing data and data interfaces. Additionally, digital technology is an enabling factor for digital innovation. To innovate digitally, digital technologies need to be utilized in an organizational context, as indicated by Berman et al. (2016) and Kavadias et al. (2016). This is supported by our findings, which highlight the need for advanced data analytics and technologies. To facilitate digital innovation, the analysis of our empirical findings suggest that customer centricity is a key objective for organizations to focus on. However, as dimensions of

customer centricity differ between B2C and B2B case companies, the findings will be discussed separately.

Customer Centricity in B2C Organizations

Changed customer expectations pressure organizations to further differentiate their product and service offerings to maintain customer loyalty and to attract new customers. To achieve an advanced differentiation level, particularly B2C case companies collect and utilize data to split market segments more precisely. In accordance with Kurniawati et al. (2013) and Westerman et al. (2011), customer data and analytics technology became key resources to enhance customer centricity. In this regard, the B2C case companies concentrate on flexible and personalized products and services to better fulfill customer needs, which Piccinini et al. (2015) highlight as the emergence of individualized and hyper-differentiated offerings. Moreover, B2C case companies utilize data to optimize the customer journey, which is in line with previous findings of Corver and Elkhuizen (2014) and Piccinini et al. (2015). Accordingly, this means that firms strive to enhance customer experiences, while customers following a path of touchpoints with a firms purchasing offer before making a buying decision. Conclusively, our findings from B2C case companies confirm the insights of the conducted literature and underline the importance of customer centricity within the concept of DT.

Customer Centricity in B2B Organizations

While B2C case companies enhance customer experience and personalization, our findings from B2B case companies indicate that firms increase customer centricity by utilizing data for complementary services and advanced interfaces. Based on our findings, we argue that B2B case companies follow a different approach to advance customer centricity, as stated in the reviewed literature. Instead of leveraging channels, experience, and individualization, the findings indicate that B2B case companies concentrate on advancing recurring business relations. In line with Piccinini et al. (2015), we found that B2B case companies have recognized that due to an increasing digital density, businesses would rather pay a premium price for complementary data-driven services and analytic capabilities, than to solely purchase an asset. In a B2B environment, organizations can tighten customer relationships by advancing interfaces with customer's purchasing processes. For instance, democratizing data between organizations within a value chain can enable automated reorders and decreases slack time. This is in line with Bharadwaj et al. (2013), who state that digital technologies lead to increased

interdependencies between organizations as well as Bowersox et al. (2005), who argue that the supply chain is an ecosystem of interconnected organizations. We found that B2B case companies enhance customer centricity by facilitating digital capabilities in two ways. First, organizations advance the connectivity of their products by integrating them in customers data-driven steering processes. In the case that organizations offer after-sales services, the gathered data can be used to optimize their timing and efficiency. Second, organizations integrate data analytics capabilities within products to support operators with intelligent information. Thereby, products are enabled to autonomously analyze data points and to provide condensed or predictive information. Overall, we found that B2B case companies strengthen customer centricity by utilizing digital technologies. As the retrieved literature predominantly focuses on B2C organizations, we identify a research gap, which this finding addresses.

To summarize, our empirical findings indicate that while customer centricity is a key objective for DT, it differs in its configuration among B2C and B2B case companies. Furthermore, our findings from B2C case companies confirm the results of the retrieved literature. Contrary, our findings from B2B case companies have not been extensively discussed in the reviewed literature. Therefore, the different approaches from B2B case companies imply that further research focusing on impacts of DT on B2B customer relations would contribute to an augmented understanding of the concept of DT. Overall, our findings of how organizations advance customer centricity with digital technologies have implications for managers of both, B2C and B2B organizations. Particularly, managers from B2B organizations should be aware that generalized recommendations regarding customer centricity might not apply to the needs of their customers.

6.3 Digital Transformation Leverages Data-Driven and Service-Related Business Models

In the previous section, we found strong indications that digital technology in combination with a focus on customer centricity leads to higher service-orientation and data-driven product extensions. This facilitates new business opportunities that leverage organizations' business models, as further discussed in the upcoming paragraphs. The section begins by applying the derived DT framework from the literature on our empirical findings.

In the previous chapter, we exhibited that digital technologies and changed customer expectations influence digital innovation. Thereby, we found that customer centricity is a key objective for organizations to focus on. Consequently, organizations innovate on service-related and data-driven business models that can leverage the phenomenon of DT in two ways. Following the framework, DT is defined as the process of devising business applications by utilizing digital capabilities and digitized data. First, digital innovation generates new business opportunities that leverage DT. This causal effect is in line with academia. For example, Hess et al. (2016) argue that new digital technologies change organizational business models. Our analysis confirms that new digital technologies, in particular data-driven innovations, generate new business opportunities. Second, digital innovation facilitates industry disruption, which further leverages DT. Shirky (2008) underlines that the more a business model depends on information as a core product, the higher will be the transformative impact. In comparison, our analysis depicts that particularly organizations with digital business models are affected by disruptive digital innovations driving DT. In this vein, our findings suggest that DT has different effects on business models depending on whether the organization has an analog or digital core product. Consequently, we separately discuss the differing implications on business models in the subsequent sections, which we identified as one of the five building blocks in the condensed DT framework.

Business Model Transformation in Organizations with Analog Core Products

Our empirical data indicates that both organizations with analog and physical core products react to DT by complementing their product offer with data-driven and service-related offerings. Often, organizations are pressured by stagnant growth of traditional cash cows, for which reason they are increasingly considering new ways to generate revenue, as Li (2015) confirms. Across our case companies, we observed a range of respective business model adaptations. On the one hand, organizations extend their business models by selling new products that focus on data utilization. Thereby, new data-driven products can enhance the value of traditional products by optimizing its use or enhancing related processes and workflows. On the other hand, organizations augment their focus on customer needs. Our case companies explained that their customers prefer purchasing a problem-solving service rather than a product they can use to solve the problem themselves. Following this aspiration, organizations focus increasingly on providing services instead of traditional product development. For this purpose, organizations facilitate advanced data-driven product

components and interfaces, for example, to connect products to a broader ecosystem, to enable pay per use and licensing models or to predict outcomes which decreases the need for manual interactions. These exemplary initiatives are in line with the evolutions in product development, described in the framework of Corver and Elkhuizen (2014). As our analysis shows, such business model adaptations enable organizations to create additional value and to generate new revenue streams. However, it also provides mature digital companies and startups with an opportunity to gain market share in new industries by offering complementary data-driven services.

Business Model Transformation in Organizations with Digital Core Products

Our data analysis reveals that two case companies with digital business models experienced a greater influence of DT on their business models. Instead of adapting their business model digitally, the organizations were impacted by disruptive changes, as commonly observed in the literature (Bughin & Zeebroeck, 2017; Schwab, 2017; Weill & Woerner, 2015; Zammuto et al. 2007). Our empirical data suggest that this is due to the fact that digital service-related business models are more sensitive to new digital trends as they can be easier replaced than analog and asset-intensive business models. Therefore, organizations benefit from quicker reaction time to sustain a successful business model and to secure future revenue streams. Our analysis indicates that permanent trend-screening and regular assessments of current and new business models can support organizations to uncover disruptive trends. Furthermore, organizations can leverage their existing digital business models by experimenting with new ones simultaneously. However, in some situations, organizations might need to disrupt their own digital business model by following a new trend. Hence, it is crucial to determine the optimal timing to change the current and potentially still profitable business model.

In conclusion, our empirical findings display that DT promotes business model changes towards data-driven and service-related business models. Thereby, we confirm the literature proposing that DT has disruptive impacts on traditional business models, particularly with regards to organizations that have highly digitalized core business models. Hence, a detailed understanding of future digital trends, restructuring capabilities, and change-affinity are vital for sustainable business development. Contrary, organizations with analog business models react by adjusting or extending their business models conforming with the impacts of DT. For this purpose, both, a precise understanding of customer needs and capabilities to utilize data are crucial to successfully advance business models.

6.4 Digital Transformation Influences Strategies and Modifies Organizational Structures

Our analyzed empirical data displays that DT affects corporate strategies as well as organizational structures and processes. As described, the findings indicate that B2B and B2C case companies have partially established diverse strategic approaches towards DT. In particular, most B2B case companies utilize functional DT strategies on business unit level. Accordingly, individual business units within organizations establish separate strategies to realize DT. Nevertheless, our results indicate that the selected B2B case companies are in the process of consolidating business unit strategies into unified corporate digitalization strategies. Hence, we argue that the interviewed B2B case companies follow a dual strategic approach: (1) continuing the primary focus on their core business and (2) seeking growth opportunities within their specialized functions across other industries, which is in line with Berman and Marshall (2014). Contrary, the findings further discover that B2C companies execute unitary corporate DT strategies. Furthermore, companies operating in corporate groups combine group-wide resources to integrate standardized DT strategies. Conversely, this means that a DT strategy is an integral part of the corporate strategy among the B2C case companies. As such, Matt et al. (2015) outline that DT strategies encompass operational and functional strategies. Additionally, the literature further sustains our findings within the B2C case companies that digital strategies are incorporated as independent pillars within corporate strategies (Hess et al. 2016, McDonald, 2012, Westerman et al. 2011).

The findings along the interviewed B2B and B2C case companies also reveal that DT strategies redesign organizational structures. To begin with, most case companies integrated top-level DT support through intensified c-level involvement. Next, most of the B2B and B2C case companies established centralized digitalization teams to organize and structure DT. This is in line with Bughin and Zeebroeck (2017), Tolboom (2016) as well as Weil and Woerner (2015), who found that organizational structures are influenced by DT across industries. In this context, the analyzed empirical data uncovers that the primary focus of the centralized digitalization teams is based on corporate-wide execution of digitalization projects, the integration of interdisciplinary team structures, flatter hierarchies and agile working methods as well as innovation workshops. Thus, our results are in accordance with Zammuto et al. (2007), who argue that traditional hierarchical structures are changed towards more flexible configurations. Furthermore, our findings support the statements of Fitzgerald et al. (2013) and Westerman et

al. (2011), who demonstrate that the advanced dissemination of digital technologies generate a higher degree of inter-organizational collaborations and flatter hierarchical structures.

The empirical data further suggests that DT strategies shape process-related modifications within organizations. With regards to the conducted analysis, we observed that lean processes and enhanced cross-organizational collaborations create the main processual building blocks across the interviewed B2B and B2C case companies. In terms of lean processes, our analysis unveils that the case companies modify and adjust their inter-organizational processes to react more rapidly to fast-changing environments, enhance transparency among business units and integrate specified customer-centric procedures. Most notably, firms in B2B markets characterized that digital technologies lead to the implementation of novel IT systems and reorganized processual techniques (e.g. VUCA-Method). This supports Westerman et al. (2011), who argue that DT initiatives reshape organizational processes towards enhanced flexibility and inter-organizational transparency. Furthermore, the B2B case companies explicitly highlighted the importance of in-depth understanding of customer processes and connected interfaces. In addition, B2C case companies repeatedly referred to the design of new online sales channels that mainly concentrate on customer centricity. Hence, our findings are consistent with Agarwal and Dhar (2014), who suggest that DT leads to streamlined processes and enhanced interaction with core customers. In terms of cross-organizational collaborations, the results display that B2B and B2C case companies intensify working relationships with suppliers. In particular, the chosen case organizations utilize newly designed IT systems and digital interfaces to be automatically connected to their suppliers. Moreover, B2B and B2C case companies are cooperating with leading tech-savvy organizations to develop digital solutions. Again, our findings are in line with the literature, as Bharadwaj et al. (2013) argue that IT infrastructure and software result in increased connectivity among businesses. In this vein, Westerman et al. (2011) further debate that digital technologies resolve the restrictions of one-way communication and knowledge distribution by enabling detailed and unrestricted collaborations.

Lastly, the findings uncover that data management and analysis build another focal point of DT. First, the examined B2B and B2C case companies utilize advanced technologies to gather and analyze data. Correspondingly, the received information is used to tailor market segments and to offer personalized products and services, in line with Davenport (2014). Second, our empirical data reveals that advanced data management leads to readjustments of inter-

organizational departments and enables new job specifications. In this context, B2B and B2C case companies refer to newly designed data analytics departments and employment vacancies such as ‘Chief Digital Officer’ or ‘Chief Software Officer’. According to Loebbecke and Picot (2015), DT causes skillset shifts and offers new job opportunities, which is supported by our findings. Third, the interviewed B2B and B2C case companies notified the universal trend of data security and legal provisions. In particular, enhanced data management and data analytics lead to fast-growing legal foundations of data security. This means that globalized guidelines and legislations in terms of data protection and data affiliation become important issues in B2B and B2C markets.

In conclusion, our empirical findings confirm the condensed framework of the literature that DT affects corporate strategies as well as organizational structures and processes. However, the strategic approaches towards DT partially vary among the analyzed B2B and B2C case companies. While B2B case companies utilize functional business unit strategies, B2C case companies prefer to execute unified DT strategies that build an integral part of corporate strategies. However, the B2B case companies indicate that DT strategies on a corporate level would be beneficial for implementing aligned initiatives to overcome silo-thinking. Furthermore, we identified that DT influences organizational structures and building blocks. In particular, centralized digitalization teams, interdisciplinary team structures, flatter hierarchies and c-level involvement are key elements of DT strategies. In addition, our study confirms the literature that DT triggers processual modifications within organizations. In this context, B2B and B2C case companies redesign operational processes to adapt quickly to fast-changing environments, enhance transparency among business units, integrate customer-centric procedures and improve value-chain collaborations across industries. Nevertheless, our findings further reveal that data management and analysis are relevant thematic areas of DT. In this vein, the influencing factors of fast-growing legal provisions of data protection and affiliation are subjects of high interest, which with regards to our conducted literature review, have not been studied intensively in academia yet. Consequently, we argue that further research in the field of corporate data security would contribute to a better understanding of DT.

6.5 Key Success Factors for Implementing Digital Transformation

The evaluated empirical data indicate that DT requires organizational KSFs. To begin with, our findings display that both B2B and B2C case companies are making use of similar KSFs to implement DT strategies. Nevertheless, the focal areas vary among B2B and B2C case companies.

First, our findings display that the B2B and B2C case companies repeatedly referred to top management support. On the one hand, our empirical data shows that B2B case companies recognized the importance of organizational flexibility as well as defined priorities and guidelines through intensified top management support. On the other hand, B2C case companies shifted the attention towards general c-level involvement and the integration of a failure culture. Thereby, the patterns we detected in our data align with Matt et al. (2015), who found that top management support, the execution of transformative leadership guidelines as well as the active involvement of executive leadership is crucial for the transformation process. Furthermore, our findings endorse de la Boutetière et al. (2018), who argue that digital-savvy leaders are needed to execute transformative processes. Moreover, Westerman et al. (2011) debate that the integration of a failure culture constitutes an integral part of top management support during DT.

Second, based on our findings, we uncovered that flatter hierarchies and cross-functional collaborations build an inherent component of DT among the B2B and B2C case companies. As described, firms competing in B2B markets tailor their traditional organizational focus towards customer centricity. In particular, this means that the analyzed businesses adopt operational processes to receive a higher degree of flexibility and intensify the implementation of interdisciplinary team structures. Furthermore, our study confirms Kavadias et al. (2016), who demonstrate that DT encourages the redesign of traditional hierarchical models and integrates a stronger mentality of agility, which leads to faster decision-making processes. In this vein, Bowersox et al. (2005) further underscore our findings by arguing that DT requires organizations to quickly adjust their operations. Beyond that, our analysis displays that B2C case companies utilize cross-functional collaborations and integrate value-stream designs into their organizational structures. This finding supports Westerman et al. (2011), arguing that partnership networks distribute impactful expertise leading to powerful collaborations.

Third, our analysis unravels that intensified people management is an additional KSF across the B2B and B2C case companies. To begin with, the case companies homogeneously pointed towards organizational workshops and innovation contests to encourage employees to participate in DT initiatives. Therefore, our results partially underpin Westerman et al. (2011), who argue that an entrepreneurial culture supports DT. Next, our analysis displays that a digital mindset and lean management lead to further encouragement of employees. In this context, de la Boutetière et al. (2018) recommend empowering employees and reinforcing new behaviours during DT, which is in line with our findings. However, we argue that further research should focus on the potential transformative effect of DT on behavioral patterns, as this would contribute to an enhanced understanding of corporate governance and change management.

Fourth, our findings reveal that utilizing data and digital technologies support DT. In accordance with Kavadias et al. (2016), organizations offer more personalized products and services by making use of advanced digital technologies. Our analysis from B2B and B2C case companies confirms this finding, as multiple respondents stressed the importance of individualized products and services, data analytics and progressive technologies such as 'AI' or 'IoT'. Furthermore, our results show that data analytics and digital technologies lead to processual transparency, enhanced lead times and higher outcomes. In addition, digital interfaces enable a stronger connectivity between manufacturers and suppliers. This finding supports Westerman et al. (2011) and de la Boutetière et al. (2018), arguing that digitalized product innovations and interfaces facilitate a higher degree of connectivity between companies. With regards to the retrieved literature, we argue that further research in the field of data and digital technologies should focus on how advanced data analytics techniques could guide DT processes. Potential findings could have managerial implications and be of relevance for organizations that are in the early stages of DT.

Fifth, our analysis demonstrates that the B2B and B2C case companies established customer-centric KPIs. Furthermore, the B2B and B2C case companies do not measure the process of DT. On the contrary, the case companies develop novel measurement systems, within the process of DT, to evaluate achievements based on newly integrated KPIs. In particular, this means that the case companies established customer-oriented KPIs such as fixed-term contracts, extensions of contracts or number of cancellations that mainly concentrate on customer-oriented services. Furthermore, data analytics enables organizations to implement advanced KPIs such as the net-promoter score, which measures the customer's willingness to

recommend the organization's products or services. In the reviewed literature, only Matt et al. (2015) tackle the subject of evaluating DT. In this context, the scholars suggest to continuously reassess DT, yet they do not provide specified guidelines or tactics. Consequently, we argue, based on our findings, that the process of DT offers an opportunity to recalibrate existing organizational KPIs towards customer-oriented KPIs. This type of assessment allows organizations to enhance the customer journey and experience by shifting the focus away from short-term financial measures.

In summary, our empirical findings confirm the condensed framework of the literature that successful DT requires certain organizational KSFs. Nevertheless, based on our analysis, we developed a set of five KSFs, which partially reflect the KSFs identified in the literature. As a first KSF, we found that top management support is critical, which reflects the literature, making the case for defined responsibility and empowering leadership. Second, we revealed flatter hierarchies and cross-functional collaborations to be vital, whereby we confirmed the retrieved literature. Third, we displayed that people management builds another component and is partially in line with a digital-savvy culture and vision. Fourth, we determined that utilizing data and digital technologies support DT. Lastly, we uncovered customer-centric KPIs as a fifth KSF. Thereby, our data confirm the relevance of customer and product knowledge, as identified in the literature, yet our analysis reveals that an advancement of such knowledge is necessary to establish customer-centric KPIs.

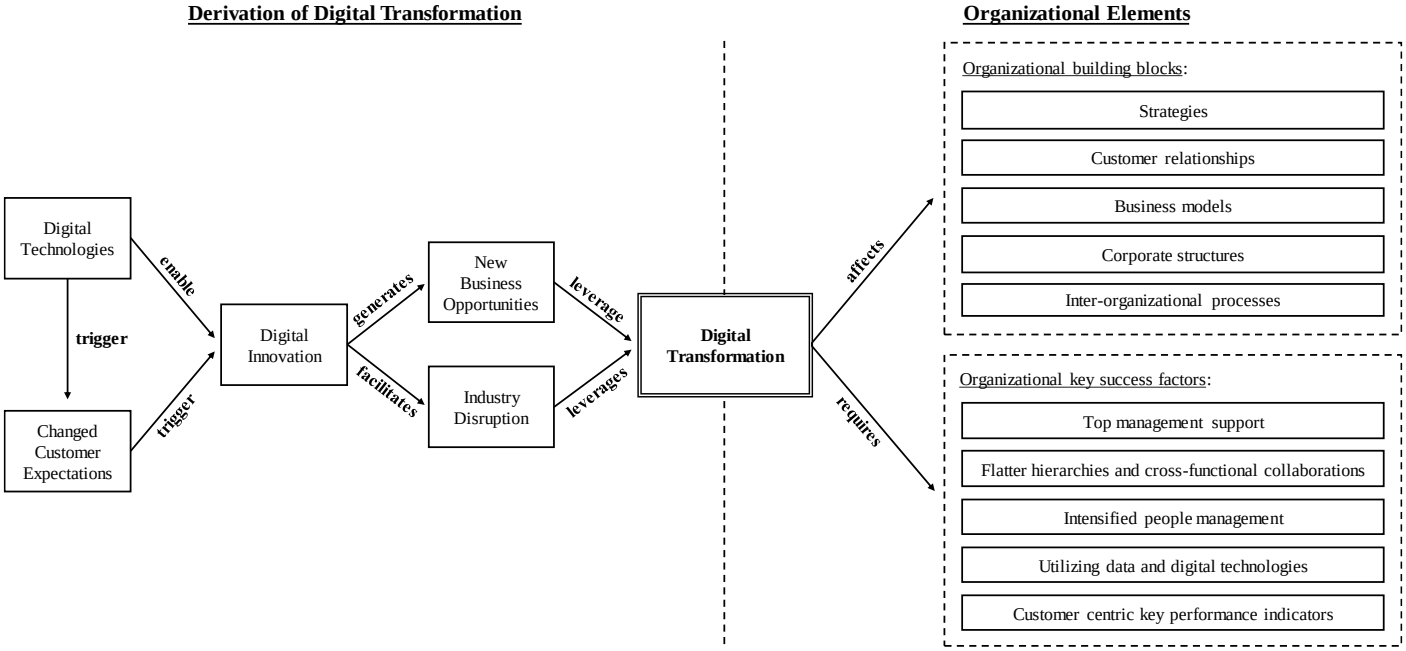
6.6 Revised Digital Transformation Framework

Summarizing our empirical findings, we confirm the notion that digital technology is a basic factor that triggers changed customers expectations, which is in line with the literature (Lucas et al. 2013; Piccinini et al. 2015). Our empirical findings further endorse that organizations strive for digital innovation to react upon changed customer expectations, whereby we confirm the literature (Berman et al. 2016; Nylén & Holmström, 2011; Westerman et al. 2011). Furthermore, our findings support the literature that digital technology is an enabling factor for digital innovation (Berman et al. 2016; Kavadias et al. 2016). Following the framework, our empirical findings confirm academia that digital innovation generates new business opportunities that leverage DT (Hess et al. 2016). In addition, digital innovation facilitates

industry disruptions and leverage DT, which is in line with the literature (Christensen, 1997; Schwab, 2017).

Considering the organizational elements of the condensed DT framework, our empirical findings prove the literature that DT affects the described organizational building blocks (Bughin & Zeebroeck, 2017; Schwab, 2017; Tolboom 2016; Weill & Woerner, 2015; Zammuto et al. 2007). Moreover, our empirical findings support academia that successful DT initiatives require certain organizational KSFs. Nevertheless, we argue for a different cluster of KSFs, which partially reflect the KSFs identified in the literature (Bowersox et al. 2005; de la Boutetière, 2018; Kavadias et al. 2016; Matt et al. 2015; Westerman et al. 2011).

Figure 2: Revised Digital Transformation Framework



7 Conclusion

7.1 Study Recap

The evolution of digital technologies has an increasing impact on business environments, which has led to the evolvement of the phenomenon known as DT. Over recent years, several studies have contributed to the understanding of this concept and highlighted its relevance for organizations. Numerous scholars elaborated frameworks that aim to grasp the concept. Therefore, the purpose of our literature review was to contribute to the understanding of DT by reviewing common literature and developing a condensed framework thereof. Besides a generalized conceptualization, we identified the need to better understand the actual impacts DT has on organizations. In particular, we focused on applied strategies and experience-based KSFs organizations utilize to turn DT into business practices. For this purpose, we analyzed eight case companies that experienced impacts of DT and implemented respective strategies or operational initiatives. By conducting eight case interviews and analyzing the collected empirical data, we addressed our guiding research questions:

How can organizations turn the concept of digital transformation into business practices?

- In what way are organizations engaged in digital transformation influenced?
- Which strategies do organizations use to drive digital transformation initiatives?
- What are the factors for a successful digital transformation process?

7.2 Main Findings

The main findings of our research study in the field of DT are clustered in five topic areas: (1) understanding of the concept, (2) altering customer perspectives, (3) business model changes, (4) strategies, and (5) key success factors. Our revealed findings are structured in the following to provide answers to the research questions of this research study.

First, we found that DT is an undefined concept for organizations. None of the case companies displayed a systematic understanding of DT and neither differentiated between 'digitalization' and 'digital transformation'. However, employees directly engaged with DT topics are well-informed about the concept's different building blocks.

Second, we revealed that customer centricity is a key objective of DT. Our empirical data uncovered that all case companies focus increasingly on customer centricity while acting upon DT. However, our results indicate that B2C case companies focus on enhanced customer experience and personalized products and services, while B2B case companies concentrate on advanced services that increase customer value by utilizing data interfaces and data analytics.

Third, the analysis unraveled that DT leverages data-driven and service-related business models. Accordingly, the findings demonstrate that the case companies transform their business models by making use of digital technologies and digital capabilities. Thereby, they are frequently impelled by customer expectations and competition. When considering analog business models separately, the observed transformations are mainly characterized by service-related business model adaptations that utilize data in new ways to complement the existing product offerings. Contrary, case companies pursuing a digital and service-related business model experienced vigorous organizational transformations. Furthermore, we observed that evolving digital trends and technologies have a disrupting impact on the respective case companies.

Fourth, we found that B2C case companies implemented DT as part of their corporate strategy, while B2B case companies rather followed a functional strategy approach. However, the B2B case companies strive to integrate DT within their corporate strategies. To drive DT strategies, the case companies often expanded the organizational structure by establishing centralized teams for DT. Those teams are usually empowered by top management but have no authority to direct functional business units. Furthermore, DT strategies comprise process modifications.

In this regard, B2B case companies expand their collaboration with suppliers and enhance their focus on customer processes. In comparison, B2C companies focus on digital sales processes that aim to increase personalization and customer experience.

The fifth finding builds upon key learnings from the conducted case companies and depicts KSFs that are crucial for turning DT into business practices. In particular, we identified the five following KSFs: (1) top management support is essential for a consequent and goal-oriented implementation of DT strategies. Without corporate alignment, DT initiatives are likely to follow converse objectives, and overarching transformational benefits will be limited. (2) Flatter hierarchies and cross-functional collaboration are essential for digital product and process optimization. Traditional organizational silos and reporting structures hinder agility, speed, and flexibility in driving digital initiatives and curb digital and collaborative work methods. (3) Intensified people management is necessary to augment an explorative mindset driving digital innovation on a daily basis. Non-transparent objectives and missing employee empowerment inhibit top-down translation of DT strategies as well as bottom-up elaboration of defined DT initiatives. (4) Capabilities to utilize data and digital technologies advance product and service portfolios. Without such capabilities, organizations struggle to optimize value chain efficiency and to draw unique customer insights, which are vital for developing personalized product and service experiences. (5) Implementing customer-centric KPIs form an uncompromised focus on customer needs. Absent measurable indicators impede an integrated focus on customer centricity as a key objective for DT strategies.

7.3 Managerial Implications

The findings of our research study indicate various practical contributions. Based on our results, we argue that managers should consider the following factors to develop DT strategies and to successfully turn DT into business practices.

Defining and Communicating Digital Transformation Objectives

Our results imply that the concept of DT is understood and conceptualized differently within organizations. Hence, managers and practitioners should draft a unified definition of this concept and communicate it throughout their organizations. This can serve as a starting point

to develop corporate DT strategies, processes, and initiatives and to effectively turn DT into business practices.

Ensuring Top Management Support and Determine Responsibilities

As our findings indicate, top management support is essential for implementing overarching and aligned DT initiatives. Further, managers should communicate clear objectives and defined responsibilities to drive DT initiatives throughout the organization. Based on our research indications, a sense for corporate-wide responsibility in combination with a centralized team that drives and supports DT initiatives appears to be a successful approach.

Focusing on Customer Centricity

Based on our research results, identifying the customers' need and striving for a customer-centric orientation should be a key objective for organizations during DT processes. In this context, we argue that managers in B2C sectors should steer their focus towards enhanced customer experience and personalized offerings, while managers in B2B sectors should rather concentrate on complementing digital services that address customer needs by utilizing data interfaces and data analytics. To increase customer engagement, managers can benefit from facilitating recurring business relations with their customers. Furthermore, mastering data analytics can draw valuable customer insights enabling organizations to enhance customer experience, to advance market segmentation, and to tailor products and services based on specific customer needs. To enable an uncompromised focus on customer needs, our findings suggest implementing customer-centric KPIs such as a net-promoter score or the number of contract extensions. Our results further indicate that measuring the direct progress of DT is insufficient as DT is difficult to quantify.

Facilitate Data-Driven and Service-Oriented Business Models

Our research study outlines that DT leverages data-driven and service-related business models by utilizing digital technologies and digital capabilities. Besides, managers should consider that analog business models seem to be less affected by DT, while digital business models experience disruptive changes. For advancing their business models, managers should establish rather a precise understanding of customer needs and extensively utilize customer data. In particular, managers should rethink existing value propositions by developing digital services that complement traditional products or services. In addition, embracing emerging digital trends

can leverage traditional business models. Current trends to consider are, for example, connectivity features based on the IoT concept, intelligent services using AI, as well as predictive models to advance process automatization. While exploiting data-driven processes, managers have to be aware of the fast-growing legal provisions of data protection and affiliation. Similar applies to the development of additional capabilities required in legal and IT departments.

Dissolve Corporate Silos

Our findings further indicate that translating DT strategies holistically into business practices requires adjustments in organizational structures. Frequently, digital innovation requires to condense different skill-sets. Hence, managers should flatten hierarchies and promote cross-functional collaboration to enable agility, knowledge-sharing, and collaborative work methods. In addition, managers can experiment with independent digital hubs. Our research study exemplifies that approaching DT from outside the line-organization promotes innovative thinking and fosters external collaboration.

Empower Employees to Drive Digital Transformation

In accordance with our findings, managers and practitioners should intensify people management to augment an explorative mindset that drives digital innovation. To elaborate digital initiatives bottom-up, employees should be empowered to use digital tools and platforms that enhance collaboration. Furthermore, new work methods, for example the concept of minimal viable products, agile project management, and fail-fast approaches, can enhance flexibility and productivity.

7.4 Theoretical Implications and Further Research

Based on the reviewed literature, we derived a condensed framework that conceptualizes DT. Throughout our data analysis, we tested the framework's applicability and developed a revised version based on our empirical findings.

The results of this research study highlight that customer centricity is an underlying key objective of DT, which confirms the conducted literature. Nevertheless, our findings revealed that customer centricity among B2B companies has not been discussed extensively in the

literature. Accordingly, we acknowledge that further research on the impacts of DT on B2B customer relations would contribute to an augmented understanding of the concept of DT.

Furthermore, our findings confirm that DT has various effects on business models depending on whether the organization has an analog or digital core product. In this context, our analysis argues that DT has disruptive impacts on organizations with digital core business models. Contrary, organizations with analog core business models rather responded by adjusting or expanding their business models.

Moreover, our empirical data confirmed that DT affects corporate strategies as well as organizational structures and processes, as set out in the condensed framework of the literature. However, our findings indicated that data management and analysis are additional inter-organizational focus areas of DT. Besides, we identified the need for further research in the field of corporate data security. Particularly, we argue that a better understanding of potential influencing factors of fast-growing legal provisions would strengthen DT initiatives.

Lastly, we derived, KSFs to turn DT into business practices and revised the DT framework accordingly. Beyond the range of KSFs reflected in the literature, we identified ‘customer-centric key performance indicators’ as a powerful supplement. Consequently, we argue that the introduced KSFs can serve as a starting point for further research. Testing the relevance of our derived KSFs on a larger scale or focusing on small and medium-sized enterprises, would contribute to the validity of our DT framework.

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Appendix A

Interview Guide – Consultancies

Understanding of digitalization and digital transformation

- What does digitalization mean for you?
- What does digital transformation mean for you?
- What were the most influential trends of digital transformation and what are expected future trends?

Digital transformation in organizations

- How are organizations impacted by digital transformation?
- What historic/current challenges did/do organizations face regarding digital transformation?
- How do organizations create or enhance value with digital transformation?

Strategies for digital transformation

- Which organizational strategies are used to overcome challenges and to create value with digital transformation?
- What are key success factors for digital transformation in organizations?
- Which processes are used by organizations to execute digital transformation initiatives?
- What are key learnings for organizations?

Effects of digital transformation

- How does digital transformation affect organizational performance?
- How do organizations measure the effects of digital transformation? (KPIs ?)
- What role does an organization's corporate culture play within the process of digital transformation?

Appendix B

Interview Guide – Case Companies

Understanding of digitalization and digital transformation

- How does your organization define digitalization and/or digital transformation?
- What were the most influential trends of digital transformation within your industry and what are expected future trends?

Digital transformation in organizations

- How is your organization and your business environment impacted by digital transformation?
- What historic/current challenges did/does your organization face regarding digital transformation?
- In what way has your organization created or enhanced value with digital transformation?

Digital transformation strategies

- Which strategy and initiatives applies your organization to overcome challenges of digital transformation and to create value?
- Which strategic initiatives were successful, and which were less successful?
- What are key success factors for digital transformation in organizations?
- What were the key learnings for your organization?
- When and how did your organization recognize the need to act upon digital transformation?
- How did/does the organization structure initiatives for digital transformation?

Effects of digital transformation

- How does digital transformation affect your organizational performance?
- How does your organization measure the effects of digital transformation?
- What role does your organization's corporate culture play within the process of digital transformation? - how much and in what way was the corporate culture affected?