

# **The Digital Transformation of Incumbent Firms**

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## **List of thesis papers**

*Paper I – Chapter 4, p. 30 ff.*

### **Digital capability gaps in traditional industries: Influencing factors and strategic responses**

Erik Hanel – University of Bamberg

Martin Friesl – University of Bamberg

- Submitted to: *Strategic Entrepreneurship Journal* (peer-reviewed Journal)  
Status quo: Under review (3<sup>rd</sup> round, revise and resubmit)
- Presented at: Virtual Toronto Strategic Management Society (SMS) 41st Annual Conference 2021 and 37th EGOS Colloquium, Amsterdam 2021 (online)

*Paper II – Chapter 5, p. 76 ff.*

### **Digital Transformation of Incumbents via Structural Ambidexterity: A case study of escalating tensions**

Erik Hanel – University of Bamberg

- Submitted to: *Long Range Planning* (peer-reviewed Journal)
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- Presented at: the British Academy of Management (BAM) 2022 Conference in Manchester, UK.

*Paper III – Chapter 6, p. 128 ff.*

### **The Digital Readiness Matrix: Being ready is half the battle to master digital transformation**

Erik Hanel – University of Bamberg

- Submitted to: *Digital Business* (peer-reviewed Journal)
- Status quo: Under review (1<sup>st</sup> round)

# 1. Introduction

Incumbents are challenged with the complexity of implementing digital technologies into their existing structures, processes, and products or services (Dąbrowska et al., 2022; Konopik, Jahn, Schuster, Hoßbach, & Pflaum, 2022) whilst also negotiating fast-growing digital entrants which threaten and disrupt existing business models (Hess, Matt, Benlian, & Wiesböck, 2016; Verhoef et al., 2021). Thus, digital transformation (DT) is at the forefront of incumbents' strategic agendas (Fitzgerald, Kruschwitz, Bonnet, & Welch, 2014; Warner & Wäger, 2019). Incumbent firms, therefore, need to reevaluate their strategic approaches and take strategic actions to cope with the impact of digital technologies (Hess et al., 2016; Matt, Hess, & Benlian, 2015) and changing competitive landscapes (Furr, Ozcan, & Eisenhardt, 2022; Verhoef et al., 2021). Yet, prior research shows that incumbents are often slow and cautious when it comes to driving their efforts forward (Volberda, Khanagha, Baden-Fuller, Mihalache, & Birkinshaw, 2021).

These issues place DT as a key topic for strategy research; in fact, the notion of DT has received increasing attention from scholars – especially over the last decade. This becomes evident through a multitude of calls for papers and special issues that set out to explore the implications of DT (Kohtamäki, Rabetino, Luleå, & Ritala; Lamine, Fayolle, Jack, & Audretsch, 2020; Lanzolla, Lorenz, Miron-Spektor, Schilling, Solinas, & Tucci, 2018; Lawton & Vassolo, 2022; Levinthal, 2019). Furthermore, multiple published reviews underline the increasing attention DT receives and highlight its importance for strategic management research. As well as a more general focus on DT (Dąbrowska et al., 2022; Hausberg, Liere-Netheler, Packmohr, Pakura, & Vogelsang, 2019; Kraus, Jones, Kailer, Weinmann, Chaparro-Banegas, & Roig-Tierno, 2021; Nadkarni & Prügl, 2021; Verhoef et al., 2021), there has also been specific focus on DT and organizational change (Hanelt, Bohnsack, Marz, &

Antunes Marante, 2021), and DT and innovation management (Appio, Frattini, Petruzzelli, & Neirotti, 2021).

Importantly, prior research has highlighted the impact of DT on incumbents. Recent and prominent examples highlight the far-reaching effects DT has on traditional industries and their incumbents. Retail giants, such as Toys ‘R’ Us or RadioShack were bankrupted by the growth of online retailers like Amazon. Streaming platforms like Spotify and Netflix caused paradigm shifts in the music, TV, and film industries. Airbnb and Booking.com reinvented the hotel industry, changing the way people travel completely (Verhoef et al., 2021). These examples show the necessity for incumbents in traditional industries to change the current modes of operation and develop new capabilities for the digital era. This fact has led scholars to pay increasing attention to incumbents and their DT (Chanas, Myers, & Hess, 2019; Hess et al., 2016; Roy, Lampert, & Stoyneva, 2018; Svahn, Mathiassen, & Lindgren, 2017; Verhoef et al., 2021; Warner & Waeger;).

Driven by the above discussion, this thesis deals with the far-reaching effects and overarching challenges of DT for incumbents, setting focus on three particular challenges and providing empirical insights in relation to them. However, this dissertation does not intend to become a ‘how-to-guide’ that purports to magically resolve all problems related to incumbent DT. Rather it aims to increase awareness of the particular issue to support individuals, teams, or organizations involved in shaping incumbents’ strategies around DT in a way that allows them to overcome the multitude of challenges they face in this regard. Consequently, this thesis builds on three fundamental topics.

Firstly, the DT of incumbent firms depends on their connections with organizations in their environment (Holotiuk & Beimborn, 2017) – this might be especially important with regard to customer firms (Ethiraj, Kale, Krishnan, & Singh, 2005). As firms can have different levels of digital capabilities (Kane, Palmer, Phillips, Kiron, & Buckley, 2017) incumbents need to recognize to what extent this is present in their existing and potential



relationships and attune their DT initiatives accordingly. Otherwise, they may risk losing valuable customers or face competitive disadvantages.

Secondly, incumbents also face internal struggles regarding the process of DT itself. For example, pre-digital structures and processes need to be digitalized or even completely re-designed (Volberda et al., 2021). To cope with these challenges, incumbents often use structurally ambidextrous designs and spin-off semi-autonomous business units with the mandate to develop digital capabilities, products, or services. However, in doing so incumbents face a multitude of tensions they need to overcome (Smith & Beretta, 2021).

Lastly, the perceptions of individuals regarding the digital readiness within and across organizations are at the very core of successfully engaging in DT endeavors (Schneider & Sting, 2020; Solberg, Traavik, & Wong, 2020). This does not necessarily refer to a high level of advancement and knowledge of digital technologies but rather a similarity of perceptions of the current capabilities. In case of discrepancies between parties in this regard, DT initiatives might underperform or even fail entirely (Gfrerer, Hutter, Füller, & Ströhle, 2021).

Table 1 provides an overview of the three core papers related to the above-described issues that build the foundation of this dissertation.

**TABLE 1** Overview of the three core papers in this dissertation

Category	Paper I (Chapter 4, p. 30 ff.)	Paper II (Chapter 5, p. 76 ff.)	Paper III (Chapter 6, p. 128 ff.)
<b>Title</b>	Digital capability gaps in traditional industries: Influencing factors and strategic responses	Digital Transformation of incumbents via structural ambidexterity: A case study of escalating tensions	The Digital Readiness Matrix – Being ready is half the battle to master digital transformation
<b>Author(s)</b>	Erik Hanel, Martin Friesl	Erik Hanel	Erik Hanel
<b>Keywords</b>	Digital transformation; digital capabilities; incumbent firms; traditional industries	Digital transformation; organizational ambidexterity; tensions; incumbent firms; traditional industries	Digital transformation; digital readiness; change management; organizational change; perceptions; incumbent firms
<b>Research Gap</b>	While current research focuses on how incumbents develop digital capabilities, the importance of capability-level differences between incumbents and customers and incumbents' strategic responses remains ill-understood within the context of DT	While scholars have explored how incumbents respond to DT and the rationale for choosing ambidextrous designs, potential tensions that unfold over time within the sub-unit or with the corporate parent and the consequences of this in the context of DT remain underexplored	Studies have dealt with the topic of varying perceptions between employees across organizations, and with differences in perceptions between managers and employees within firms. However, none have considered management-employee as well as buyer-supplier relationships simultaneously
<b>Research Question</b>	What are influencing factors of DCGs between incumbents and customers and what are incumbents' responses to such DCGs?	How do tensions unfold and affect maturing, structurally separate units of incumbents in the context of DT?	How do consistent or inconsistent perceptions between managers and employees or suppliers and buyers impact the digital readiness of firms?
<b>Theoretical Perspective</b>	Capability-based view of the firm	Organizational ambidexterity	Digital (change) readiness
<b>Research Method</b>	Multiple case study	Extended case method	Multiple case study
<b>Key Findings</b>	<ul style="list-style-type: none"> <li>• DCGs are a focal firm's ability to design and control products, services, and processes by utilizing digital technologies in relation to its customer base</li> <li>▪ Strategic responses differ according to the magnitude of DCGs: large DCGs offer the opportunity for 'digital diversification'; moderate DCGs, lead to bridging gaps by adopting the role of 'digital parents'; small DCGs cause firms to form 'digital collaborations'</li> <li>▪ The market setting influences strategic orientation and consequently the rise of DCGs: consolidation or fragmentation of customer portfolio and competitive landscape and the extent to which players have similar digital pressures</li> </ul>	<ul style="list-style-type: none"> <li>▪ Neglecting the multitude of tensions that arise in ambidextrous designs may lead to escalating tensions</li> <li>▪ Escalating tensions are the product of three interrelated underlying mechanisms: emerging, shifting, and pervasive tensions over time</li> <li>▪ Despite being aligned, structural changes and strategic intent might reinforce the escalation of tensions</li> <li>▪ The escalation of tensions can negatively affect organizational or strategic level outcomes in the context of DT</li> </ul>	<ul style="list-style-type: none"> <li>▪ The conceptualization of the Digital-Readiness-Matrix reveals four distinct types of digital readiness: 'Digital Apprentice', 'Digital Collaborator', 'Digital Team Player' and 'Digital Synchronizer'</li> <li>▪ Varying constellations of perceived digital readiness between managers and employees and buyers and suppliers demand different foci to be resolved</li> <li>▪ Making perceptions of key parties involved in DT projects transparent seems to have the potential to improve digital strategies for products and services by revealing discrepancies that need closing and commonalities that can be leveraged</li> </ul>

The first paper titled “Digital capability gaps in traditional industries: Influencing factors and strategic responses”, suggests that capability levels need to be considered not only with regard to the overarching idea of maturity (Kane et al., 2017) but also in relation to customers – this matters as it affects incumbents value-creation relationships and competitive positioning. The origins of such capability-level differences are an ill-understood yet crucial topic for the DT of incumbent firms. Drawing on a multiple case study (Eisenhardt, 1989, 2021; Yin, 2018) of five incumbents in traditional industries, the concept of digital capability gaps (DCGs) is introduced in this paper. The study reveals that nuances in DCGs lead to varying strategic responses of incumbent firms: whereas large DCGs lead to ‘digital diversification’, moderate DCGs cause firms to adopt the role of a ‘digital parent’. By digitally diversifying, incumbent firms utilize their digital capabilities to enter new domains; a digital parent on the other hand innovates on behalf of their customers to bridge the existing DCG. Moreover, incumbents with relatively small DCGs might enter into ‘digital collaborations’ to develop digital capabilities with customer firms. Furthermore, this study reveals influencing factors of DCGs: The consolidation or fragmentation of customer portfolios and competitive landscapes; and the extent to which players face similar needs for DT (digital pressure). Overall, this study contributes to the growing literature on DT of incumbents (see chapter 4, p. 30 ff.). At the point of submission this paper is under review in the third round (revise and resubmit) in the Strategic Entrepreneurship Journal.

The second paper, titled “Digital Transformation of incumbents via structural ambidexterity: A case study of escalating tensions” sets the focus on strategizing for DT as a focal point for incumbent firms due to the transformative and disruptive nature of digital technologies, investigating how incumbent firms attempt to overcome the challenges of the digital age through structural ambidexterity (O'Reilly & Tushman, 2004; O'Reilly & Tushman, 2013; Smith & Beretta, 2021). This is addressed by using an extended case method design (Burawoy, 1991, 1998; Danneels, 2010) by drawing on a longitudinal case study of an

incumbent firm. This study reveals the potentially negative impact of escalating tensions, which are the product of three interrelated underlying mechanisms, in structural ambidextrous solutions. It thereby contributes to the literature on DT by showing how tensions in the context of DT emerge, evolve, shift, pervade, and consequently escalate over time. Furthermore, it highlights the complexity incumbents face in the context of their DT and thus contributes empirically to the question of how DT is actually different from other forms of change (see chapter 5, p. 76 ff.). At the point of submission this paper is under review in the second round (revise and resubmit) at Long Range Planning.

The third paper, titled “The Digital Readiness Matrix – Being ready is half the battle to master digital transformation” sheds light on the importance of considering differing perceptions regarding DT within and across organizations. Different attitudes or perceptions between managers and employees positively impact the establishment of ‘digital readiness’, which is seen as a precursor and underlying condition for the successful implementation of DT projects (Gfrerer et al., 2021). However, there is only little knowledge as to what extent perceptions within (managers and employees) and across (buyer and supplier) organizations impact digital readiness. The findings in this paper reveal that digital readiness perceptions of managers and employees as well as buyers and suppliers are crucial for a firm’s digital readiness. The development of the Digital-Readiness-Matrix in this paper supports managers in spotting potential gaps between the perceptions and anticipating of obstacles in the course of their DT initiatives (see chapter 6, p. 128 ff.). At the point of submission this paper is under review in the journal ‘Digital Business’.

In addition, this dissertation also entails an excursus entitled “Why Digital Transformation is not just 0 and 1...”; this piece is thematically linked to the third paper. As DT is a multi-stage process it involves much more than just the use of digital technologies: accompanying employees during this transition has become a central aspect of the journey toward DT. None of this is really new. The fact that a manager cannot reach the goal without his or

her team should no longer surprise anyone. What is surprising, however, is the limited communication about how to implement such projects (De la Boutetière, Montagner, & Reich, 2018). This article, therefore, recommends three approaches – transparency, emotional intelligence, and activation – that help managers to navigate their employees through the fog of DT (see chapter 7, p. 164 ff.). This paper is already published in the journal ‘Wissensmanagement’ (not peer-reviewed).

The further structure of this dissertation is as follows: firstly, a general overview of the theoretical background this dissertation is embedded in, in particular research on strategic management and DT, is provided; then, this is complemented by a brief explanation of the general research approach in this thesis; this is then followed by the main chapters of this dissertation; finally, the overall conclusion – including theoretical and managerial implications.

## 2. Theoretical Background

With this being a cumulative dissertation, this chapter will give a general theoretical overview of DT and outline its relevance for strategic management research; this will be necessary to understand the context that the three main chapters are embedded in. Therefore, I will provide an overview of recent advancements in strategy and DT research. Here, the core concepts of this thesis are defined and triggers, drivers, strategic action, as well as key challenges will be discussed. This is supplemented by the three theoretical perspectives: the capability-based view of the firm, organizational ambidexterity, and digital readiness utilized in this dissertation.

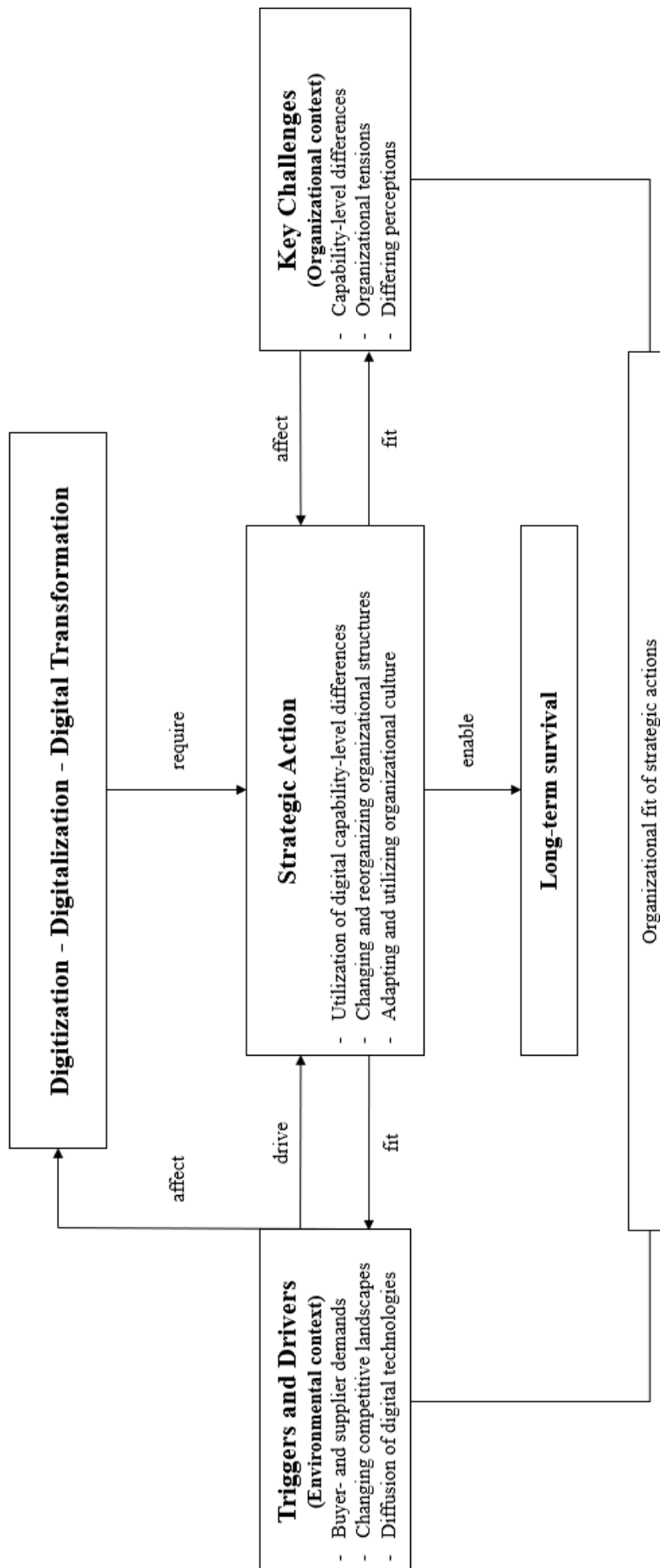
Strategic management research is ultimately concerned with the “organizational challenges arising from an ever-changing environment” (Drnevich, Mahoney, & Schendel, 2020: 36). Until strategic management research formed in the late 1960s research argued for a “deterministic one-best-way approach” (Furrer, Thomas, & Goussevskaia, 2008: 3). However, the fundamental publications of Alfred Chandler (1962), Igor Ansoff (1965), and Kenneth Andrews (Learned, Christensen, & Andrews, 1965) shifted this perception to a contingency perspective. At the core of this perspective is the understanding that firms need to adapt to their environment (Furrer et al., 2008). When these notions are taken together, it is seen that strategic management research focuses on how firms and their actors cope with organizational challenges in their pursuit to adapt to an ever-changing environment.

The diffusion of digital technologies fuels fundamental changes in the environment of firms and, consequently, the organizational challenges they need to cope with (Sebastian, Ross, Beath, Mocker, Moloney, & Fonstad, 2017). Thus, by nature, DT represents a strategic question rather than a solely technological one (Rêgo, Jayantilal, Ferreira, & Carayannis, 2021; Vial, 2019). Furthermore, as incumbent firms in traditional industries often fully or partially rely on their pre-digital structures and processes (Volberda et al., 2021), they face disproportionate organizational challenges to transform in the light of the new digital age

(Nadkarni & Prügl, 2021). For example, their established business models are threatened by a continued diffusion of digital technologies and the consequent rise of new digital entrants. This forces them to adapt and reinvent their core sources of value creation and capture, which pushes some of them on the verge of extinction (Verhoef et al., 2021).

The present chapter sets focus on the current state of knowledge around DT, paying specific attention to incumbent firms. Firstly, the importance of DT and embedding this in strategic management research sets the scene for this chapter. Secondly, the terms digitization, digitalization, and DT, which are central to this stream of research, will be explained in more detail. Thirdly, triggers and drivers, as well as key challenges of incumbent firms in traditional industries, will be elaborated. Based on this, strategic actions that form are discussed (see Figure 1 for an overview). Finally, I draw on the three theoretical perspectives that are utilized in this dissertation to study the DT of incumbent firms in traditional industries.

**FIGURE 1** Overview of digital transformation in strategic management research





## **2.1 The Study of Digital Transformation in Strategic Management**

Over the past decade, DT has risen to become an important phenomenon for practitioners (De Jong & van Dijk, 2015; De la Boutetière, Montagner, & Reich, 2018; Fitzgerald et al., 2014) and academics (Adner, Puranam, & Zhu, 2019; Vial, 2019). So far, research has focused on various sub-domains in this context, such as organizational change (Hanelt et al., 2021) and innovation management (Appio et al., 2021), or has focused on different kinds of organizations – e.g., new digital firms (Denoo, Yli-Renko, & Clarysse, 2021), small-to-medium-sized enterprises (Cenamor, Parida, & Wincent, 2019; Eller, Alford, Kallmünzer, & Peters, 2020; Matarazzo, Penco, Profumo, & Quaglia, 2021), and large incumbent firms (Warner & Wäger, 2019). Indeed, the study of incumbents' DT has been a particular point of interest (Furr et al., 2022; Murtinu, Park, Tucci, & Wadhwa, 2021; Simsek, Heavey, Gisling, Stam, & König, 2020). Amongst other things, scholars have focused on the strategic responses of incumbent firms (Broekhuizen, Bakker, & Postma, 2018; Klos, Spieth, Clauss, & Klusmann, 2021; Matarazzo et al., 2021; Matt et al., 2015), the development of crucial capabilities for DT (Ferreira, Fernandes, & Ferreira, 2019; Roy, Lampert, & Stoyneva, 2018), or incumbents' utilization of digital technologies to fuel innovation efforts (Smith & Beretta, 2021; Svahn, Mathiassen, & Lindgren, 2017).

While the general opinion seems to be that incumbents in traditional industries are on the verge of extinction or, at the bare minimum, are struggling to adapt (Verhoef et al., 2021; Volberda et al., 2021), Roy et al (2018) find that incumbent firms can overcome the challenges of DT and not fall victim to the 'innovators dilemma' (Christensen, 1997). Furthermore, Cozzolino et al. (2018) point out that incumbents experiment with and successfully reinvent their established approach to value creation and capture in light of threats by new digital technologies and entrants. Thus, the study of incumbents' DT represents an important stream of research. Moreover, while the DT of incumbent firms represents an important stream of research, the organizational challenges that arise from the diffusion of digital

technologies and from the need to understand how incumbents cope with them through their DT remain to be explored to their fullest. In addition, while research on DT is experiencing increasing interest, definitional issues around the concept remain unresolved. Although various scholars have started to define DT, there is no generally accepted definition just yet (Furr et al., 2022; Hanelt et al., 2021).

### **2.1.1 The Concept of Digital Transformation**

Scholars argue that part of the challenges around DT and its research is the definition of DT, which may change depending on the context of the focal firm(s) (Furr et al., 2022). Research so far has argued that DT entails different phases, stages (Verhoef et al., 2021), or degrees of maturity (Kane et al., 2017; Klötzer & Pflaum, 2017) – generally, scholars distinguish between three phases or degrees of maturity with regard to DT: ‘digitization’ (early), ‘digitalization’ (developing), and ‘digital transformation’ (maturing) (Kane, 2017; Verhoef et al., 2021). However, ‘digitalization’ and ‘digital transformation’ are often used interchangeably (Hausberg et al., 2019), even though the phases entail different characteristics and goals (Verhoef et al., 2021). Thus, what DT means might be contingent on particular contexts. Therefore, it is necessary to establish a common ground of understanding for this dissertation and provide a definition for DT.

First of all, ‘digitization’ is defined as “the encoding of analog information into digital format” (Verhoef et al., 2021; Yoo, Henfridsson, & Lyytinen, 2010: 725) or in other words, turning analog into digital. The e-book represents a prominent example of the changes that accompany the digitization of well-established products. While the incumbent product, the book, still holds high relevance in today's time, the rise of Amazon’s Kindle and others changed how books are published, accessed, and consumed. This fundamentally altered the book publishing industries and blurred industry lines to formerly unrelated industries such as telecommunications, consumer electronics, or computer industry consequently shifting competitive landscapes (Yoo et al., 2010). However, based on its definition digitization as

the initial phase only refers to the change in documentation processes and does not entail new forms of value creation (Verhoef et al., 2021).

Whereas research seems to have established a common understanding of digitization, the concepts of digitalization and DT are still blurry and lack generally accepted definitions (Furr et al., 2022; Hanelt et al., 2021). See Table 2 for an overview of selected definitions for digitalization and DT.

**TABLE 2** Definitions for ‘digitalization’ and ‘digital transformation’ (selection)

Author(s)	Concept	Definition
Autio, Nambisan, Thomas, & Wright (2018: 76)	Digitalization	“Digitalization creates potent digital affordances that likely have a transformative effect upon the organization of economic activity by supporting radical business model innovation” (Autio et al., 2018: 76).
Dąbrowska et al. (2022: 2)	Digitalization	“Digitalization – that is, the implementation of digital technologies [(Setia, Venkatesh, & Joglekar, 2013)]”
Fitzgerald et al. (2014: 2)	Digital Transformation	“the use of new digital technologies (social media, mobile, analytics or embedded devices) to enable major business improvements (such as enhancing customer experience, streamlining operations or creating new business models)”
Furr et al. (2022: 3)	Digital Transformation	“the adoption of novel strategies and business models that are enabled by a myriad of new information technologies”
Hess et al. (2016: 124)	Digital Transformation	“Digital transformation is concerned with the changes digital technologies can bring about in a company’s business model, which result in changed products or organizational structures or in the automation of processes.”
Teece (2010: 173)	Digital Transformation	“how the enterprise creates and delivers value to customers, and then converts payment received to profits”
Tilson, Lyytinen, & Sørensen (2010: 749)	Digitalization	“A sociotechnical process of applying digitizing techniques to broader social and institutional contexts that render digital technologies infrastructural”
Verhoef et al. (2021: 3)	Digitalization	“Digitalization describes how IT or digital technologies can be used to alter existing business processes [(Li, Nucciarelli, Roden, & Graham, 2016)]”
Volberda et al. (2021: 3–4)	Digital Transformation	“the use of new digital technologies to enable company-wide change (evolutionary versus transformative), involving the reframing of cognitive models of management (by envisioning new digital business models), the building of new digital routines (for the seizing of digital opportunities), and the implementation of new organizational forms (for setting up and integrating digital operations) for creating and appropriating new value in an established or new ecosystem.”

Digitalization describes how digital technologies can be utilized to reinvent existing processes (Verhoef et al., 2021). Here, the notion of ‘digital technologies’ serves as an umbrella term for technologies related to information, communication, and connectivity or, as Sebastian et al. (2017) summarized it: SMACIT technologies (social, mobile, analytics, cloud, and Internet of Things technologies). The rise of these new digital technologies enabled new

opportunities for incumbent firms. For example, the establishment of new sales and communication channels such as social networks or e-commerce platforms (Ramaswamy & Ozcan, 2016). This offers incumbent firms the opportunity to improve their existing structures and processes to generate additional value (Pagani & Pardo, 2017; Verhoef et al., 2021).

Finally, whereas digitization and digitalization describe the change of specific applications or processes, DT entails more extensive and company-wide changes by creating and implementing entirely new business models based on the utilization of SMACIT technologies (Sebastian et al., 2017). On the one hand, this enables the rise of new digital entrants with novel business models that alter entire industries – such as Airbnb or Amazon (Verhoef et al., 2021). On the other hand, incumbent firms reconfigure their existing business approach and search for new business models – for example, amongst others, major incumbents in traditional industries such as GE, Philips, and Lego invest in building digital platforms “to cash in on opportunities offered by digital technologies“ (Sebastian et al., 2017: 197–198).

As a consequence of the above discussion, and in line with Hinings and colleagues (2018: 53), the underlying understanding of DT for this work is characterized by “the combined effects of several digital innovations bringing about novel actors (and actor constellations), structures, practices, values, and beliefs that change, threaten, replace or complement existing rules of the game within organizations, ecosystems, industries or fields (Krimpmann, 2015; Loebbecke & Picot, 2015; Mangematin, Sapsed, & Schüßler, 2014).”

### **2.1.2 Triggers and Drivers of Digital Transformation**

As DT is the combined effect of several digital innovations (Hinings et al., 2018), this chapter aims to provide an overview of the particular triggers and drivers of DT in incumbent firms. In existing literature, three interrelated core factors can be identified that are relevant to this research. First and foremost, the diffusion and mainstream adoption of digital technologies (Sebastian et al., 2017). Second, the changing competitive landscapes that arise

through the adoption of new business models of incumbent firms (Cozzolino et al., 2018; Matarazzo et al., 2021), and the rise of new digital entrants and consequent further changing of competitive landscapes (Verhoef et al., 2021). Third, are the changes in buyer- and supplier demands, such as the need for new service and product offers, and the accompanied changing business processes (Vial, 2019).

### **Diffusion of Digital Technologies**

The diffusion of digital technologies has significant impact on incumbents. It challenges their traditional business models, blurs industry distinctions, and leads to the creation of new industries and the rise of new digital entrants (Sebastian et al., 2017). Consequently, this has disrupted various industries, such as retail or tourism, through the rise of new platforms for communication and commerce (Verhoef et al., 2021). Digital technologies also enable firms to easily reach markets on a global scale, speed up innovation, and facilitate the creation of new business models and revenue streams.

However, the diffusion of digital technologies also presents challenges for incumbent firms. Indeed, many established firms seem to struggle to adapt to the rapid pace of digital change and have faced competition from new digital entrants that are able to better leverage digital technologies (Volberda et al., 2021). In addition, the rise of platform-based business models, enabled by digital technologies, led to the emergence of new intermediaries that can capture a significant share of value in an industry (Verhoef et al., 2021). In response to these challenges, incumbent firms have started to develop dynamic capabilities for DT (Warner & Wäger, 2019), and have ramped up innovation efforts to create new products and services (Matarazzo et al., 2021; Smith & Beretta, 2021). However, the success of incumbents' digital strategies varies, and some incumbent firms still struggle to adapt to the changing business landscape due to their often incremental approaches (Volberda et al., 2021).

Overall, the diffusion of digital technologies triggers DT initiatives and requires incumbents to adapt and innovate in order to remain competitive in the long run.

## **Changing Competitive Landscapes**

DT fundamentally changes how organizations create and capture value for and from their customers. By doing incumbents integrate digital technologies in all areas of their business activities (Matarazzo et al., 2021). This changes the nature of competition for incumbents in multiple ways.

First, the increases in speed and efficiency that come with the integration of digital technologies changes competition. The automation of processes and utilization of data analytics to foster decision-making makes businesses more flexible and responsive to market changes. This provides competitive edge over incumbent firms that might be slower to integrate digital technologies or do not have the same level of digital capabilities at present (Ferreira et al., 2019). Second, incumbent firms may face challenges in terms of competing with new digital entrants that better embrace and utilize digital technologies to create and capture value (Verhoef et al., 2021). This is seen in the ability of the rise of such firms to lead to market disruption and thus potentially cause the demise of incumbent firms (Danneels, 2010). However, incumbent firms that are able to adapt to and adopt digital technologies can also regain or maintain competitive advantage and renew themselves (Roy et al., 2018). Third, the integration of digital technologies also creates new markets and leads to the rise of varying business models. For example, digital technologies enabled the rise of e-commerce platforms that opened up new avenues for organizations to attract customers and distribute products and services. This created new competition for incumbent firms within traditional industries (Verhoef et al., 2021).

In conclusion, DT significantly alters competitive landscapes by creating new market opportunities and business models, increasing the speed and efficiency of firms, and potentially leading to the disruption of incumbent firms. These drive DT in incumbent firms and increase the need to continuously monitor and adapt to changes in order to remain competitive.

## **Buyer- and Supplier Demands**

As DT affects incumbent firms it also transforms their buyer and supplier demands. Here, the continuous diffusion of digital technologies drastically changes the relationship between buyers and suppliers, as well as how services and products are created, distributed, and utilized (Yoo, Boland, Lyytinen, & Majchrzak, 2012).

For example, the rise of e-commerce, (mobile) applications and artificial intelligence allows buyers to gain greater visibility over their supply chains and to be better informed with regard to their decision-making (Lemon & Verhoef, 2016). Meanwhile, suppliers are leveraging digital technologies to improve their products and reduce lead times; this leveraging also enables suppliers to better analyze customer preferences and other data points when developing their products and services (Hofmann, Sternberg, Chen, Pflaum, & Prockl, 2019). For instance, the increasing diffusion and acceptance of commerce platforms have led to a shift in buyer demand toward convenience and transparency. This has had a significant impact on incumbent firms, as it fuelled the need to adapt their business models to meet these changing demands and remain competitive (Bakos, Lucas, Oh, Simon, Viswanathan, & Weber, 2005).

Overall, the expectations of customers' and suppliers' DT significantly affect incumbents' established business models. These changes drive the need for further DT of incumbents as those firms who are able to adapt and effectively incorporate digital technologies into their value creation and capture activities will be better positioned to succeed in the long run.

### **2.1.3 Key Challenges of Digital Transformation**

Below I argue that these triggers and drivers give rise to three distinct challenges. First, differences in digital capability levels between firms in business relationships demand varying strategic responses from incumbents. Second, organizational tensions that arise through ambidextrous design in an effort to pursue DT initiatives need to be addressed. Third, differing perceptions with regard to digital readiness might lead to resistance and key stakeholders opposing the DT efforts of incumbents. In the following, these three challenges that build the base for this dissertation will be explained in more detail.

#### **Digital Capability-level Differences**

Capability-level differences between firms, potentially affect both incumbents' competitive positioning as well as the value-creating relationships with customers. To cope with the challenges of DT, incumbent firms need to develop digital capabilities (Warner & Wäger, 2019). Unsurprisingly, organizations' adoption of digital technologies and the development of essential digital capabilities occurs at varying speeds (Kane et al., 2017). For instance, Amazon's fully automated brick and mortar retail stores are an example of such differences: their cashierless convenience stores are equipped with cameras and sensors that scan what is put into and out of shopping carts and then automatically deduct the amount from customers' accounts (Eley, 2021). However, other retailers do not yet show this level of digital capabilities in their day-to-day activities. These differences are likely to matter, as evident in the example of the movie rental chain 'Blockbuster', which had to file for bankruptcy protection after failing to keep up with changing demands in digitally-enabled products and services, such as the rise of Netflix (Hess et al., 2016).

Furthermore, such differences might also be displayed with regard to incumbents and their customer firms. In these instances, customer firms that possess or demand higher levels of digital capabilities pose a threat to the incumbents' survival, as the example of Blockbuster powerfully illustrates (Hess et al., 2016). The same occurs vice versa, as incumbents



might struggle to successfully implement new digital technologies and drive their DT efforts. This stems several challenges for incumbents: As customer firms might have different levels of digital capabilities (Kane et al., 2017), incumbents need to maintain existing processes and structures to avoid the break-up of essential business relationships. In addition to that, the implementation of new digital technologies is a complex endeavor (Smith & Beretta, 2021; Yoo et al., 2012) and might be accompanied with resistance from customers when it comes to the introduction of new digitally infused products or services.

Overall, these examples suggest that the existence of digital capability level differences is an important strategic phenomenon and challenge for incumbent firms that warrants closer investigation.

### **Organizational Tensions in Ambidextrous Designs**

Organizational tensions in ambidextrous designs potentially threaten the success of DT efforts and therefore represent another main challenge in the context of incumbents' DT. Indeed, ambidextrous designs are, by definition, a means to resolve organizational tensions, as the simultaneous pursuit of exploitation and exploration activities naturally causes tensions within the firm (Andriopoulos & Lewis, 2009). For example, changes in existing capabilities might alter or even destroy crucial core competencies of the firm and thus cause tensions on different units of analysis (Christensen, Bartman, & Van Bever, 2016; Tushman & Anderson, 1986; Venkatraman, 2017). These conflicts might undermine the success of ambidextrous approaches, and consequently also the wider DT objectives. In fact, organizational tensions in this context can be plentiful and might appear related to various issues. In particular, conflicts and tensions might arise from but are not limited to: capability tensions – e.g., existing core capabilities vs. new digital capabilities (Leonard-Barton, 1992); structural tensions – e.g., integration vs. autonomy in structural ambidextrous designs (Friesl, Garreau, & Heracleous, 2019; Raisch, Birkinshaw, Probst, & Tushman, 2009); process

tensions – e.g., productivity vs creativity (March, 1991); or strategic goals – e.g., profitability vs. innovation (Andriopoulos & Lewis, 2009).

As incumbents need to drive their DT, it is unavoidable to engage in organizational ambidexterity in some form and deal with the consequent organizational tensions. Managing and overcoming these tensions is therefore an essential factor for the success of DT initiatives. If tensions are not addressed, they might eventually cause the demise of strategic goals. For example, Smith and Beretta (2021: 188) emphasize that coping with and managing tensions is a “highly difficult balancing act” which needs to be recognized by management in order for it to be possible to be prepared to cope with and alleviate them.

Therefore, organizational tensions that arise in ambidextrous designs represent a second major challenge for incumbents in the context of DT.

### **Differing Perceptions of Digital Readiness**

The success of digital initiatives also depends on the alignment of individual stakeholder perceptions regarding the digital readiness of an organization (Gfrerer et al., 2021). Thus, differing perceptions between stakeholders who are involved or affected by digital initiatives pose a key challenge to overcome for incumbent firms. In particular, differing perceptions regarding digital readiness between managers and employees within the organization but also between incumbents and their customers can undermine the successful transition in the context of DT.

The implementation of digital change initiatives might alter employee and/or customer routines, demonstrating that management needs to take the individual perceptions of these stakeholders into account. Indeed, Gfrerer and colleagues (2021) suggest that shared perceptions among employees and managers are a prerequisite for successful DT initiatives through examining differences in perception across hierarchies within firms. Similarly, Schneider and Sting (2020) highlighted the necessity for managers to pay attention to employee perceptions and communication strategies surrounding DT initiatives in order to establish

uniformity across hierarchical levels. If these factors are not taken into account, employees might resist change initiatives and prevent a successful transition.

Additionally, Kane et al. (2017) point out that organizations achieving notable success in terms of DT consider how their customers and partners utilize digital technologies and adjust accordingly. Furthermore, customers can also resist change initiatives (Ram & Sheth, 1989) and thus potentially compromise the success of incumbents' DT. Consequently, differing perceptions and the recognition of potential obstacles of varying readiness perceptions in buyer-supplier relationships present a crucial challenge for incumbents'. Therefore, considering buyer-supplier perceptions and management-employee perceptions is essential. Conversely, firms that neglect to do so may experience difficulty realizing success with DT initiatives in the future (Lucas Jr. & Goh, 2009) if customers reject them, despite an internal alignment between managers and employees.

In summary, incumbents face a plethora of challenges that they need to overcome to achieve success in their DT. Three of the main challenges were identified in this chapter. First, as digital technologies spread incumbent firms need to adopt them and develop new capabilities. However, this transition comes at varying speeds (Kane et al., 2017), which creates capability level-differences between firms. This might be a particular challenge for firms' business relationships as they need to maintain alignment with their existing customer firms and at the same seize the opportunities of DT. Second, as competitive landscapes change, incumbent firms attempt to develop new digital capabilities. By doing so they are constrained due to existing structures and processes (Chanias, Myers, & Hess, 2019). To overcome this constrain, incumbents often set-up structurally separated semi-autonomous business units with the mandate to drive digital capability development (Broekhuizen et al., 2018; Visser, Weerd-Nederhof, Faems, Song, van Looy, & Visscher, 2010). However, this does also give rise to a multitude of conflicts in the course of such endeavors (Hamel & Zanini, 2016). Third, the success of digital initiatives is also dependent upon the individual

stakeholders and their perceptions regarding the digital readiness of an organization (Gfrerer et al., 2021); these might not be limited to the organization itself, but also other stakeholders too – for example, buyers represent a crucial component, as their acceptance is vital for the success of new products (Ram & Sheth, 1989). Achieving alignment with regard to the perceived digital readiness across firms, therefore, constitutes a critical success factor for DT (Gfrerer et al., 2021).

## **2.2 Selected Theoretical Perspectives on Digital Transformation**

To address these challenges and provide more nuanced insights on how incumbents deal with them, theoretical perspectives are an essential tool for research. In this dissertation, the above-described challenges will be looked at from various angles that are briefly introduced and put into context in this chapter: first, the capability-based view of the firm (Amit & Schoemaker, 1993); second, organizational ambidexterity (March, 1991) and third change readiness and in particular, digital readiness (Gfrerer et al., 2021).

### **2.2.1 The Capability-based-view of the Firm**

The capability-based view of the firm highlights the centrality of organizational capabilities as essential in determining a firm's sustained competitive advantage (Amit & Schoemaker, 1993). Organizational capabilities describe the knowledge, skills, and resources which enable firms to create and capture value (Leonard-Barton, 1992). According to the capability-based view of the firm, organizational capabilities are the primary drivers of a firm's competitive advantage as they enable firms to adapt to changing market conditions and to develop new products and services that meet their customer demands (Helfat & Peteraf, 2003). Additionally, capabilities allow firms to coordinate and integrate internal resources and activities, which is an essential practice for achieving efficiency and effectiveness (Collis, 1994). This theoretical perspective was utilized in the first paper "Digital capability gaps in traditional industries: Influencing factors and strategic responses."

Generally, capabilities might be classified into operational capabilities and dynamics capabilities: operational capabilities represent a routine or a compilation of routines (Winter, 2000) that are directly concerned with the production of products, providing a service, or the tasks necessary to do so; dynamic capabilities are not directly concerned with such activities, but rather reflect a “firm’s ability to integrate, build, and reconfigure” operational capabilities (Helfat & Peteraf, 2003; Teece, Pisano, & Shuen, 1997: 516). Whereas studies have already emphasized the need to develop dynamic capabilities for DT (Teece, 2020; Verhoef et al., 2021; Volberda et al., 2021; Warner & Wäger, 2019), the focus in this thesis rests on the operational aspect of digital capabilities.

In this context, the capability-based view of the firms offers a suitable perspective, as DT involves the adoption and integration of digital technologies into a firm’s value creation and capture activities (Kane et al., 2017). This requires the development of new skills and knowledge, as well as the integration of these skills and knowledge across the organization (Warner & Wäger, 2019). The capability-based view of the firm emphasizes the role of organizational capabilities in enabling firms to adapt and respond to changing market conditions. This is particularly relevant in the context of DT. Thus, it can provide insights into how firms can effectively coordinate and integrate these changes in order to realize the benefits of DT.

In summary, the capability-based view of the firm offers a useful framework for understanding how firms can successfully navigate DT in the pursuit of achieving competitive advantage.

### **2.2.2 Organizational Ambidexterity (Structural Ambidexterity)**

Organizational ambidexterity has gained increasing attention in the management literature as a key determinant of organizational success. It refers to the ability of an organization to pursue both exploration and exploitation: exploration refers to the process of seeking out new ideas and opportunities; exploitation refers to the process of utilizing and refining existing ideas and resources (March, 1991; Raisch, 2008). This theoretical perspective was utilized in the second paper “Digital Transformation of incumbents via structural ambidexterity: A case study of escalating tensions.”

Achieving ambidexterity is challenging for organizations, as exploration and exploitation require different resources and processes. In an attempt to achieve ambidexterity research defines three main approaches to ambidexterity: structural, sequential, and contextual (O'Reilly & Tushman, 2013). Some organizations attempt to achieve ambidexterity through structural ambidexterity by creating separate units for exploration and exploitation (O'Reilly & Tushman, 2008; Raisch & Tushman, 2016). Another approach to achieving ambidexterity is adopting a sequential design, which involves switching between phases of exploitation and exploration over time (Siggelkow & Levinthal, 2003). Finally, contextual ambidexterity includes implementing flexible systems and processes that allow for both exploration and exploitation to occur, as well as establishing a culture that values and supports both types of activities at the same time (O'Reilly & Tushman, 2013). Moreover, these approaches are not necessarily mutually exclusive and can be happening simultaneously or in sequence (Birkinshaw & Gibson, 2004). For example, incumbents might start out by structural ambidexterity when starting an autonomous sub-unit and once matured switch to contextual or sequential ambidextrous designs.

Organizations that are able to achieve ambidexterity are better to respond to changing market conditions and customer needs. This makes this perspective particularly suitable for research on DT as DT requires organizations to simultaneously pursue both exploration and

exploitation (Smith & Beretta, 2021). On the one hand, organizations need to explore the use of new digital technologies and approaches in order to stay ahead of competition and find new ways to use digital technologies to improve their operations and customer experience. On the other hand, they also need to exploit existing technologies and processes in order to be efficient and effective (Nambisan, Lyytinen, Majchrzak, & Song, 2017; Svahn et al., 2017).

In summary, an organizational ambidexterity perspective offers a fruitful pathway to explore incumbents' DT efforts as they attempt to effectively balance exploration and exploitation in the process of adopting new digital technologies and approaches.

### **2.2.3 Change Readiness and Digital Readiness**

Change readiness is the organization's ability to successfully adopt and implement change. Thus, the concept helps to assess if an organization is ready to successfully undertake a change initiative or make a significant change to its business model (Kaplan & Norton, 2004). Literature describes several factors that can impact an organization's change readiness, including its leadership, culture, communication systems, and level of employee engagement – all of which can affect the adaptability of incumbents and their ability to handle the challenges that come with implementing change initiatives (Holt, Armenakis, Feild, & Harris, 2007). This theoretical perspective was utilized in the third paper “The Digital Readiness Matrix – Being ready is half the battle to master digital transformation.”

Digital readiness in particular, represents a certain and complex change scenario (see also chapter 2.1.1. The concept of Digital Transformation, p. 12 ff.) and refers to an organization's ability to effectively use and leverage digital technologies to support its operations and achieve its strategic goals. This involves having the necessary infrastructure, processes, and skills in place to effectively utilize digital technologies, which includes developing a strong digital presence, as well as the ability to collect, analyze, and use data to improve decision-making (Gfrerer et al., 2021).

Therefore, digital readiness represents a useful perspective for research on DT because it has the potential to help organizations understand and prepare for the challenges and opportunities that come with implementing digital change initiatives. As discussed above, DT involves significant changes to an organization's operations and processes and thus is a complex and challenging change process (Hanelt et al., 2021). By considering digital readiness, one can assess an organization's readiness to adopt digital technologies and identify any potential barriers or challenges that may need to be addressed to successfully transform. This perspective can also help to understand how to effectively manage the change process and support organizations as they adapt to new digital technologies and ways of working (Gfrerer et al., 2021).

Overall, the digital readiness perspective can provide valuable insights and guidance for DT initiatives, helping to better understand the challenges and opportunities incumbents may face and how to effectively navigate this complex change process.



### 3. Research Approach

In this chapter, I will elaborate briefly on the general research approach, data collection process, and particular challenges I faced while pursuing research during a global pandemic. This dissertation follows a solely qualitative research approach. In general, qualitative research aims to achieve a “holistic understanding of a phenomenon” (Bloomberg & Volpe, 2019: 42). Therefore, choosing a qualitative research approach is seen as particularly suitable for this dissertation, which aims to establish a holistic picture of incumbents’ DT. Furthermore, it is the intent of this thesis to explicate patterned relationships in incumbents’ DT rather than “merely [...] explaining and predicting effects” (Cornelissen, 2017: 372).

By choosing a qualitative methodology the researcher aims to deep-dive into the essence of a topic, which requires the researcher to be deeply immersed in the topic, objects and people studied. A key challenge is thereby presented in the requirement to find an appropriate research approach. Indeed, in qualitative research, different methodologies are not favored over one another (Bloomberg & Volpe, 2019) and also do not relate to strict guidelines one needs to adhere to in their use (Graebner, Martin, & Roundy, 2012). These notions are exemplified by Pratt et al. (2009: 556), who underline them in the following statement: “there is no accepted “boilerplate” for writing up qualitative methods and determining quality.”; in qualitative research, the challenges rather are placed unto the researcher to match a research approach to a specific research problem or question (Bloomberg & Volpe, 2019).

Generally, there might be two approaches to explain strategic change, in this case, the strategic change in the context of DT: one approach may be to employ variance theory, which is concerned with explaining distinct phenomena with regard to relationships between dependent and independent variables; another may be process theory, which focuses on studying distinct sequences of events causing a certain outcome (Langley, 1999; Mohr, 1982). As argued above, qualitative research is about a holistic understanding of phenomena, which means that both approaches – variance theory and process theory – are utilized in this

dissertation – in papers I and III, and paper II, respectively. The individual research approaches and rationale for choosing them are briefly outlined below (for a more detailed description of the methodology, see the individual chapters):

The first paper (see also Chapter 4, p. 30 ff.), follows a multiple case study design (Eisenhardt, 1989; Yin, 2018) – commonly referred to as the “Eisenhardt Method” (Eisenhardt, 2021) – to investigate a total of five cases of incumbent firms. This method is particularly useful when there is insufficient knowledge around a topic (Eisenhardt, 1989), with the method’s main aim being to develop and link constructs together to explain a particular phenomenon (Eisenhardt, 2021). Thus, following this approach to discover and explore the influencing factors of DCGs between incumbents and customers, as well as generating understandings of what incumbents’ responses are, is highly suitable as DCGs remain underexplored.

The second paper (see also Chapter 5, p. 76 ff.), follows an extended case method design (Burawoy, 1991, 1998; Danneels, 2010). This methodology aims to extend an existing body of research and is appropriate for research on complex and unstructured phenomena – the appropriateness of this method is illustrated through the study by Tripsas and Gavetti (2000), which used a similar approach in their study of Polaroid’s digital imaging shift. As the paper investigates how tensions unfold and affect maturing, structurally separate units of incumbents in the context of DT, it corresponds with the aim of the second chapter to explore ambidextrous designs of an incumbent firm in the context of its DT. Furthermore, this study draws on a longitudinal in-depth case study of an incumbent firm which is a particularly suitable method when studying structural ambidexterity (Harreld, O'Reilly, & Tushman, 2007; O'Reilly & Tushman, 2013; Raisch, 2008).

The third paper (see also Chapter 6, p. 128 ff.), aims to understand what people think and perceive with regard to digital readiness of their firm by asking: How do consistent or inconsistent perceptions between managers and employees or suppliers and buyers impact the

digital readiness of firms? Due to the requirements for richness presented by this question, in-depth, semi-structured interviews lay the foundation for this paper. However, while the internal validity of cases in qualitative research is strong, external validity and generalizability might be limited (Ferlie, Fitzgerald, Wood, & Hawkins, 2005). Consequently, this paper builds on a comparative case study approach (Eisenhardt, 1989) to increase external validity. Overall, four cases consisting of interviews with focal firms and business clients were investigated.

Another key challenge of conducting qualitative research is research access (Friesl, Hanel, & Konuk, 2022). Qualitative research often requires a plethora of different cases and data sources. However, obtaining these is not only time intensive for the researcher and participants but might also include highly sensitive and critical information about an organization that would otherwise not be studied in detail. Furthermore, qualitative studies often require numerous face-to-face interviews, which meant that the aforementioned challenges for qualitative research were evermore amplified by a global pandemic whilst this study was conducted. However, taken together, this dissertation draws on 48 semi-structured interviews across 15 organizations. This is supplemented by notes from numerous informal interviews and meetings. Furthermore, to complement the primary interview data, an extensive amount of secondary was collected – especially for Papers I and II. A detailed overview of the data utilized is provided in each method section of the chapters on the following pages.

## **4. Digital capability gaps in traditional industries: Influencing factors and strategic responses**

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### **Abstract**

This paper introduces the concept of digital capability gaps (DCG); the relative difference of a focal firm's ability to design and control products, services, and processes by utilizing digital technologies in relation to customers. These capability differences matter as they affect incumbents' strategic response and the value-creating relationship between firms and customers. First, our findings reveal that strategic responses differ according to the magnitude of DCGs: Large DCGs may offer the opportunity for 'digital diversification' by using the capabilities developed to enter new domains. In cases of moderate DCGs, firms aim to bridge gaps by adopting the role of a 'digital parent' and innovate on behalf of customers. Finally, in the cases of small DCGs firms may respond by forming 'digital collaborations' in order to jointly develop digital capabilities. Second, our study also unpacks the influencing factors that affect DCGs: the consolidation or fragmentation of customer portfolio and competitive landscape and the extent to which players have a similar digital pressure for adopting digital capabilities. Overall, our study contributes to the growing literature on the digital transformation of incumbents.

## 1. Introduction

Incumbent firms in traditional industries such as construction, manufacturing, or trade increasingly undergo digital transformation (DT). In order to cope with the changing environment and achieve or maintain a competitive advantage, incumbents need to complement their existing competences with new ‘digital’ capabilities (Eller, Alford, Kallmünzer, & Peters, 2020; Verhoef et al., 2021; Volberda, Khanagha, Baden-Fuller, Mihalache, & Birkinshaw, 2021). Digital capabilities are described as firms’ ability to design and control products, services, or processes by utilizing digital technologies (Yoo, Boland, Lyytinen, & Majchrzak, 2012). Yet, the level of such digital capabilities may substantially vary across firms (Kane, Palmer, Phillips, Kiron, & Buckley, 2017; Nelson, 1991) and thus, can have substantial strategic implications for the relationship between incumbent firms and their customers.

In this paper, we use the notion of digital capability gaps (DCGs) to describe such differences between incumbent firms and their customers. We define DCGs as the relative difference of a focal firm’s ability to design and control products, services, and processes by utilizing digital technologies in relation to customers. DCGs may manifest in different ways depending on whether focal firms or customer firms display relatively higher levels of digital capabilities. For instance, in traditional industries craft related practices might still be more important than digital technologies resulting in lower levels of digital capabilities compared to focal firms. Consequently, adoption times across customers increase and potentially negatively affect the DT efforts of the focal firm (Garcia, Bardhi, & Friedrich, 2007). Yet, there might also be instances in which customer firms demand more advanced digital capabilities (Keaveney, 1995). These examples already suggest that DCGs have different characteristics and may also require different strategic responses. However, current research has mainly focused on how incumbents develop digital capabilities (Chanias, Myers, & Hess, 2019;

Hess, Matt, Benlian, & Wiesböck, 2016; Roy, Lampert, & Stoyneva, 2018; Svahn, Mathiassen, & Lindgren, 2017; Verhoef et al., 2021). Yet, what influences DCGs and incumbents' responses to DCGs have remained an ill-understood topic in the context of DT.

The capability-based-view provides a useful conceptual frame to understand what influences DCGs and what respective responses are. The capability-based view of the firm considers organizations as bundles of resources and capabilities that are deployed towards a particular end, such as DT (Amit & Schoemaker, 1993; Ethiraj, Kale, Krishnan, & Singh, 2005). This portfolio of capabilities is underpinned by a firm's strategic orientation within its market setting; the extent to which firms tend to focus on customers or competitors in strategy making (Gatignon & Xuereb, 1997). A firm's strategic orientation thus affects the portfolio of capabilities deployed and how incumbents interact with customers and competitors (Zhou & Li, 2010). Hence, this perspective helps us to address the following research questions: What are influencing factors of DCGs between incumbents and customers and what are incumbents' responses to such DCGs?

To answer this question, we build on a multiple case study design (Eisenhardt, 1989, 2021; Yin, 2018) of five incumbent firms in traditional industries. Our findings reveal that strategic responses differ according to the magnitude of DCGs: Large DCGs may offer the opportunity for 'digital diversification' by using the capabilities developed to enter new domains. In cases of moderate DCGs, firms aim to bridge gaps by becoming adopting the role of 'digital parents'; innovating on behalf of customers. Finally, in the cases of small DCGs firms may respond by forming 'digital collaborations' in order to jointly develop digital capabilities. Moreover, our study also unpacks the influencing factors that give rise to DCGs: the consolidation or fragmentation of customer portfolio and competitive landscape and the extent to which players have a similar digital pressure for adopting digital capabilities. These can either be symmetric or asymmetric. These factors influence incumbents' strategic orientation and thus the deployment of digital capabilities.

These findings make three contributions to the growing debate on DT in incumbent firms (Chanas et al., 2019; Hess et al., 2016; Roy et al., 2018; Svahn et al., 2017; Verhoef et al., 2021). First, our conceptualization of DCGs helps to better understand the nuances of capability-level differences between incumbents and their customers in the context of DT. While extant research already reveals that firms can be at different stages of DT (Kane et al., 2017; Volberda et al., 2021), our findings suggest that digital capabilities need to be considered not only with regard to the overarching idea of maturity (Kane et al., 2017) but in relation to other firms as well. This matters as, second, DCGs may have both positive and negative strategic implications. Our findings show that these relative capability levels matter for DT. Complementing extant research on DT (Chanas et al., 2019; Warner & Wäger, 2019), we show that DCGs might be exploited as diversification opportunities or else require mitigation (via ‘digital parenting’ or ‘digital collaborations’) to develop existing customer relationships into the digital sphere. Finally, third, our paper unpacks the influencing factors of DCGs: the density of the customer portfolio and the competitive landscape and the extent to which pressures for DT are distributed across the industry (horizontal vs. vertical digital pressure). These findings complement prior research on the triggers and resources of DT (Matarazzo, Penco, Profumo, & Quaglia, 2021; Verhoef et al., 2021; Volberda et al., 2021; Warner & Wäger, 2019).

## **2. Theoretical Background**

### **2.1 Incumbent Firms, Digital Transformation, and Digital Capability Gaps**

Incumbent players face increasing competition due to the rise of new digital technologies (Verhoef et al., 2021) that threaten their established business models (Volberda et al., 2021). Yet, at the same time, DT represents a way to maintain and increase competitiveness, e.g., if firms succeed when digitally transforming processes or products (Ferreira, Fernandes, & Ferreira, 2019). Consequently, DT is now an integral part of incumbents' strategy agendas (Fitzgerald, Kruschwitz, Bonnet, & Welch, 2014; Hess et al., 2016; Warner & Wäger, 2019). Against this backdrop, it is not surprising that DT has gained increasing attention in the strategy and entrepreneurship literature (Lanzolla, Lorenz, Miron-Spektor, Schilling, Solinas, & Tucci, 2020; Rietveld, 2018; Roy et al., 2018; Srinivasan & Venkatraman, 2018; Verhoef et al., 2021; Volberda et al., 2021). Following Hinings and colleagues (2018: 53), we understand DT as “the combined effects of several digital innovations bringing about novel actors (and actor constellations), structures, practices, values, and beliefs that change, threaten, replace or complement existing rules of the game within organizations, ecosystems, industries or fields (Krimpmann, 2015; Loebbecke & Picot, 2015; Mangematin, Sapsed, & Schüßler, 2014).”

First and foremost, strategy scholars argue that while “the basic conceptual tools of our trade [...] remain invaluable, a new set of frameworks may be useful to understand the impact of digital transformation” (Adner, Puranam, & Zhu, 2019: 259). Thus, scholars have started to address a multitude of topics in the context of DT, such as organizational change (Hanelt, Bohnsack, Marz, & Antunes Marante, 2021) or digital entrepreneurship (Jafari-Sadeghi, Garcia-Perez, Candelo, & Couturier, 2021). An important stream of research acknowledges that DT requires firms to develop new and/or change their existing portfolio of capabilities (Eller et al., 2020; Ferreira et al., 2019; Siachou, Vrontis, & Trichina, 2021; Urbinati, Manelli, Frattini, & Bogers, 2021; Verhoef et al., 2021; Volberda et al., 2021). Thereby,



strategy and entrepreneurship scholars have investigated different aspects, such as the positive impact of distinct resources for DT (Eller et al., 2020), how dynamic capabilities foster the DT of incumbents (Teece, 2020; Teece & Linden, 2017; Warner & Wäger, 2019), and how firms can exploit digital capabilities (Autio, Nambisan, Thomas, & Wright, 2018; Nambisan, Siegel, & Kenney, 2018). Furthermore, research highlighted the value creation potential of DT through novel resource configurations (Amit & Han, 2017) and the importance of collaborations and strategic alliances for capabilities in context of DT (Cherbib, Chebbi, Yahiaoui, Thrassou, & Sakka, 2021; He, Meadows, Angwin, Gomes, & Child, 2020).

More specifically, there is an increasing focus on how incumbent firms in traditional industries tackle the challenges of DT (Furr, Ozcan, & Eisenhardt, 2022; Roy et al., 2018; Svahn et al., 2017; Verhoef et al., 2021; Volberda et al., 2021). This stream of research suggests that the path of DT may go two ways. On the one hand, incumbents are held back by challenges to adapt to changing environments, capability level inertia, and consequently, a lack of new digital capabilities (Tripsas & Gavetti, 2000; Volberda et al., 2021). On the other, incumbents may be able to renew themselves and profit from emerging business opportunities, thus creating new digital capabilities and capturing new value (Agarwal & Helfat, 2009; Roy et al., 2018). For instance, Warner and Wäger (2019) portray the DT of incumbents in traditional industries as an ongoing process of incorporating digital technologies in firms' day-to-day activities. Furthermore, Roy and colleagues (2018) point out that incumbents can, in fact, 'avianize' themselves (as they call it) instead of falling victim to the 'innovators dilemma' (Christensen, 1997). However, while previous studies emphasized the need to develop capabilities for DT (Teece, 2020; Volberda et al., 2021; Warner & Wäger, 2019) or foregrounded stages of digital maturity (Kane et al., 2017; Verhoef et al., 2021), our focus rests on digital capability-level differences between incumbents and their customers. Indeed, as incumbents attempt to develop digital capabilities, they do so via different means, causing substantially different levels of digital capabilities across firms (Kane et al.,

2017). We conceptualize these varying degrees between incumbents and their customers in designing and controlling products, services, and processes by utilizing digital technologies as DCGs.

Furthermore, prior research highlights the relationship of incumbents with customers as a main driver of incumbents' DT (Andal-Ancion, Cartwright, & Yip, 2003). However, while current research focuses on how incumbents develop digital capabilities (Chanias et al., 2019; Roy et al., 2018; Svahn et al., 2017; Volberda et al., 2021), the importance of different digital capability levels between incumbents and their customers remains an ill-understood topic in the context of DT. Below we draw on the capability-based view of the firm to address this issue.

## **2.2 A Capability-based Perspective on Digital Capability Gaps**

To tackle the challenges of DT, incumbents need digital capabilities. They represent the ability of firms to design and control products, services, or processes by utilizing digital technologies (Yoo et al., 2012). Drawing on Leonard-Barton (1992), this 'ability' can be operationalized into four distinct capability components: specific knowledge and skills, technological systems, managerial systems, and norms and values that foster a firm's DT in a specific context. More precisely, employees' knowledge and skills are firm-specific routines and technical comprehension, made explicit in technical systems by collecting and organizing this tacit knowledge. These are guided and triggered by managerial systems, such as networks, to create new knowledge as well as controlled by reporting structures. Ingrained in these elements are values and norms, which refer to the way of structuring, collecting, and controlling knowledge in the firm.

Building capabilities requires firms to acquire knowledge (Grant, 1996) that becomes embedded in organizational routines (Eggers & Kaplan, 2013; Zollo & Winter, 2002). Firms do so by strategically orientating towards other firms. Strategic orientation in this context "focuses on how firms should interact with external environments such as customers,

competitors, and technology to conduct business (Day, 1994; Gatignon & Xuereb, 1997)” (Zhou & Li, 2010: 224). This orientation paves the way for how they retain, distribute, and utilize resources (Zhou & Li, 2010). Thereby incumbents’ strategic orientation can be toward particular groups of organizations such as customers (Denoo, Yli-Renko, & Clarysse, 2021; Ethiraj et al., 2005; Hashai & Zander, 2018; Helfat & Raubitschek, 2000; Slater & Narver, 1998) and/or competitors (Day, 1994; Day & Wensley, 1988; Gatignon & Xuereb, 1997; Han, Kim, & Srivastava, 1998; Huygens, van den Bosch, Volberda, & Baden-Fuller, 2001). We particularly focus on these two orientations rather than including technological orientation for two reasons: First, as this paper is inherently about the technological orientation of incumbents, namely their DT efforts, all firms in this context are guided by this orientation. Second, the degree to which the strategic orientation is successful depends highly on market dynamics (Jaworski & Kohli, 1993), which are mainly influenced by two key players: customers and competitors (Zhou & Li, 2010).

Thus, incumbents’ level of capabilities depends on their orientation towards customers. This orientation can entail either structured interactions (e.g., as part of a project) or unstructured (e.g., revealed in casual conversations) and may come in different forms such as customer feedback, customer relationship, and simply through producing and distributing products or services (Helfat & Raubitschek, 2000). Multiple studies deal with vertical interactions with regard to the acquisition of capabilities. For example, Denoo and colleagues (2021) point out that the customer portfolio has a significant impact on the development of firms. Correspondingly, Ethiraj and colleagues (2005) point out that capabilities are context-specific and come from ‘learning by doing’ in customer interactions. By addressing the question “where do capabilities come from?” they revealed that long-term customer relationships lead to the development of specific capabilities that positively affect turnover and cost efficiency. Further, Burgelman’s seminal paper (2002) on the co-evolution of Intel’s capabilities with the semi-conductor industry also illustrates an example of customer-centric learning.

Intel's focus on its current customer segment led to a co-evolutionary lock-in and displays the importance of customer firms for capabilities.

Furthermore, incumbents' level of digital capabilities also depends on their orientation towards competitors. This may occur by observing their market activities (Levinthal & Myatt, 1994; Lewin & Volberda, 1999) and thus imitation (Ahuja & Katila, 2004; Friesl, Garreau, & Heracleous, 2019; Huygens et al., 2001), yet also via direct interactions, e.g., collaboration with competitors in the form of joint ventures (Kogut, 1988) or alliances to seize new knowledge (Grant & Baden-Fuller, 2004; Hamel, 1991; Koza & Lewin, 1998). Also, capabilities may be acquired via M&A transactions with the intent to reconfigure existing and integrate new knowledge (Karim & Mitchell, 2000; Vermeulen & Barkema, 2001). For instance, in their multiple case study of the music industry, Huygens and colleagues (2001) show that firms search for new capabilities within their competitive landscape. The competitive dynamics between incumbents and new firms triggered the formation of new capabilities and, consequently, new organizational forms. Furthermore, Ahuja and Katila (2004) found that once firms are restricted in their opportunities, they expand their search beyond the usual scope. Moreover, Moghaddam and colleagues (2016) argue that forming strategic alliances leverages firms' capabilities. However, engaging in too many alliances has the opposite effect.

Thus, based on the relationship between firms' strategic orientation in particular market settings and firms' organizational capabilities we ask the following research questions: What are influencing factors of DCGs between incumbents and customers and what are incumbents' responses to such DCGs?

### **3. Research Methods**

We adopt a multiple case study design to gain in-depth insights into the nuances of customer DCGs and respective strategic responses. As extant theory seems insufficient and only little is known about the different digital capability levels between incumbents and their customers, this approach seems particularly useful (Eisenhardt, 1989, 2021; Yin, 2018). Furthermore, multiple cases enable more robust results and generalizability than single cases (Eisenhardt & Graebner, 2007). As this paper focuses on differences in existing customer DCGs and not the process of DT, we rely on a cross-sectional data set. We also follow a replication logic, whereby each case confirms or disconfirms conclusions drawn from previous ones. As a result, this leads to increased generalizability of findings (Bingham, Howell, & Ott, 2019; Eisenhardt & Graebner, 2007).

#### **3.1 Research Context**

To investigate different levels of customer DCGs and respective strategic responses, we selected a focus in which such issues are likely to be salient. We argue that this is particularly the case in traditional industries, which are often characterized by a modest technology focus (McKelvey & Ljungberg, 2017). These traditional industries include areas such as retail trade, service sectors, manufacturing, and construction (Anna, Chandler, Jansen, & Mero, 2000; Edelman, Brush, & Manolova, 2005). Indeed, a recent study by the German Federal Ministry of Economic Affairs and Climate Action (Büchel & Engels, 2022) reveals that the adoption of digital technologies in such traditional industries lags behind the overall industry average (as measured by a digitalization index). For instance, the average digitalization index in Germany (which represents the status quo and the development of digitalization in the German economy by aggregating a large amount of data into one index value) in 2021 was 105.1. Traditional industries, such as retail/trade and manufacturing, only achieved 75.1 and 72, respectively.

We started our research with the case of Gamma (trade). The company faced challenges through varying degrees of digital capabilities between them and its customers. Thus, after initial analysis of the Gamma case, we chose further firms in B2B contexts as the pressure of DT is likely to be on both the focal firm and its customer firms. Indeed, in the context of DT, incumbents aim to improve their current business performance through digital technologies while searching for new digitally enabled business opportunities. In contrast to incumbents, entrepreneurial firms have been characterized as companies younger than six years and tend to be more explorative than exploitative (Bingham et al., 2019; Zahra, Ireland, & Hitt, 2000). We chose to sample across industries as this offers the possibility of gathering comparative data on potential contextual contingencies on DT. Furthermore, we relied on a cross-industry sample as the initial case of Gamma suggested that the consolidation or fragmentation of customer portfolio may play a vital role. Consequently, we added Alpha (trade), Beta (manufacturing), Delta, and Epsilon (both manufacturing and trade). We use pseudonyms for the case firms to ensure confidentiality. All the focal firms in our sample are major players in their respective niches. Thus, our final sample consists of five DT cases of German incumbents in various non-related traditional industries (an overview is provided in Table 1).

**TABLE 1** Case Overview

Focal firm	Revenue in mil. €	Type of firm	Founded	No. of employees	No. of formal + informal interviews	Informants by type focal firm	Informants by type customer firm	No. of secondary data sources
Alpha	< 200	Trade	1900s	~ 600	5+3	Executives: 1 Management: 3 Employees: 1	Executives: 1 Management: 1 Employees: 0	17
Beta	< 200	Manufacturing	1900s	~ 300	10+4	Executives: 1 Management: 4 Employees: 4	Executives: 1 Management: 0 Employees: 0	26
Gamma	< 200	Trade	1800s	~ 600	9+3	Executives: 2 Management: 1 Employees: 2	Executives: 1 Management: 2 Employees: 1	13
Delta	< 200	Manufacturing + Trade	1800s	~ 300	5+3	Executives: 1 Management: 0 Employees: 2	Executives: 0 Management: 1 Employees: 1	13
Epsilon	< 200	Manufacturing + Trade	1900s	~ 300	9+2	Executives: 3 Management: 2 Employees: 2	Executives: 0 Management: 1 Employees: 1	18

Alpha is a privately-owned wholesaler focused on spare parts for their specific industry segment. Beta is a family-owned manufacturer and supplier of components for original equipment manufacturers. Similarly to Alpha, Gamma is a wholesaler. Their product range spans across multiple related industries. Delta is a mechanical engineering firm and spare parts provider. Epsilon is a wholesaler and producer of essential parts for manufacturing companies. We found that all focal firms in our setting, apart from digital initiatives, possess similar core capabilities. They distinguish themselves through special and long-term customer relationships and in-depth product knowledge. In contrast, customer firms draw on a combination of craftsmanship, which we describe as the required skill set to meet the competitor-specific consumer demands and product and service creation, the ability to combine individually unusable products and services to create value for the customer by using craftsmanship.

### 3.2 Data Collection

We used three main data sources: (1) qualitative data from semi-structured interviews with key informants in focal firms and key informants of customer firms, (2) available secondary data, including press releases, annual accounts, news articles featuring case companies, and industry reports (3) and notes from informal meetings, emails, and phone calls about the research project.

Our main data source are 38 semi-structured interviews with multiple key informants across hierarchical levels of focal firms and interviews with respective customer firms (see Table 1). The initial interviews were conducted either with the owning manager or managing director of the focal firm. After that, we used snowball sampling to gather data for each of the cases. This is a sampling approach where the initial contacts, which are relevant to the topic of the research, are used to establish further contacts. We thus asked initial interviewees (typically the Managing Directors) to make recommendations regarding additional interviewees that are relevant and knowledgeable about the research topic (Bell, Bryman, & Harley, 2022; Bingham et al., 2019). For instance, in the case of Delta, we conducted an initial interview with the owner manager, who then scheduled interviews with two employees and recommended a manager as well as an employee from a customer firm. We followed the same approach for all case companies. The majority of additional interviews were conducted within three months of the initial interview with managing directors. Interviews lasted between 30 and 90 minutes.

The interview guide (see Appendix Chapter III) consisted of open-ended core questions and a specific list of questions that varied depending on the interviewee's role. For example, the interview guide with executives aimed to collect a general overview, while interviews with customers focused on the particular interaction between firms and customers. Apart from one interview, which was conducted jointly, all interview data was collected by the first author. The interview data was then enriched with secondary data sources and detailed



notes taken throughout the course of the research project. Even though the notes from informal discussions did not necessarily evolve around DCGs, they were particularly relevant for insights into the context, challenges, and products in the respective markets and provided a contextual understanding for the research.

An important consideration when conducting case study research is informant bias (Bingham et al., 2019; Martin & Eisenhardt, 2010). To address this issue, we interviewed informants at multiple hierarchical levels across firms (see Table 1). We further granted full anonymity to all informants and firms to foster the openness of the interviewees. Where possible, we also supplemented our interview data with secondary data sources. Finally, all participants of focal firms showed a strong interest in the topic, as DT is challenging their business.

### **3.3 Data Analysis**

Data analysis involved three main steps. First, we started with the within-case analysis in which the relationship of the focal firm with customer firms was the unit of analysis. We collated all available data and screened it for relevance in conjunction with the research objective (Miles, Huberman, & Saldaña, 2020) to prevent “death by data asphyxiation” (Pettigrew, 1990: 281). As we were aware of the extant literature around strategic orientation, capabilities, and DT, we combined theory elaboration (Shepherd & Sutcliffe, 2011) and theory building (Eisenhardt, 1989). Thus, we engaged in both top-down as well as open coding across all interviews and documents. In addition to the importance of a firm’s strategic orientation towards customers and/or competitors, which comes from existing theory (Zhou & Li, 2010), open coding revealed emergent findings such as the structure of the customer portfolio and digital pressure.

Coding was an iterative process. We initially assigned descriptive first order themes that were then aggregated in multiple steps to more abstract second order codes (Strauss & Corbin, 1997). Both the first and second author were involved in this process. We relied on

frequency counts of first order themes (occurrence across interviews and documents) to ensure that codes used for subsequent analysis are represented in multiple primary and secondary sources. To show the relative prevalence of second order codes across our data set, we then aggregated these frequency counts (number of interviews that include at least one first order theme from the list of first order themes per second order code). The trail of evidence for this step of data analysis, linking primary data with first and second order codes, is presented in Table 2. Moreover, in Table 2 we also show the frequency counts and data triangulation by drawing on primary interview and secondary data supporting second order codes. This triangulation was especially necessary as our research might suffer from retrospective bias (Graebner, Martin, & Roundy, 2012).

In the second step of data analysis, we evaluated capability levels between focal firms as well as customers utilizing Leonard-Barton's (1992) construct of core capabilities as an analytical framework (Miles, Huberman, & Saldaña, 2020). Drawing on this framework, we operationalized digital capabilities into four dimensions (skills and knowledge, technical systems, managerial systems, and norms and value) and used these dimensions to compare and contrast digital capability levels across focal firms and customer firms. This step of analysis revealed that focal firms may display different levels of capability components compared to customers. We introduce the concept of DCGs to describe these differences. Table 4 displays a concise comparison of digital capability components as well as illustrative quotes as evidence for DCGs. We deliberately chose longer illustrative quotes in order to show how interviewees compared capability levels in their narratives. This is visualized by adding capability components in bold brackets throughout these quotes. Based on the analysis of DCGs, we started to construct within-case narratives that provide the rationale behind DCGs per focal firm. Two further researchers were involved in critically reviewing each within-case narrative to strengthen the case descriptions.

**TABLE 2** Trail of evidence (\*Number of interviews that included at least one of those first order codes)

Second order codes First order theme	Interviews (n=38)	Secondary Data (n = 87)	Illustrative quotes of first order codes
<b>Vertical digital pressure</b> <i>asymmetric</i>	<b>32/38 – 84%*</b>	<b>13/87 – 15%*</b>	
Our customers are not pressured to change at the moment	16/38	7	Companies [referring to Gamma customers] are making slow progress in their digital transformation and are reluctant to take advantage of digital opportunities. [...] Although targeted digitalization could save around 30% in planning capacities. (News Article - Gamma)
Our customer firms slowly adopt digital competences	21/38	7	However, the enormous potential of data to optimize business processes and develop new services is hardly utilized by many companies. Only around twelve percent of the companies surveyed by the [market research organization] say they use data fully for this purpose. In other areas, such as marketing, controlling, or business analysis, data is used even less efficiently. (News Article - Gamma)
The customer level market conditions have not really changed	15/38	5	I think the human element, change, and especially the [customer segment], is not the most innovative activity, because the fact is the activity of our customer, of the craftsman, does not change fundamentally. (Alpha)
<i>symmetric</i>			
The customer level market conditions have changed as well	10/38	4	Despite increasing popularity and continuous trends, the digital transformation and the changing information and shopping behavior lead to the fact that, as in this example, a [customer firm] cannot rely solely on its personal consulting strength, its expertise, and on the offline unique selling propositions [...]. (News Article - Beta)
Our customers need to push DT to remain competitive	10/38	2	You now have a connected [product], which is of course a competitive advantage from the companies and customers' point of view [...] Yes, that runs through all areas up to what we had earlier in the context of [...] efficiency increase and thus ultimately also increases the profit. (Beta)
<b>Horizontal digital pressure</b> <i>symmetric</i>	<b>29/38 – 76%</b>	<b>42/87 – 48%</b>	
DT intensified competitive pressure	22/38	16	The competitive landscape is still in turmoil and the intensity of competition is increasing. The increasing differentiation of offerings for specific application purposes is creating high innovation pressure. (Management Report - Beta)
Our competitors have a lot of digital competences	16/38	2	If you look at the market now, then you can quickly see how broad the portfolio of [competitor 1] and how broad the portfolio of [competitor 2] is. What has [competitor 3] to offer [...] You can also see on our page what we mean by complete system [...]. And that is of course only partially competitive. (Beta)
There are new digital entrants in the competitive environment	10/38	1	Customers come to us, spend three hours choosing their [product], get it drawn, also digitally visualized in 3D planning, and deal with it, but on-site with us. State of the art. That's how it is. Now it's also possible online.
We need to develop digital competences to remain competitive	24/38	23	Some start-ups do it really cleverly and very, very well. (Gamma) As an innovative company, we meet the challenges of digital transformation head-on and develop our own solutions to problems (Management Report - Epsilon)
<b>Customer portfolio</b>	<b>18/38 – 47%</b>	<b>12/87 – 14%</b>	
We only have a few customers	6/38	1	We are in a very comfortable, but at the same time also a very risky situation, namely by making most of the sales with one large customer. (Beta)
We have a lot of different customers	12/38	11	Due to our wide-ranging customer base, there are no particular risks in the sales area. We have so far been able to successfully withstand the severe effects of the currently ongoing pandemic (Management Report - Epsilon)
<b>Competitive environment</b>	<b>19/38 – 50 %</b>	<b>4/87 – 5%</b>	
Our competitive environment is easy to grasp	6	0	By default, of course, we can say [competitor 1] and [competitor 2], are the main manufacturers of systems. (Beta)
We have a lot of competitors	13	4	But when they're in our industry, you typically have the complexity of having a zillion providers. (Alpha)

**TABLE 2** Trail of evidence (\*Number of interviews that included at least one of those first order codes)

- continued

Second order codes	Interviews (n=38)	Secondary Data (n = 87)	Illustrative quotes of first order codes
<b>First order theme</b>	<b>28/38 – 74%</b>	<b>9/87 – 10%</b>	
<b>Customer orientation</b>			
We rarely work with customers on digital initiatives	10/38	0	Little, Little, [referring to cooperations in the context of digital transformation] You're actually thrown in at the deep end when something comes along. (Alpha Customer)
We work with customers on digital initiatives	5/38	4	Beta approached us as a supplier and wanted to develop an optimum [product] together with our engineers right from the start. This close development partnership enables us to have a significant influence on important parameters of [digitalization of the product]. (Article - Beta)
We monitor and talk with our customers to provide better digital solutions	20/38	5	The company tries to put itself in the customer's shoes in order to be able to implement their wishes in the best possible way and to be as close as possible to their real needs. At the same time, the company is also aware of the importance of disruptive innovation and is therefore also concerned with the question of what happens when start-ups or established platforms enter the market. (News Article - Epsilon)
Our customers require digital solutions from us	16/38	0	As a product manager, I have to transfer the requirements of our direct customers. And they want a [digital] system. (Beta)
<b>Competitor orientation</b>	<b>14/38 – 36%</b>	<b>36/87 – 41%</b>	
We utilize our professional networks, such as associations, to drive DT	9/38	8	The [industry] has taken a step forward on the subject of data management, which was the focus last year. [Name] Chairman of the Management Board of [Name of Association], reported, the companies have now agreed on options for action: clarification of a data model in phase 1 and implementation of an industry standard in phase 2. The aim is now to get the suppliers on board in order to establish a joint industry solution for the future. (News Article - Gamma)
We collaborate with start-ups to benefit from their digital capabilities	5/38	6	[The managing director of Epsilon] argued along the same lines. For him, it is clear that medium-sized companies can also learn from start-ups and that positive effects result from cooperation. At [Epsilon], young employees have been working hand in hand with experienced staff for a long time in order to overcome challenges in an agile manner. For him, the cooperation of young, agile start-ups with established companies works similarly. (News Article - Epsilon)
We utilize M&A activities to access digital capabilities	3/38	16	As a result of the merger, the needs of our customers can now be addressed in an even more targeted and rapid manner. The comprehensive networking of our group, the extensive portfolio, the development and engineering competence as well as extensive experience in the service area offer great added value for all parties involved. (News Article - Epsilon)
We partner with other competitors to develop digital services or products	5/38	10	With the integration of [company], the service portal that has been established on the German market for many years, [Alpha] is now going one step further: manufacturers can organize their entire after-sales service via the portal. They can handle service incidents within and outside the warranty period, order services [...] and approve invoices. In this way, the manufacturer can not only offer an efficient after-sales service but also build up an information base for further service offerings such as warranty extensions or predictive maintenance solutions. (News Article - Alpha)

The third step of data analysis involved a cross-case comparison to find common patterns that explain what influences different customer DCGs and how incumbents respond. Our analysis was characterized by constantly comparing the cases and building theoretical arguments, which we then linked to the emerging constructs (Eisenhardt, 2021). Our cross-case comparison revealed that the nuances of DCGs are linked to particular market settings and the consequent strategic orientation of the focal firm. This again influences their strategic responses to the DCG. To substantiate this argument, we coded the extent to which these are present at low, medium, or high levels for each of the five cases. The coding scheme for these levels of magnitude is presented in Table 3.

**TABLE 3** Operationalization of second order codes

Second order code	Degree	Operationalization as reported by interviewees
Customer portfolio consolidation	low	▪ Diversified customer portfolio
	medium	▪ Wide range of customers and some dependency on major customers
	high	▪ Dependency on a small number of customers
Competitive landscape fragmentation	low	▪ Only very few competitor firms
	medium	▪ Wide competitive landscape with few major players
	high	▪ Different associations with a lot of members or/and of a fragmented competition
Vertical digital pressure	symmetric	▪ Customer level market conditions have changed
	asymmetric	▪ customers need to push DT to remain competitive
Horizontal digital pressure	symmetric	▪ Customer firms are not pressured to change at the moment
		▪ Slowly adopt digital competences and
		▪ Customer level market conditions have not really changed
Customer orientation	low	▪ DT intensified competitive pressure
		▪ Competitors are perceived to have a lot of digital competences
		▪ There are new digital entrants
	medium	▪ Need to develop digital competences to remain competitive
		▪ A low dependency on individual customer firms
		▪ Digitalization for customers happens mainly through feedback
	high	▪ Most customers have no requirements for individual digital solutions yet
		▪ A rather low dependency on individual customer firms
		▪ Digitalization for customers mainly through feedback
Competitor orientation	low	▪ Some customers have no requirements for individual digital solutions
		▪ A high dependency on a few large firms
		▪ A respective co-specialization and collaboration in terms of DT
	medium	▪ Customer firms have a high demand for individual digital solutions
		▪ Some rare collaborations or mutual exchanges with other competitors or start-ups
		▪ Very little/no engagement with regard to investment opportunities or M&A
	high	▪ Occasional collaboration or mutual exchange with other competitors or start-ups
		▪ Some engagement with regard to investments opportunities or M&A
		▪ Utilization of external networks, mutual exchange

Throughout our analysis, we utilized extensive tables and charts to organize, compare and contrast our findings (see Tables 4-7). This is not only important to enhance the trustworthiness of our research but also simply to structure our data set effectively and be able to display illustrative examples (Cloutier & Ravasi, 2021). Furthermore, to develop clear constructs, we paid particular attention throughout our analysis to the definition, the scope conditions, relationships between each of the constructs, and coherence with regard to our theoretical argument (Suddaby, 2010).

## **4. Findings: Digital Capability Gaps in Traditional Industries**

### **4.1 Overview: Digital Capability Gaps, Responses, and Strategic Orientation**

Our analysis reveals what influences DCGs, yet also what the responses of incumbents to such gaps are. The prevalence of customer and competitor orientation leads to varying DCGs between incumbents and their customer firms. Hereby the five case firms show varying sizes of DCGs toward their customers. Based on the qualitative assessment of Table 4 we find that Alpha shows a relatively large customer-facing DCG. Gamma, Delta, and Epsilon a relatively moderate customer-facing DCGs, and Beta a relatively small customer-facing DCG (see Tables 4 and 5).

**TABLE 4** Illustration of digital capability components and gaps  
(Explanation: white = similar capability level; grey = some differences; black = major difference)

Case	Digital Capability Components				Digital capability gap	Illustrative quote: Customer digital capability level relative to focal firm
	Skills and Knowledge	Technical Systems	Managerial Systems	Values and Norms		
Alpha	Data analytics	Digital orchestration	Social networks	Solution provider	Relatively large customer-facing DCG	We also used to have 2,000-page catalogs. They are bulky. But they are still in these repair cars. They are lovingly maintained since 2005 with a million post-its in them, with new article numbers, for example, with additional new prices, cross-references, and so on. This means that handling has become extremely complicated [ <b>data processing; digital orchestration</b> ]. [...] You have very experienced craftsmen with [...] 20 years of professional experience. They have a very hard time with new media [ <b>data-driven</b> ]. (Alpha)
	Data processing	Article master data	Workshops	Data-driven		
	Digital practice	Digital services				
Beta	Data processing	Digital orchestration	Workshops	Component supplier	Relatively small customer-facing DCG	And there clearly is customer loyalty. You can also incorporate the whole digital aspect [ <b>digital services</b> ]. I think we do that very well here. We could perhaps orchestrate our internal tools better [ <b>digital orchestration</b> ] if I look at what's happening down at the service department, where three tools are used in parallel. We have the engine to maintain the ticket once, to read out the engine, and then still to run the engine on the test bench. And if any system is not working properly, they all have to be run down. (Beta)
	Digital practice	Article master data		Data-driven		
		Digital services				
Gamma	Data processing	Digital orchestration	Associations	Solution provider	Relatively moderate customer-facing DCG	What I would find good is a kind of app or platform where you can put all your companies in, where you get your material from. And where you then only have to enter your keyword, what you are looking for [ <b>digital practice</b> ]. Then all the companies are listed, so to speak, whether the company has it and so on, and then maybe out of 10 companies, 3 companies have it and then the prices are displayed [ <b>data processing</b> ]. [...] You have to imagine that you have 20 suppliers or so and if you then have your own platform for each [ <b>digital orchestration</b> ] [...], then you have called 5 more quickly and are more successful and faster [ <b>data-driven</b> ]. (Gamma Customer)
	Digital practice	Article master data	Social networks	Data-driven		
		Digital services	Workshops			
Delta	Data processing	Digital orchestration	Social Networks	System supplier	Relatively moderate customer-facing DCG	If you [order] from us as a major customer [...] Then it's still done by phone or e-mail [ <b>digital practice; data processing</b> ]. But it is not the case that we have an online store [ <b>digital orchestration</b> ]. The management also stresses the importance of the fact that the personal aspect is still in the foreground [ <b>craftsmanship</b> ]. (Delta Customer)
	Digital practice	Article master data	Workshops	Data-driven		
		High-tech product				
Epsilon	Data processing	Digital orchestration	Social Networks	Solution provider	Relatively moderate customer-facing DCG	I would say that I'm currently the most aware of this, but the big players are so huge that they don't even get involved in such topics and actually have their own digital transformation topics, and there's less with us. We tend to be with [smaller customers], who are simply dependent on things running well and smoothly. They depend on us to streamline production [ <b>data processing; digital practice; digital orchestration</b> ]. (Epsilon)
	Digital practice	Article master data	Workshops	Data-driven		
		Digital services				

**TABLE 5** Influencing factors and strategic responses to digital capability gaps

Firm	Influencing factors (Market setting)	Firm-level strategic orientation		Digital capability gap	Strategic response
		Customer orientation	Competitor orientation		
Alpha	Customers: Highly fragmented customer portfolio and asymmetric digital pressure	medium	high	Relatively large customer-facing DCG	<b>Digital diversification:</b> Alpha faces a fragmented customer portfolio and asymmetric digital pressure. As a result, their orientation leans more towards the fragmented competitive environment with a similar digital pressure causing a relatively large customer-facing DCG and started to diversify by adapting their business model based on the DCG.
	Competitors: Highly fragmented competitive portfolio and similar digital pressure				
Beta	Customers: Concentrated customer portfolio and symmetric digital pressure	high	low	Relatively small customer-facing DCG	<b>Digital collaboration:</b> Beta is highly dependent on their concentrated customer portfolio which faces similar digital pressures. As a result, their orientation leans more towards customers, causing a relatively small customer-facing DCG. This drives them into a 'digital collaboration' with their customers
	Competitors: Highly concentrated competitive portfolio and symmetric digital pressure				
Gamma	Customers: Highly fragmented customer portfolio and asymmetric digital pressure	low-medium	high	Relatively moderate customer-facing DCG	<b>Digital parent:</b> Gamma faces a fragmented customer portfolio and asymmetric digital pressure. As a result, their orientation leans more towards the fragmented competitive environment with a similar digital pressure causing a relatively moderate customer-facing DCG. This triggers a digital parent behavior by providing additional digital services for their customers in order to bridge the existing DCG.
	Competitors: Highly fragmented competitive portfolio and similar digital pressure				
Delta	Customers: Highly fragmented customer portfolio and asymmetric digital pressure	medium	high	Relatively moderate customer-facing DCG	<b>Digital parent:</b> Delta faces a fragmented customer portfolio and asymmetric digital pressure. As a result, their orientation leans more towards the fragmented competitive environment with a similar digital pressure causing a relatively moderate customer-facing DCG. This triggers a digital parent behavior by providing additional digital services for their customers in order to bridge the existing DCG.
	Competitors: Highly fragmented competitive portfolio and similar digital pressure				
Epsilon	Customers: Highly fragmented customer portfolio and asymmetric digital pressure	low-medium	medium	Relatively moderate customer-facing DCG	<b>Digital parent:</b> Epsilon faces a fragmented customer portfolio and asymmetric digital pressure. As a result, their orientation leans more towards the fragmented competitive environment with a similar digital pressure causing a relatively moderate customer-facing DCG. This triggers a digital parent behavior by providing additional digital services for their customers in order to bridge the existing DCG.
	Competitors: Mid-level fragmentation of competitive portfolio and similar digital pressure				



Importantly, our findings also indicate that these DCGSs are influenced by incumbents' customer or competitor orientation which again is influenced by the market setting in which they operate. For instance, firms that display high competitor orientation display larger customer-facing DCGs and vice versa. This market setting refers to the consolidation or fragmentation of the customer portfolio and competitive landscape but also how pressures for DT are distributed across competitors (horizontal) or along the supply chain (vertical). Thereby vertical and horizontal digital pressures refer to the extent to which firms face similar needs for DT. Below we first describe what the responses of incumbent firms are and show in detail how varying digital capability levels between incumbents and their customer firms are influenced by incumbents' strategic customer and competitor orientation.

#### **4.2 Strategic Responses to Digital Capability Gaps**

Varying digital capability levels across incumbents and customer firms matter as they affect the value creating relationship between firms. For example, strongly diverging levels of digital capabilities may require incumbents to pursue diversification and innovation efforts in an attempt to bridge the existing DCG. This might take two ways. First, the utilization of the existing DCG and diversification of their product and service portfolio. Second, innovating on behalf of customers in an attempt to support their DT transition and bridge the DCG. In contrast, a similar level of digital capabilities might be advantageous for collaboration and mutual development between incumbents and their customers. The findings will be structured as follows: First, we will describe the varying strategic responses of incumbent firms to DCGs. Second, the market setting and consequent effects on strategic orientation and DCGs of incumbents will be explained in detail.

#### 4.2.1 Digital Diversification

Firms may respond to large DCGs by diversifying their product or service portfolio into other domains. Relatively large DCGs result from an amplified orientation towards competitors compared to customers. These gaps are characterized by the focal firm's significantly higher digital capability level compared to their customers making it possible for them to enter new market domains. For example, Alpha faces a fragmented customer portfolio with asymmetric digital pressure for DT, i.e., customers do not see the need to adopt digital technologies. As a result, their strategic orientation leans more towards the fragmented competitive environment with a similar digital pressure causing a relatively large customer-facing DCG. For instance, the components of managerial systems and values and norms in the case of Alpha seem to be balanced throughout the value chain. However, we see a critical gap in capabilities in terms of skills and knowledge, and technical systems. Here only relatively large customer firms possess similar capabilities. At the same time, SMEs, which constitute the main share of their customer base, lack skills in knowledge like data processing, digital practice, or data analytics. Alpha's managing director related when asked about interactions with customer firms:

*We still have a wire printer [laughs]. It is important to make it as easy as possible for our customers. Not only for them to search and find [in the online shop] but also to order. [...] we offer a very wide range. (Alpha)*

This dilemma led Alpha to start offering their customers an e-commerce platform that they can leverage for their own business with consumers. The managing director explained how they approach DT on behalf of customers:

*We currently have, for example, 4600 suppliers that we handle. Accordingly, many also have no digital capabilities. And then, of course, we offer customers to handle this and provide virtually the entire process. [...] Thereby, of course, they skip ten development stages. (Alpha)*

Through these initiatives, they also gain data analytical skills by gathering customer, product, and other relevant data. Based on these digital capabilities Alpha then started to

diversify its services. In addition to their core business, they now offer additional services that are based on their data analytics skills.

#### **4.2.2 Digital Parenting**

Three firms in our sample displayed moderate DCGs. Interestingly, these firms responded with a common approach; to close DCGs they innovate on the behalf of their customers. These gaps are characterized by the focal firm's relatively higher digital capability level compared to their customers. For example, Gamma, Delta, and Epsilon face a fragmented customer portfolio and asymmetric digital pressure. As a result, their strategic orientation leans more towards the fragmented competitive environment with a similar digital pressure causing a relatively moderate customer-facing DCG. This triggers, what we call, a digital parent behavior by providing additional digital services for their customers in order to bridge the DCG.

For example, in the case of Delta, we could find similar managerial systems, values, and norms but again different levels of technical systems, skills, and knowledge. For instance, while digital orchestration, article master data, and digital services are widely established in the focal firm, customer firms seem to only pick up on these now (see Tables 4 and 5). Thus, while firms like Gamma, Delta, and Epsilon invest in building digital capabilities, they still need to maintain alignment with their client base. For example, they hold on to outdated processes and software and continue to accept hand-written orders sent via fax machines. By maintaining this alignment, focal firms increasingly deviate from their core business and support their customers but do not monetize on it (yet). Hereby, we found that the focal firms seem to slip into a parenting role, whereas small firms assume the child's role. Levinthal and March describe the problematic nature of this approach: "parents who are particularly fast in adapting to their children's needs reduce the pressure on the latter to be adaptive, resulting in a lack of socialization (manners) in children of highly adaptive parents" (1993: 93 f.).

Firms aim to go digital ‘for’ the customer, but while doing so, they seem to reinforce the customers’ adverse attitude towards DT.

The fragmented competitive landscape with low supplier powers even amplifies this situation. Customer firms do not solely depend on just one supplier but have a multitude of competing firms to choose from. Additionally, the switching costs for customer firms in the industries are low. These conditions further nourish the attitude of customers towards DT as a manager described:

*It’s a thin line. If we would say: ‘[Gamma]24’, every service is purely online. That would be the merciless death of this company because they [customer firms] just wouldn’t accept it. (Gamma)*

Moreover, a middle manager of a customer firm acknowledged this circumstance while talking about what would happen if the focal firm adopted only digital processes:

*I think it would be tough. If there would be someone else, they would switch most probably to someone who is doing it old school. (Delta)*

To respond to this situation and maintain customer relationships, Gamma, Delta, and Epsilon adopted the habit of innovating on behalf of their customers as a response to their deviating levels of digital capabilities.

#### **4.2.3 Digital Collaboration**

Finally, in instances of small DCGs firms may respond by building informal digital collaborations with customers. These gaps are characterized by the focal firm's relatively similar digital capability level with respect to their customers. Beta is highly aligned with their concentrated customer portfolio which faces similar digital pressures. As a result, their strategic orientation leans more towards customers, causing a relatively small customer-facing DCG. This fairly similar digital level makes facilitates the formation of a ‘digital collaboration’ in which incumbent and customer firms jointly develop digital capabilities.

For example, in the case of Beta, we could find relatively similar levels throughout the digital capability components. Especially skills and knowledge are aligned with their

customer firms. This can be attributed to their high customer orientation. Beta produces high volumes of highly specified products for a small set of customers. By doing so, digital capabilities need to be strongly aligned with this consolidated customer portfolio. This increases the importance of individual relationships with customers compared to firms with fragmented customer portfolios such as Alpha and Gamma. In order to maintain and nourish these highly important relationships they enter into a digital collaboration whereas digital capabilities are set to focus on individual customer requirements. Consequently, and in contrast to the digital diversification response, they set a relatively higher focus on customer orientation than competitor orientation. This orientation is exemplified by a manager of Beta describing the input from and interaction with their customer:

*That is a very important input, [...] we also have other large customers, such as [name of customer], who is involved here, who then gives us requests and requirements, which we react to. (Beta)*

Overall, this response leads to a similar level of digital capabilities of Beta and their customer portfolio.

#### **4.3 Market Setting, Strategic Orientation, and Digital Capability Gaps**

Our findings also suggest that DCGs can not be divorced from the market setting in which firms operate. Indeed, our findings reveal that a focal firm's strategic customer and competitor orientation depends on the distinct market setting of an incumbent firm. In particular, it is influenced by the consolidation or fragmentation of the customer portfolio, the competitive environment and, what we call, the distribution of digital pressures (horizontal and vertical across the industry).

### 4.3.1 Influencing Factors of Strategic Customer Orientation and Digital Capability

#### Gaps

**TABLE 6** Comparative analysis influencing factors customer orientation

Firm	Customer portfolio consolidation	Digital pressure (vertical)	Customer orientation	Representative quotes (customer orientation)
Alpha	low	asymmetric	medium  A rather low dependency on individual customer firms. Digitalization for customers mainly through feedback. Some customers have no requirements for individual digital solutions	<ul style="list-style-type: none"> <li>70 percent of our customer portfolio are classic small companies with between one and four employees, classic service companies similar to craft businesses. And the remaining 30 percent are really larger customers, retail chains, purchasing cooperatives</li> <li>The customers [...] are very traditional, I would say [...] They have little connection to it and also little desire to invest.</li> <li>The customer also has very little pressure to digitalize.</li> <li>With customers, i.e., with the classic average customer, no, there are a few, there are a few associations or really big players on the market, we are in exchange with them and already have some ideas</li> </ul>
Beta	high	symmetric	high  High dependency on few large firms and respective co-specialization. Customer firms have high demand for individual digital solutions.	<ul style="list-style-type: none"> <li>Can you imagine we only have 80 customers? [...] which we turn over millions with. [...]</li> <li>The customer says okay, that's nice, but we need more. And I believe that digital transformation is very important here, that you create a system that is also integrated into a larger context.</li> <li>Our customers, [name of digital interface] for example, a programming interface that we provide, and based on that our customers then develop products. So, I would say that we develop digital products together with our customers.</li> </ul>
Gamma	low	asymmetric	low-medium  Low dependency on individual customer firms Digitalization for customers mainly through feedback. Most customers have no requirements for individual digital solutions yet.	<ul style="list-style-type: none"> <li>At the moment, it is simply the case that digital has not yet had an extreme impact on the customer's business model.</li> <li>They stay the same and say: "It works the way it is, and we get orders, we get money, revenue and so on, and we do not need to change something about the status quo."</li> <li>They [customers] have almost no interest as far as digital things are concerned</li> <li>The customer says, "I don't need it. It only steals time." But that could also be because our customers don't currently need to change [...]. They don't get any competitive pressure from it. The order books are full.</li> </ul>

**TABLE 6** Comparative analysis influencing factors customer orientation – continued

Firm	Customer portfolio consolidation	Digital pressure (vertical)	Customer orientation	Representative quotes (customer orientation)
Delta	low	asymmetric	medium  A rather low dependency on individual customer firms. Digitalization for customers through mutual exchange. Customers have some demand for individual digital solutions.	<ul style="list-style-type: none"> <li>▪ On the one hand, there are of course also established large [customers] or tradition-conscious [customers] that digitalize to a certain extent. A process can be standardized, but that's the end of the line somewhere. Maybe one or two innovations and then the connection to the Internet in case something needs to be controlled remotely again.</li> <li>▪ But that is perhaps also, as I said at the beginning, the [proficiency], that is a very tradition-conscious person. Even if there are innovations that promise a much better quality and heaven and earth it will be very difficult to dissuade him from his way.</li> <li>▪ But now these topics [digital initiatives], which I also touched on earlier with [specific topic]. These wishes do not come from the customer, so they have to be put into their mouths.</li> </ul>
Epsilon	low-medium	symmetric	low-medium  A rather low dependency on some customer firms. Occasional digitalization projects with customer firms. Most customers have no requirements for individual digital solutions yet	<ul style="list-style-type: none"> <li>▪ We have a relatively broad customer structure; large companies require more in terms of logistics systems. So, they don't come to us with "we'd like that", but rather they want us to develop and build something together.</li> <li>▪ But I think the requirements of the customers, will develop in the same direction.</li> <li>▪ We now have a large project with [big customer] where we have an app for maintenance.</li> <li>▪ For the most part, our clients are very conservative</li> </ul>

**Customer portfolio:** Our findings suggest that the extent to which digital capabilities rest upon customer orientation depends on the consolidation or fragmentation of a firm's customer portfolio. The degree of consolidation affects the firm's ability to draw on customer-level feedback regarding the appropriateness of products and/ or services. Thus, the degree of consolidation or fragmentation plays an important role as customers might have specific requirements for individual digital solutions. For example, Beta's customers require them to build applications and interfaces according to their specific needs. Therefore, such requirements trigger firms' customer orientation as well as processes or products suited to a particular customer. For example, Delta produces individualized high-technology products with different degrees of automation based on their customer needs. Nevertheless, as Delta's customer portfolio is fragmented and rather diverse, customer-specific requirements do not cause them to become solely dependent on only a few firms. Thus, they include digital applications in the individual products and react to particular needs as a sales manager described:

*The customer is coming to me. They have these such-and-such preconditions and would like to have this and that [...] and then we discuss, and the customer tells me what and how much technology, automation, and digitalization they want, need, or must have, and I show them possible ways and means. (Delta)*

However, the Beta case tells a different story, as only a few customers buy large quantities of their products. Consequently, their digital capability level is closely linked to only a small number of customer firms. Thus, Beta shows a high degree of customer orientation where digital processes and products are highly interlinked.

In summary, the degree of customer orientation is influenced by the customer portfolio as firms with very few customers, such as Beta, show a high degree of co-specialization of digital capabilities. However, with an increasing breadth of the customer base, focal firms show a decreasing tendency of customer orientation. Consequently, the degree of customer orientation increases as knowledge is specifically needed and acquired for/or with customer firms.

***Vertical digital pressure:*** Apart from the fragmentation or consolidation of the customer portfolio, we found that the extent to which focal firms and their customers face similar pressures for pursuing DT ('symmetry of vertical digital pressure') affects their customer orientation. Indeed, our data set reveals an interesting pattern. While the focal firms in our sample are faced with fierce competitive pressures forcing the need for digital capabilities, this is not always the case with their customers (see Table 6). Rather, customer firms tend to exploit their existing set of capabilities as an Alpha manager described:

*[...] The industry typically operates with good margins and is used to growth. Accordingly, the message 'we always did it this way' is often widespread. (Alpha)*

These asymmetric pressures between focal firms and their respective customer base constrain digital opportunities for incumbents as there is limited knowledge to acquire from customer firms.



For instance, in the cases of Alpha, Gamma, Delta, and Epsilon, SMEs constitute the main share of the respective customer base. These firms are not affected by DT yet and therefore feel little to no need to adapt. Indeed, the customer firms' revenue mainly depends on two operational capability components: First, the traditional skills, tools, and techniques passed on for generations to meet very particular and competitor-specific consumer demands. Second, product and service creation capabilities, which represent the ability to combine individually futile products and services to create value for the customer by using particular skill sets. It becomes evident that those skillsets have not extensively been affected by digital technologies resulting in little to no adaptation pressure so far. This is underlined by a manager of Gamma when asked about the relationship with customer firms:

*At the moment, it is simply the case that digital has not yet had an extreme impact on the customer's business model. (Gamma)*

Consequently, digital capabilities are considered 'cost drivers' without direct business value. This predominant skepticism towards digital capabilities hinders the firms from fully embracing digital practice. A managing director of a customer firm critically summed up the situation:

*They stay the same and say: "It works the way it is, and we get orders, we get money, revenue and so on, and we do not need to change something about the status quo."*

However, we also observed that in cases of similar pressures, the degree of customer orientation increases. For example, Beta's customers also put a high emphasis on digital topics. Thus, and in contrast to the other cases, Beta focuses on its customers in this context. This becomes evident through their close engagement with some of their customers, as a manager pointed out when asked about cooperations with other firms:

*We have a big customer, [name of customer], with whom we constantly coordinate and who also helps us to find the right requirements. (Beta)*

In summary, customer orientation is manifested in the contact, usage, and integration of digital applications and processes in firms' everyday business activities. However, if

customer firms have well-established and entrenched capabilities (as is the case in traditional craft-based industries), we observed asymmetric vertical digital pressures and a consequent resistance towards DT. This constrains the customer orientation of the focal firm.

#### **4.3.2 Influencing Factors of Strategic Competitor Orientation and Digital Capability Gaps**

Similarly to customer orientation, our findings reveal that competitor orientation also depends on incumbents' market settings. In particular, it is influenced by the consolidation or fragmentation of the competitive portfolio and, what we call, the respective symmetry of horizontal digital pressures. The horizontal digital pressure describes the difference or similarity in demand and scope of digital capabilities required by focal firm and their competitors (see Table 7).

**TABLE 7** Comparative analysis influencing factors competitor orientation

Firm	Competitive landscape fragmentation	Digital pressure (horizontal)	Competitor orientation	Representative quotes (competitor orientation)
Alpha	high	symmetric	high  Utilization of external networks, mutual exchange and collaborations with other competitors, and active engagement in investment opportunities	<ul style="list-style-type: none"> <li>It's a very fragmented market because we have a lot of manufacturers on the market and therefore a lot of devices, a lot of spare parts</li> <li>Risks lie primarily in [...] competitive price pressure. Increased use of the Internet is contributing to this, which is increasing transparency with regard to prices and availability.</li> <li>We also found a small Italian start-up that is working on a similar solution. And we want to adopt this and then continue to develop this software internally.</li> <li>We are thinking about working with them [competitors] to digitalize processes so that communication between the individual companies improves and is also automated.</li> </ul>
Beta	low	symmetric	low  Some rare collaborations with competitors and low engagement in investment opportunities or mutual exchange.	<ul style="list-style-type: none"> <li>So, when I started there was really only [Competitor 1] and then there was a bit [Competitor 2 and 3], but now there are more suppliers, and they are becoming more and more alike</li> <li>What's going on here is actually quite amusing, because most of the manufacturers that are currently entering the market [...] are trying to build up a second foothold here somehow. And everyone here is of the opinion that they have the coolest engineers, so there is relatively little exchange.</li> <li>And it would be a more lucrative business in purely economic terms, and why would I want to share?</li> </ul>
Gamma	high	symmetric	high  Utilization of external networks, mutual exchange and collaborations with competitors, and active engagement in investment opportunities.	<ul style="list-style-type: none"> <li>We have teamed up with other [competitors] to create a new online site</li> <li>And because we [...] had in principle already decided many years before in an association of [competitors] for an online store [...] [this department was a pioneer and also profited from it. Of course, from the ideas or from the merger of the various [competitors]. [...]</li> <li>We had several discussions with various start-ups over the past two years. More intensive ones, too. Some of them in terms of cooperation. And of course, talk in terms of funding. What we do right now is that we work with a start-up that uses [specific data format] with artificial intelligence, so that the things [...] are assigned automatically</li> </ul>
Delta	high	symmetric	high  Utilization of external networks, mutual exchange and collaborations with competitors, and active engagement in investment opportunities.	<ul style="list-style-type: none"> <li>In the meantime, it has become totally opaque and unclear what kind of companies are active in this segment.</li> <li>I would say that the best source of ideas is actually personal exchange, usually with other entrepreneurs.</li> <li>[We] try to always get a head start or to dive into new fields in order to be able to relax this really fierce competitive situation.</li> <li>The majority [of competitors] has always been following the same course, more or less successful, of course.</li> <li>They exchange within their external network and get to know things that could be possible [...] at the moment.</li> </ul>
Epsilon	medium	symmetric	medium  Utilization of external networks, mutual exchange, and collaborations with competitors, and some engagement in investment opportunities.	<ul style="list-style-type: none"> <li>I think our industry is very manageable, so you actually know all the market players. What has changed extremely, and this will also be the case in other industries, is that small and medium-sized companies are disappearing a bit.</li> <li>I think in terms of production, we released a game-changer for our domain [...] and now competitors reach out to us for support.</li> <li>As a result of the merger, the needs of our customers can now be addressed in an even more targeted and rapid manner. The comprehensive interconnection of our Group [...] offers a great added value for all parties involved.</li> </ul>

**Competitive environment:** The extent to which digital capabilities rest upon competitor orientation depends on the consolidation or fragmentation of a firm's competitive environment. This affects the firm's ability to draw on competitor activities and collaboration to identify and develop appropriate digital capabilities for products and/or services. This orientation might trigger different strategic activities, such as competitive intelligence, strategic alliances, mergers, and acquisitions, or mutual exchange to foster digital capabilities. Especially in fragmented competitive environments, we observed that focal firms tend to be orientated toward competitors. For example, Gamma engages in collaborations to complement knowledge in digital practice and orchestration to interconnect the digital technologies in the firm:

*We decided to start an e-commerce platform in collaboration with other firms [...] In fact, our department pioneered, and the rest of the company profited from that. Of course, also from the ideas in the coalition from different competitors. (Gamma)*

Moreover, also Epsilon collaborates with other competitors to develop new digital services. For example, a partnership to build a marketplace is intended to create new digital services and products and foster the digital capability level of both firms.

*We have a big supplier who is looking for trade partners [...] who contacted us with the idea of creating a marketplace [...] and wants to work with us exclusively because we have the right understanding. (Epsilon)*

These collaborations constitute fruitful opportunities for firms to gain new ideas around DT and, more importantly, are intended to enhance digital capability levels. However, in the pursuit of keeping up with the pace of DT, time constitutes a crucial obstacle. To steer clear of this constraint, incumbents actively search for possible investment opportunities to increase their digital knowledge; a manager of Alpha pointed out when asked how they engage with competitors:

*We look more and more into the start-up scene. [...] Thereby, it is not about customer acquisition. The dominant goal is technology and competence. (Alpha)*

Another pathway that focal firms take to overcome time constraints is acquiring other firms. For example, Delta recently acquired a competitor which developed software for their core product. Thus, they aim to integrate the software firm for their product development as building it themselves would simply take too long. The acquisition opens new avenues for Delta in terms of their DT an employee stated in response to the question of how challenges of DT are tackled:

*We signed the letter of intent to acquire one of our competitors. And this company, for example, has an IT department. [...] and this department will open up completely new possibilities compared to what we already have. (Delta)*

If Delta had decided to build the software themselves, they would lack years behind the state of the software from their close competitor. Thus, Delta is able to integrate its supply chain further while the acquired company can profit from the digital practice and know-how of Delta as a parent company. In contrast, we found that Beta does not orientate towards competitors as much. Indeed, in their consolidated competitive environment, the firm focuses more on its customer orientation and neglects competitors. This becomes evident by a manager's comment on the issue when asked about engagements with other competitors:

*And everyone here is of the opinion that they have the coolest engineers, so there is relatively little exchange. (Beta)*

In summary, we observed that firms increasingly show competitor orientation in fragmented landscapes, while this was rather limited in consolidated industries. Indeed, our cases show that firms in fragmented competitive environments, such as Alpha, Gamma, and Delta, overproportionally showed a competitor orientation. Beta, which is situated in a consolidated competitive landscape, showed significantly less competitor orientation.

**Horizontal digital pressure:** Apart from the fragmentation of the competitive landscape, the extent to which focal firms and other competitors face pressures for pursuing DT ('symmetry of horizontal digital pressure') also affects their competitor orientation. Indeed, our

data reveals that in all cases, focal firms and competitors are faced with fierce competitive pressures (see Table 7) as a Gamma manager explained:

*A company that is existing for so long has to change constantly. DT is our next big economic step. We can resist doing that now, but there is no point in doing that. The train leaves the station, or we can follow along. (Gamma)*

Because firms have a limited ability to deploy resources and capabilities yet similar pressures to adapt, they orientate toward each other as a coping mechanism. This amplifies the intensity and quantity of collaborations, especially in fragmented industries. The aim is to improve and build new digital capabilities simultaneously. For example, we found an increasing utilization of external networks and mutual exchange with competitors that foster digital capability levels. The DT manager of Delta commented on this in response to the question of where new ideas come from:

*Often the ideas come from our management. They exchange within their external network and get to know things that could be possible or that are done at the moment. [...] for example, the topic around e-commerce advancement came from our management. (Delta)*

Additionally, the affiliations with industrial associations provide a platform to exchange and learn about DT within the competitive environment. For example, in some instances, we found that the firms engage in working groups within the associations:

*In associations, for example [Name of Association]. In the meantime, there is a working group that deals with the topic of digitalization. (Gamma)*

Gamma's affiliations with industrial associations drove their professionalism in article master data. Consequently, it also enhanced their data processing capability when dealing with the administration of customer, product, and other data, as the managing director explained:

*By now, the associations deal intensely with the topic of data editing. [...] You notice that it slowly gets more professional. It becomes increasingly clearer. (Gamma)*

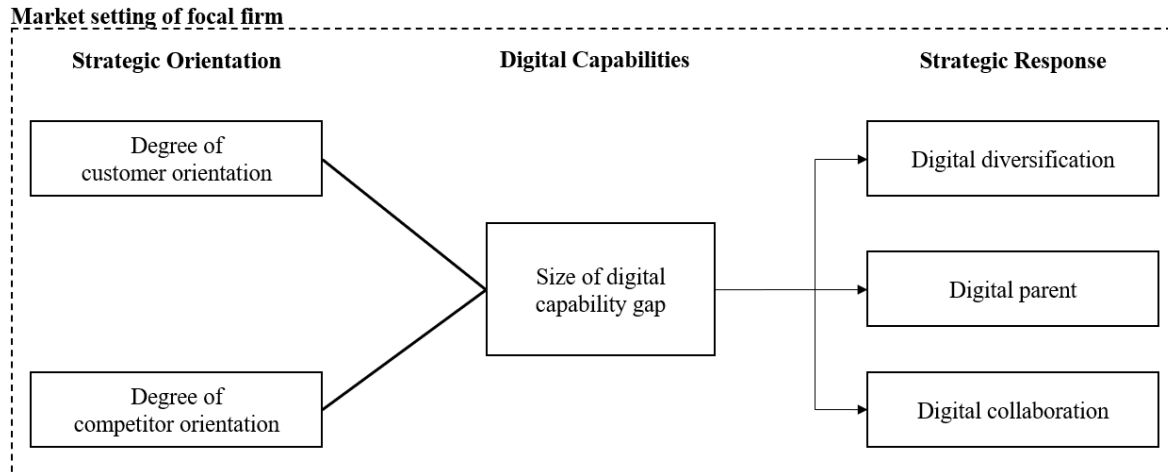
In summary, our findings imply that most incumbents in our sample show a competitor orientation for several reasons. First, firms facing similar challenges and constraints exploit

mutual exchange and collaborations to foster collective digital initiatives in and between firms. Secondly, start-ups and incumbents work together to build new digital solutions by bringing complementary capabilities to the table. Thirdly, to avoid time constraints, incumbents engage acquire digital capabilities inorganically via M&A or corporate venturing.

## **5. Theoretical Implications and Discussion**

In a digital world, the future viability of incumbents in traditional industries depends on their ability to develop digital capabilities (Roy et al., 2018). In this paper, we set out to answer the following research questions: What are influencing factors of DCGs between incumbents and customers and what are incumbents' responses to DCGs? Our paper reveals that the relationships of firms with their customers and competitors cast a shadow into the future as a firm's strategic competitor and customer orientation shape the firm's digital capabilities. This matters as we find that the relational underpinnings of digital capabilities are an integral part of understanding DT and, more importantly, DCGs. Our paper shows that varying DCGs lead to differing strategic responses; namely 'digital diversification', 'digital parent', and 'digital collaboration'. Furthermore, we reveal that differing DCGs are the result of a focal firm's varying customer and competitor orientation. Moreover, the extent to which incumbent firms orientate towards customers and competitors is influenced by the firm's market setting: (1) the consolidation or fragmentation of the customer portfolio and the competitive landscape and (2) the distribution of vertical as well as horizontal digital pressures (see Figure 1 for an overview).

**FIGURE 1** Strategic orientation and responses to digital capability gaps



We contribute to the debate of DT in incumbent firms by developing a nuanced concept of DCGs, showing how customer and competitor orientation influence DCGs and again what factors might drive this orientation. Early research on DT already argues that the orientation of incumbents, their customers, and competitors are main drivers for DT in traditional businesses (Andal-Ancion et al., 2003). Furthermore, current research has contributed to our understanding of which digital resources and capabilities are needed (Chanias et al., 2019; Verhoef et al., 2021) and how they are developed (Kane et al., 2017; Matarazzo et al., 2021; Teece, 2020; Teece & Linden, 2017; Volberda et al., 2021; Warner & Wäger, 2019; Yoo et al., 2012). By articulating the concept of DCGs and respective strategic responses, we make the following contributions to this highly relevant debate:

First, we argue that the concept of DCGs provides new explanatory means to extant research on DT in incumbent firms (Furr et al., 2022; Roy et al., 2018; Svahn et al., 2017; Verhoef et al., 2021). DCGs describe the difference of a focal firm's ability (in relation to their customers) to design and control products, services, and processes by utilizing digital technologies. These gaps may vary in size. While extant research already reveals that firms can be at different stages of DT (Kane et al., 2017; Verhoef et al., 2021), our DCG concept suggests that capability levels need to be considered not only with regard to the overarching idea of maturity (Kane et al., 2017) but in relation to customers. This matters as DCGs may have both positive and negative strategic implications. While our paper does not empirically



reveal the consequences of DCGs, our data provides indicative evidence that DCGs may become a hindrance to incumbents' DT. For example, in the case of Gamma, the firm's attempt to build stronger digital capabilities is partially stifled by customers' traditional craftsmanship. At the same time, one can assume that incumbents may try to deliberately exploit DCGs to create and maintain some form of dependency. Thus, our typology provides a framework that helps to better understand the impact of DT on incumbent firms (Adner et al., 2019).

Second, previous research on incumbents' DT already highlights orientation toward customers and competitors are important drivers for DT (Andal-Ancion et al., 2003; Volberda et al., 2021). However, our findings suggest that particular customer and competitor orientations result in varying DCGs and consequent different strategic choices incumbent firms make in the course of their DT (Chanias et al., 2019; Warner & Wäger, 2019). This is important as the success of incumbents' DT may depend on complementary capabilities compared to customers or partners (Roy et al., 2018). Furthermore, it helps to better understand incumbents' particular strategic choices in the context of DT. Thus, we contribute to the debate on DT in incumbent firms by revealing that different nuances of capability-level differences between incumbents and their customers lead to varying strategic responses. In particular, we show three strategic responses: 'digital diversification', 'digital parent', and 'digital collaboration' which represent choices through which incumbents attempt to drive DT in instances of customer-facing DCGs. For example, while Alpha is able to diversify and monetize based on their large DCGs, other case firms with moderate DCGs' innovate on behalf of customers to bridge their DCG and slip into a parents' role.

Third, we add to research on the DT of incumbents by showing two key factors that influence customer and competitor orientation in the context of DT. On the one hand, digital pressure in relation to customers and competitors. On the other, the density of customer portfolio and competitive landscape. The notion of digital pressure emphasizes the extent to

which firms feel the need to adapt their products, services, and processes relative to their customer portfolio or competitive landscape. Extant research already highlights that resource demands vary across different stages of DT (Furr et al., 2022; Verhoef et al., 2021) and that DT generally increases pressure on incumbent firms (Vial, 2019; Warner & Wäger, 2019). We add to this that different or differently increasing demands are also important with regard to the relation of incumbents, their customers, and competitors. These differences matter as they affect the incumbents' orientation towards customers and competitors. Here, the symmetry or asymmetry of digital pressures on a vertical (customers) and horizontal (competitors) level impacts this orientation. Firms facing similar challenges (symmetric digital pressure) are more likely to exploit mutual exchange and collaborations to foster collective digital initiatives. Consequently, the respective prevalence of the orientation depends on the perceived digital pressure, meaning the demand and scope of digital capabilities firms need relative to customers and competitors.

Furthermore, our findings also indicate that the consolidation or fragmentation of the customer portfolio and competitive landscape impacts customer and competitor orientation. Confirming previous research, we show the importance of taking specific industry characteristics into account (Ferreira et al., 2019). Indeed, Denoo et al. (2021) point out that the composition of the customer portfolio is a crucial determinant of firms' future developments. Furthermore, Wang & Gao (2021) argue that competition can indeed be a crucial source of competitive advantage. We add to this by showing that differences in customer portfolio and competitive landscape impact the respective customer and competitor orientation for DT. For instance, in fragmented competitive landscapes, such as in the case of Alpha, Gamma, and Delta, incumbents show higher degrees of competitor orientation than in consolidated ones. Furthermore, incumbents with consolidated customer portfolios, such as Beta, show higher degrees of customer orientation.

In summary, the results of this study shift salience to the digital-operational capabilities through which everyday value-adding activities are delivered. We believe that this focus is absolutely crucial for DT in incumbent firms. Digital technologies, in some form or other, are going to fundamentally permeate every capability of the firm. For example, incumbent firms like Alpha, Gamma, and Epsilon solely relied on physical transactions in the past. Consequently, their capabilities aligned with the need for this type of transaction. However, due to the described pressures of DT, these operational capabilities are shifting more and more towards digital operational level capabilities. Hence, this focus on operational level capabilities complements prior research highlighting incumbents' need to develop or acquire capabilities to successfully manage DT (Matarazzo et al., 2021; Teece, 2020; Teece & Linden, 2017; Warner & Wäger, 2019).

### **5.3 Limitations and Avenues for Future Research**

This research is also subject to limitations that open up avenues for future research. Even though our data set consists of five cases with 38 informants across more than 15 companies, only in one case we were able to observe a digital diversification and digital collaboration response. Also, our paper reveals but might not be limited to two key factors influencing orientation and consequently DCGs. Hence, future research needs to address the phenomenon with a larger industry-level data set. This should further strengthen the established concept of DCGs and explore other possible factors shaping digital capability levels. Moreover, we relied on a cross-sectional data set as our focus was to get a picture of different digital capability levels at a certain point in time. Therefore, a potential limitation is a retrospective bias. Even though we triangulated our interview data with secondary sources and across informants, further studies could concentrate on how the described dynamics play out over time by using longitudinal data sets. This might be especially relevant regarding the directionality of DCGs. In fact, our findings show only one-directional gaps. In our cases,

focal firms with moderate and large DCGs are ahead. Thus, future research should also focus on the directionality of DCGs.

## **6. Conclusion and Practical Implications**

The DT of incumbent firms is a key challenge in traditional industries. While a growing body of research started to unpack the ‘how’ of digital capability development, the relational underpinnings of different digital capability levels and consequent inter-organizational capability gaps are not well understood. This paper shows that different capability levels may manifest in DCGs. Importantly, varying orientations towards customers and competitors influence the size of these gaps. Further, we show two factors that influence orientation: first, the consolidation or fragmentation of customer portfolio and competitive landscape. Second, the extent to which players face similar a need for DT (‘symmetric or asymmetric digital pressures’).

Analyzing the relationship between incumbents and customers also offers practical insights for managers both within and in facilitative settings such as industry associations. First, our paper shows that different capability levels of co-dependent firms are a crucial component and main driver for the success and performance of DT related initiatives. This shifts salience to managers’ attempts to gauge capability dependencies and ways to mitigate any gaps. Second, we show that structural conditions with regard to customer portfolio and competitive landscape constrain or enable learning opportunities in context of DT. This has substantial implications for practice, as firms may want to deliberately shift their approach to capability development in the context of digital capabilities to avoid such constraints. Finally, the digital pressure on a vertical and horizontal level potentially provides an orientation for managers on whether to engage, support, or invest with customer firms. Increasing awareness about these issues has the potential to ease firms’ DT path.

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## **5. Digital Transformation of Incumbents via Structural Ambidexterity: A case study of escalating tensions**

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### **Abstract**

Strategizing for digital transformation has become a focal point for incumbent firms due to the transformative and disruptive nature of digital technologies. This paper investigates how incumbent firms attempt to overcome the challenges of their digital transformation through structural ambidexterity. I address this through an extended case method design by drawing on a longitudinal case study of an incumbent firm. This study reveals the potentially negative impact of escalating tensions, which are the product of three interrelated underlying mechanisms, in structural ambidextrous solutions. It thereby contributes to the literature on digital transformation by showing how tensions in the context of DT emerge, evolve, shift, pervade, and consequently escalate over time. Furthermore, it highlights the complexity incumbents face in the context of their DT and thus contributes empirically to the question of how DT is actually different.

## 1. Introduction

Based on the premise that “strategy, not technology, drives digital transformation” (Kane, Palmer, Phillips, Kiron, & Buckley, 2015: 3), this paper investigates how incumbent firms attempt to overcome the challenges of their digital transformation (DT) through structural ambidexterity. Multiple studies have already addressed how incumbents should engage in DT (Oberländer, Röglinger, & Rosemann, 2021; Roy, Lampert, & Stoyneva, 2018; Sund, Bogers, & Sahramaa, 2021; Warner & Wäger, 2019). Often incumbents set up new (semi-) autonomous business units with the mandate to develop digital capabilities (Broekhuizen, Bakker, & Postma, 2018; Visser, Weerd-Nederhof, Faems, Song, van Looy, & Visscher, 2010). However, due to their often incremental approach incumbents struggle and are generally seen as slow when it comes to DT compared to new market entrants (Verhoef et al., 2021; Volberda, Khanagha, Baden-Fuller, Mihalache, & Birkinshaw, 2021). Furthermore, structural changes are not without risk. They may lead to short- and medium-term performance declines (Sastry, 1997) and give rise to conflicts (Hamel & Zanini, 2016) within organizations as digital technologies potentially alter or even destroy crucial core competence (Christensen, Bartman, & Van Bever, 2016; Tushman & Anderson, 1986; Venkatraman, 2017).

These tensions might arise from but are not limited to the relationship between the business unit and the firm or different groups of employees, the transitions between exploitation and exploration activities, or differing contextual requirements, such as market conditions (Zimmermann, Raisch, & Cardinal, 2018). In addition, Volberda and colleagues (2021: 4) emphasize that incumbents face a multitude of tensions and challenges in their attempt to overcome their “pre-digital mindsets, routines, and structures.” They suggest that future research should study the way they cope with these tensions of DT (Khanagha, Volberda, & Oshri, 2014; Smith & Beretta, 2021; Volberda et al., 2021). Furthermore, Verhoef et al. (2021) identify organizational structures as a key theme for future research about DT.

However, despite its importance, research around DT and structural ambidexterity seems still insufficient. While scholars explored how incumbents respond to DT (D'Ippolito, Messeni Petruzzelli, & Panniello, 2019), and the rationale for choosing ambidextrous designs (Broekhuizen et al., 2018; Visser et al., 2010), potential tensions that unfold over time within the sub-unit or with the corporate parent and the consequences in the context of DT remain underexplored.

In this paper, I draw on organizational ambidexterity literature (Tushman & O'Reilly, 1996) and, in particular, the notion of structural ambidexterity (O'Reilly & Tushman, 2004; O'Reilly & Tushman, 2008). Prior literature points out that incumbents increasingly rely on structural ambidexterity in an attempt to transform digitally (Khanagha et al., 2014; Sebastian, Ross, Beath, Mockler, Moloney, & Fonstad, 2017). While structural separation is often the starting point of DT initiatives it is not mutually exclusive but rather complementary to sequential and contextual ambidexterity (Birkinshaw & Gibson, 2004). Therefore, the focus of this paper is to shed light on the above-described topic by asking: How do tensions unfold and affect maturing, structurally separate units of incumbents in the context of DT?

I address this question through an extended case method design (Burawoy, 1991, 1998; Danneels, 2010) by drawing on a longitudinal case study of an incumbent firm here referred to as 'Alpha'. More specifically the case study focuses on the establishment, growth, and maturing phase of the (semi-)autonomous Alpha business unit (ABU). The sole purpose of ABU was and still is to grow a new, by now digital product domain. The study reveals the potentially negative impact of escalating tensions, which are the product of three interrelated underlying mechanisms. Neglecting the multitude of tensions that arise in ambidextrous designs may lead to escalating tensions. Here, escalating tensions are the result of the combination of emerging, shifting, and pervasive tensions over time. Thereby structural changes and strategic intent might be decoupled or reinforce the escalation of tensions. Furthermore, the escalation of tensions can negatively affect organizational or strategic level outcomes in

the context of DT. Based on these findings, this research makes the following contributions to the growing literature around DT:

First, while ambidextrous solutions are a means to resolve frictions between firms existing and future strategies and directions (Andriopoulos & Lewis, 2009; Papachroni, Heracleous, & Paroutis, 2016; Raisch, Birkinshaw, Probst, & Tushman, 2009), the implementation of these solutions may also be fraught with difficulty. It is these emerging tensions over time that remain ill-understood. This paper shows how tensions escalate over time by describing an in-depth case of how tensions in the context of DT emerge, evolve, shift, pervade, and consequently escalate over time. This matters as the escalation of tensions potentially alters incumbents' performance and strategic success in the context of their DT. Second, the desired alignment of an incumbent's new strategic intent and structure necessary for competitive purposes may have the unintended consequence of fuelling the escalation of tensions. Similar to existing research, this study shows that DT entails structural changes (Porter & Heppelmann, 2014). These changes can fuel the emergence of tensions that incumbents need to balance (Smith & Beretta, 2021). This matters, as even though strategy and structure might be aligned (Miles & Snow, 1984; Rumelt, 1974) they can also act as a catalyst for the escalation of tensions. Finally, and in line with Smith and Beretta (2021) and Furr et al. (2022), this study also highlights the importance and distinctiveness of research on DT. In particular, it highlights the complexity incumbents face in context of their DT and thus contributes empirically to the question of how DT is actually different (Adner, Puranam, & Zhu, 2019).

## **2. Theoretical Background**

### **2.1 The Challenge of Digital Transformation in Incumbent Firms**

The emergence and ever-growing relevance of digital technologies have altered competition as new digital entrants threaten and compete head-to-head with incumbent firms (Bughin & van Zeebroeck, 2017; Porter & Heppelmann, 2014). These trigger strategic responses of incumbents to transform digitally (D'Ippolito et al., 2019), including the product (Matt, Hess, & Benlian, 2015; Yoo, Boland, Lyytinen, & Majchrzak, 2012) or business-model level (Broekhuizen et al., 2018; De Jong & van Dijk, 2015; Klos, Spieth, Clauss, & Klusmann, 2021; Matarazzo, Penco, Profumo, & Quaglia, 2021). Furthermore, DT has become an integral part of strategy and management research. This is underpinned by reviews about research on DT in general (Hausberg, Liere-Netheler, Packmohr, Pakura, & Vogelsang, 2019; Kraus, Jones, Kailer, Weinmann, Chaparro-Banegas, & Roig-Tierno, 2021; Nadkarni & Prügl, 2021; Verhoef et al., 2021), in information systems (Vial, 2019), DT and organizational change (Hanelt, Bohnsack, Marz, & Antunes Marante, 2021), as well as in innovation management (Appio, Frattini, Petruzzelli, & Neirotti, 2021). Furthermore, there are multiple ongoing calls for papers and special issues dedicated to exploring the implications of DT (Lamine, Fayolle, Jack, & Audretsch, 2020; Lanzolla, Lorenz, Miron-Spektor, Schilling, Solinas, & Tucci, 2018; Levinthal, 2019).

As the concept of DT gains traction in management literature, scholars also started to address the question as to what extent DT is different (Adner et al., 2019; Vial, 2019). Indeed, past literature points out that amongst others, new product development (NPD) in the context of DT is “a complex transformation” as it requires novel approaches, inherently different compared to existing ones (Smith & Beretta, 2021: 188). DT focuses on transforming the existing way of doing business through the adoption of digital technologies (Hinings, Gegenhuber, & Greenwood, 2018). This process of DT typically involves the use of technology-driven tools and platforms to enable the automation of processes, the integration of

data systems, the optimization of customer experiences, and the delivery of enhanced services. This approach to innovation is distinct from other forms of innovation as it is designed to create a shift in the way an organization or industry operates, rather than simply improving existing operations (Vial, 2019). However, the sole application of digital technologies does not necessarily lead to increased performance (Usai, Fiano, Messeni Petruzzelli, Paoloni, Farina Briamonte, & Orlando, 2021). Thus, additional research is needed to understand how this transformation unfolds (Adner et al., 2019; Levinthal, 2019).

A particular point of interest in this context is how incumbents cope with and manage the challenges of DT (Murtinu, Park, Tucci, & Wadhwa, 2021; Simsek, Heavey, Gisling, Stam, & König, 2020). So far, studies on incumbents and DT have focused on topics such as firms' resources and capabilities in the context of DT (Eller, Alford, Kallmünzer, & Peters, 2020; Ferreira, Fernandes, & Ferreira, 2019; Roy et al., 2018), digital strategy making and implementation (Chanas, Myers, & Hess, 2019; Correani, Massis, Frattini, Petruzzelli, & Natalicchio, 2020; Sebastian et al., 2017) or how firms utilize digital technologies to foster innovation (Smith & Beretta, 2021; Svahn, Mathiassen, & Lindgren, 2017). For example, D'Ippolito and colleagues (2019) studied incumbents' strategic responses in light of digital innovation. They find that strategic responses depend on what resources need to be mobilized to reconfigure a firm's activity system. Therefore, business model preferences may be directed by the complexity of the reconfiguration process. Furthermore, Cozzolino and colleagues (2018) addressed the question of how incumbents adapt to facing disruption through DT. They found that in contrast to the assumption of the innovator's dilemma (Christensen, 1997), incumbents seem to anticipate and invest early in case digital technologies open new possibilities.

By doing so it is essential that incumbents develop the ability to deploy resources and capabilities to pursue digital innovation (Ceipek, Hautz, Petruzzelli, Massis, & Matzler, 2021). In order to do so, established firms, need to create organizational structures that foster

more rapid and flexible reactions (Verhoef et al., 2021). To accomplish that, they often set up new (semi-) autonomous business units with the mandate to drive their DT efforts (Broekhuizen et al., 2018). But such changes are not without risk. They may lead to short- and medium-term performance declines, e.g., if the changes do not fit the environmental requirements or the responsiveness with regard to adjusting the strategic orientation is not accurate in terms of market demands (Sastry, 1997). Furthermore, those changes may also give rise to conflicts when managers have a particular interest in maintaining the status quo (Hamel & Zanini, 2016). Moreover, digital technologies potentially alter or even destroy crucial core competencies (Christensen et al., 2016; Christensen & Overdorf, 2000; Tushman & Anderson, 1986; Venkatraman, 2017). This again might reinforce tensions and the relatively ‘slow’ or incremental progress of incumbents’ DT and highlights the complexity of this matter.

Smith and Beretta’s (2021) study of the way incumbent firms manage and organize their DT and the potential conflicts in ambidextrous structures sheds light on this complexity. They emphasize three tensions, ‘organizing’, ‘attention’, and ‘knowledge sharing’ that arise through separation and integration in ambidextrous designs. They focus on a focal point of incumbents DT, the introduction of ‘new’ digitally infused products (Porter & Heppelmann, 2014; Yoo et al., 2012). Established firms often utilize digital technologies to develop new products, generate value, and seize the potential of DT. Indeed, some scholars point out that existing competencies and assets might act as a catalyst for incumbent firms rather than hinder them (Roy et al., 2018). However, building new products and capabilities might also interfere with or even destroy existing competencies and structures. Furthermore, by doing so incumbents also need to overcome their “pre-digital mindsets, routines, and structures” (Volberda et al., 2021: 4). Therefore, firms often adopt structural ambidexterity to tackle this dilemma (Danneels, Verona, & Provera, 2018; Khanagha et al., 2014; Sebastian et al., 2017; Smith & Beretta, 2021). However, despite the study of Smith and Beretta (2021), literature



still lacks insights into the tensions and their effects on (semi-)autonomous business units and incumbent parents overall. Hence, taking a structural ambidexterity perspective on DT might help to provide a deeper understanding of the complex issues faced by incumbents and their ambidextrous solutions to drive DT efforts.

## **2.2 A Structural Ambidexterity Perspective on Digital Transformation**

The construct of ambidexterity is well-established in strategy literature. Its basic notion is that to succeed, firms need to exploit existing competencies while simultaneously exploring new ones (O'Reilly & Tushman, 2013). However, while doing so, firms face a dilemma: balancing the opposites of exploration and exploitation (March, 1991). If organizations lean too much towards exploitation and neglect exploration, they might prosper in the short term but suffer in the long term. Similarly, if the focus is on exploration rather than exploitation, the existing business might suffer (Birkinshaw & Gibson, 2004; Tushman & O'Reilly, 1996).

To cope with the underlying challenge of achieving ambidexterity, extant literature distinguishes three main approaches: structural ambidexterity, sequential ambidexterity, and contextual ambidexterity (O'Reilly & Tushman, 2013). Structural ambidexterity is understood as pursuing exploitation and exploration activities in structurally separate subunits. These units entail varying capabilities, processes, and cultures (O'Reilly & Tushman, 2008). For example, Raisch and Tushman (2016) studied six longitudinal cases of large corporate firms' new business initiatives. They found that to be successfully scaled, units initially develop distinctive capabilities that later are integrated into the core unit over time. Secondly, sequential ambidexterity describes the switching between sequences of exploitation and exploration at different points in time (Siggelkow & Levinthal, 2003). For example, Nickerson and Zenger (2002) point out that Ford switched between phases of highly decentralized and autonomous operations, which favored adoption (exploration) to local markets and globally centralized operations to increase efficiencies (exploitation). Finally, contextual ambidexterity proposes exploitation and exploration activities on the individual rather than the

organizational level. This approach argues that the individuals in an organization make the choice when to follow exploitation and exploration activities (Birkinshaw & Gibson, 2004). An example of contextual ambidexterity is Adler et al. (1999), describing the operation of Toyota's production system. Workers would perform routine tasks while being expected to switch their jobs to increase efficiency (O'Reilly & Tushman, 2013).

However, research also argues that these different approaches are not necessarily mutually exclusive and may even be complementary. Indeed, Birkinshaw and Gibson (2004) point out that successful firms such as Intel, 3M, or Hewlett Packard draw on structural and contextual ambidexterity to balance exploitation and exploration efforts. However, organizational ambidexterity is not a sure-fire success. It might also be unsuccessful, e.g., when firms fail to properly make use of integration mechanisms (Hansen, Wicki, & Schaltegger, 2019).

Hence, regardless of whether firms pursue any or a combination of these three approaches, they inevitably face tensions along the way when attempting to balance exploration and exploitation activities (Andriopoulos & Lewis, 2009). Research has extensively studied the tensions firms need to cope with in this context (Friesl, Garreau, & Heracleous, 2019; Hansen et al., 2019; Leonard-Barton, 1992; O'Reilly & Tushman, 2013; Smith & Beretta, 2021). The nature of these tensions might relate but is not limited to the strategic intent, e.g., profit emphasis versus breakthrough emphasis (Andriopoulos & Lewis, 2009), processes, e.g., efficiency versus flexibility (March, 1991), structures, e.g., degree of integration versus differentiation (Raisch et al., 2009) or capabilities, e.g., exploitation of existing versus exploring new capabilities (Leonard-Barton, 1992).

While the particular types of tensions that arise in the pursuit of ambidexterity (Andriopoulos & Lewis, 2009; Tushman & O'Reilly, 1996) and how they can be managed are well documented (Papachroni et al., 2016; Smith & Beretta, 2021; Zimmermann et al., 2018), the rise of tensions and their impact in maturing sub-units, especially in the context of DT, remains

underexplored. More precisely, we lack knowledge of where certain strategic intents prevail (exploration or exploitation) and varying structural changes as well as correlating tensions in the course of ambidextrous designs occur. Exploring this phenomenon is especially relevant for research on incumbents DT. In fact, Smith and colleagues (2021) point out that time is an important factor with regard to incumbents' DT efforts. Yet this remains an understudied but crucial aspect of structural ambidextrous solutions, especially regarding the complex issues of incumbents' DT. Thus, this paper asks the following research question to extend the literature on ambidexterity and DT: How do tensions unfold and affect maturing, structurally separate units of incumbents in the context of DT?

### **3. Methodology**

#### **3.1 Research Context**

I adopt an extended case method design (Burawoy, 1991, 1998; Danneels, 2010) by drawing on a detailed case of a major multi-national firm (here referred to as ‘Alpha’) and the structurally separate Alpha business unit (ABU). As this research aims to extend the current literature on DT, this approach is useful. In fact, this method is particularly suitable for dealing with complex issues and unstructured phenomena. For instance, prominent examples used a similar approach. These include but are not limited to Burgelman’s research at Intel (1991), Tripsas and Gavetti’s (2000) seminal paper about Polaroid’s shift towards digital imaging, and Danneels’s (2010) study about the downfall of Smith Corona. Furthermore, literature shows and recommends that using in-depth case studies seems particularly suitable in the context of structural ambidexterity (Harreld, O’Reilly, & Tushman, 2007; O’Reilly & Tushman, 2013; Raisch, 2008).

To address the above-described issues, I choose an incumbent firm in a traditional industry. Established firms in maturing industries face a twofold challenge with regard to DT: the need to exploit current advantages while simultaneously exploring new opportunities (Hitt, Ireland, Sirmon, & Trahms, 2012; Ketchen, Ireland, & Snow, 2007). Hence, they aim to improve their current business performance through digital technologies while searching for new digital business opportunities (Hess, Matt, Benlian, & Wiesböck, 2016).

The case firm, Alpha, is a well-established, family-owned firm. It is a top-five global player in its segment, headquartered in Germany, and was founded in the early 20<sup>th</sup> century. By now, more than 25.000 staff members operate worldwide across five continents, in 24 countries, and over 55 locations. Alpha is set in a traditional industry environment, currently undergoing fundamental changes triggered by the diffusion of digital technologies. The industry is growing continuously and now is affected by the need to integrate more data-driven approaches, develop and implement more software into their products and streamline

production by using digital technologies. However, despite the continued growth only firms which will adopt the new digital reality are likely to survive in the long run. To cope with these changes, they initiated major strategic digital initiatives, one of which builds the core of this research. With these initiatives, they aim to double their revenue and hire more than 10.000 new employees over the next years. Part of these initiatives is the diversification of their product portfolio and consequent entry into a new market. To do so they set up a new autonomous business unit, ABU. ABU is a wholly owned subsidiary of Alpha with the sole intent to diversify and digitalize the product portfolio based on the existing core competencies. This gave rise to major challenges for them as amongst other things the new market has different environmental conditions compared to the established core business. For example, while the core business rests upon receiving detailed product specifications from only a few customers, the new industry environment requires a more proactive ‘searching’ and ‘trial and error’ approach. However, both new and existing markets share the need for more data-driven approaches, streamlined production, and implementation of new software into products.

### **3.2 Data Collection**

I focus on a 7-year period starting from 2014, the year ABU was established. The data collected includes semi-structured interviews, meeting observations, notes and observations from a site visit, and a feedback meeting with senior management of Alpha, as well as extensive archival data (see Table 1 for an overview). In total, I conducted 20 semi-structured interviews with organizational members across all hierarchies. In addition to this primary data, I collected 79 articles available in the public domain and internal documents, such as strategy documents, presentations, and organizational charts. I also draw on the legally required management reports and balance sheets from ABU and Alpha of the period accessed via Federal Gazette (Bundesanzeiger).

**TABLE 1** Detailed overview of data sources

Data Types and Dates	Amount	Use in Analysis
<u>Primary Data Sources</u>		
Semi-structured interviews	20 semi-structured interviews (6 management informants and 10 employee informants)	Insights into operations, development, tensions, and strategy regarding DT of ABU and Alpha in general
Notes and observations from (informal) meetings, site visit, and feedback presentation	25 informal meetings and extensive field notes	Informal discussion to provide insights and contextual understanding of current tensions
	Feedback meeting with management team	Presentation of research to senior management to give and receive feedback, gaining insights about the current understanding
	Participation in meetings with external consultancy and site visit (at ABU) as well as extensive email exchange	Observation to build an understanding of current challenges, workflows, and context
<u>Secondary Data Sources</u>		
Newspaper, specialized press articles, and press releases	79 articles (14 press releases, 54 news articles, and 11 industry reports)	Coded for interpretation, development, and understanding as well as public perception and depiction of ABU
Annual management reports	14 reports (financial statements, inc. management reports)	Coded for insights and comparison between internal understanding and external communication
Archival documents and reports	Organigram / organizational chart Internal presentations of consultancy and strategy documents/slides	Provided contextual understanding and coded for focus and strategy regarding ABU and DT in general

*Primary data sources.* The core data source of this research are 20 semi-structured interviews. Thereof, five interviews were conducted with the Head of DT at Alpha. The other 15 interviews were with knowledgeable actors working at ABU. These include the Vice President of ABU, the Director of Product Development, several heads of departments as well as team members. Interviewees were chosen in close collaboration with the Head of DT and based on their knowledge and expertise to ensure a high quality of interview data. All interviews, apart from one, were recorded and transcribed verbatim. In addition to the transcripts, I also draw on detailed notes and observations from a site visit, 25 informal meetings, a feedback meeting with senior management, and multiple meetings with an external consultancy and senior management staff of ABU. All interviews and meetings took place between September 2020 and September 2021.

*Secondary data sources.* To complement primary data sources, I collected 79 articles from the public domain, 14 official management reports, and several internal strategy documents, presentations, and organizational charts. I accessed the articles through a systematic search of business databases Ebsco, Web of Science, and Proquest and all press releases from the company website. This was complemented by searching for relevant video content on YouTube. The initial set of articles was scanned and checked for relevance. If the article did not provide any value for the focus of this research, it was excluded. The remaining pieces were aggregated and categorized based on their content and according to the following themes: industry information, key milestones, personnel, digital, and strategy.

### **3.3 Data Analysis**

As I use an extended case method, the data analysis is characterized by repeated cycles of analysis between theory and data (Burawoy, 1991; Danneels, 2010). In combination with Burawoy's (1991; 1998) original work on the extended case method, I used Wadham and Warren's (2014) methodological paper for practical guidance around this method.

Starting, data analysis using the extended case method involves repeated cycles between the analysis of empirical data and theories and concepts. This research originated in the interest of incumbents DT in traditional industries. Looking at research around DT it became evident that ambidexterity literature is a suitable avenue to investigate this field further. As described above, past research has already highlighted the importance of ambidexterity literature for understanding the impacts of DT (Smith & Beretta, 2021). However, research also points out that we need to reassess established tools and concepts in light of the challenges DT brings to organizations (Levinthal, 2019).

To analyze the data set, I relied on a temporal bracketing strategy (Langley, 1999). Thus, my analysis began by identifying specific breakpoints to structure the development of ABU and define distinct phases. To structure phases, analysis should find significant events as starting or endpoints. For example, in this case, I found three significant events: The

structural separation of ABU, Alpha managers joining ABU, and the announcement of a strategy shift with new management. Figure 1 contains a detailed overview of this step of analysis and the resulting breakpoints and key events throughout the history of Alpha and ABU. Furthermore, the study initially started with ambidexterity literature. After integrating the Alpha case, analysis pointed specifically towards exploitation-exploration tensions in the course of becoming ambidextrous.

I then started a first open coding cycle for each phase close to the original text in the transcripts and news articles. This step revealed that different tensions in ABU were present and seemed to increase over time. I then started axial coding by clustering the first order codes across transcripts in each phase and generated first aggregated themes. For example, process tensions in each of the three phases were a result of this step (see also Table 2-4 for a detailed overview). In a subsequent step, the extended case study method requires a constant back and forth between data collection and data analysis (Danneels, 2010). For example, the struggles Alpha faced directed me towards specific tensions and incremental changes of incumbents in the context of DT. I then revised my initial coding and paid specific attention to the findings of the first step to get a more nuanced picture of the phenomena. The shifts and pervasion of tensions later described in the findings were a core insight in this part of the analysis.

Process research focuses on why and how things develop and therefore entails detailed stories of decisions, actions, events, and involved actors over time (Langley, 1999; van de Ven & Huber, 1990). Consequently, I wrote up detailed narratives for each phase when analyzing transcripts and secondary data. This step was characterized by constant comparisons of emerging interpretations with the available case data and used theory to ensure a high fit. To substantiate the emerging findings, I wrote up extensive Tables detailing the strategic intent, structural changes, and tensions arising in each phase (see Tables 2-5). Subsequently, I searched for the rationale behind the emerging storyline of ABU. It became clear at this



stage that even though strategy and structure were aligned throughout all phases, outcomes on the organizational and strategic level might be compromised if emerging tensions are neglected. In particular, they caused a competence trap in phase two which eventually led to an unclear strategic direction in phase three. Consequently, Figure 2 gives an overview of the transition between the phases and the connection between strategic intent, structural changes, tensions, and outcomes.

## **4. Findings: The Digital Transformation of ABU**

### **4.1 A Brief History of Alpha**

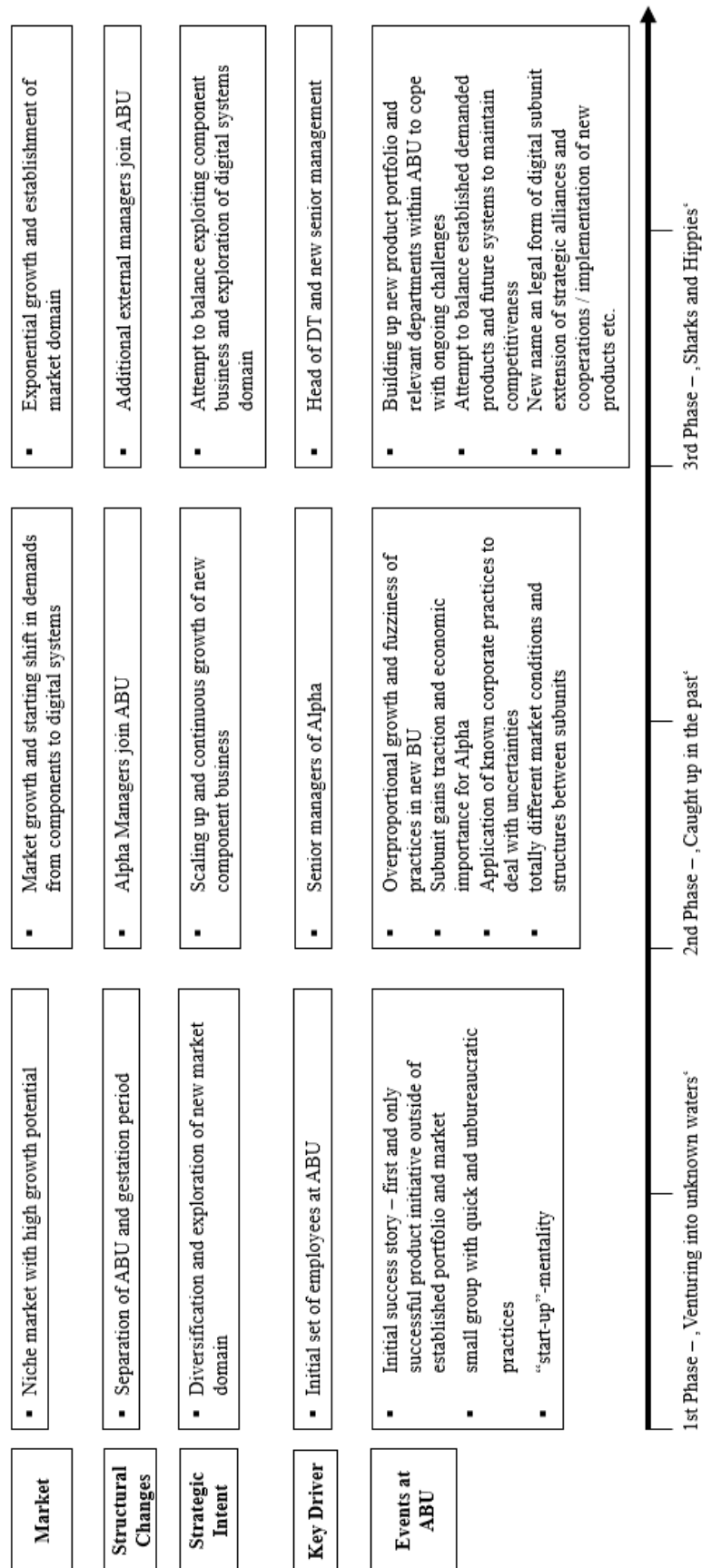
Alpha was founded in Germany in the early 20<sup>th</sup> century and continuously grew within its core business, especially fuelled by Germany's 'economic miracle' after World War II. In the third quarter of the 20<sup>th</sup> century, the current chairman and grandson of the founder took over. He developed Alpha into one of the heavyweights in its industry. In the 21<sup>st</sup> century, the company also expanded internationally, mainly driven by various acquisitions and joint ventures. The core business of Alpha is to be a supplier that produces a high volume of specific electronic and mechanical components for a distinct product. Thus, after decades of success within its core business, Alpha's strategy was shaped by the ability to scale production volumes efficiently based on predefined product characteristics in alignment with a consolidated group of strategic customers. The strategy-making process was and still is driven by efficiency and standardization in a stable and ever-growing environment. However, triggered by the consequences of the financial crisis and the gradual stagnation of their core business, Alpha experienced increased pressure. These pressures were fuelled by radical innovation and DT.

Consequently, Alpha started to ramp up its diversification efforts and drive DT initiatives forward. They developed a new component that targeted a new market domain but was based on their existing set of capabilities around mechanics and electronics. Following this product

development, they set up a new semi-autonomous business unit, ABU, that sole purpose was to develop and grow this new domain.

*The [ABU] success story started during the economic and financial crisis in 2009. At that time, the [city of HQ] company wanted to extend its portfolio.  
(News Article)*

**FIGURE 1** Timeline of influencing factors and triggers at ABU



However, shortly after the launch market dynamics in the new market shifted, and instead of the individual components customer firms demanded ‘digital systems’. These, in contrast to components, require different capabilities with regard to development, processes, and production. For example, individual components only needed an interface for connectivity with other components, whereas digital systems are already combined and integrated individual components which are connected to each other. Connectivity in this context refers mainly to seamless data flows between individual components. This shifted requirements for ABU which started as a sole component supplier to eventually become a supplier of already digitally integrated systems.

The journey of ABU can be subdivided into three phases (see Figure 1 for an overview). In the following section, I will present my findings in detail and describe the respective strategic intent, mode of ambidexterity, and occurring tensions for each phase.

#### **4.2 Phase 1 – ‘Venturing into unknown waters’**

The first phase starts with the set-up of ABU and the first product developments. This phase was characterized by a focus on the exploration of the new market and a predominantly informal structure. An initial team of Alpha employees was forming the core team and ABU was formally and physically separated from Alpha (see also Table 2).

**TABLE 2** Phase 1 – ‘Venturing into unknown waters’

<b>1<sup>st</sup> phase ‘Venturing into unknown waters’</b>		<b>Representative Quotes</b>
<b>Strategic Intent</b>	Exploration	<ul style="list-style-type: none"> <li>At that time, we realized that our profession was and is in mobility. That’s why we quickly became interested in [components for the new industry], created our own division with start-up-typical approaches, quickly developed our first prototype, and then launched the first series [of components] in the market in 2014. At that time, we succeeded in designing a - technically speaking - real flagship product that is also [“Made in Germany”]. (Managing Director in a News Article)</li> <li>I think we came out of this start-up track. We were also encouraged to work in this way to some extent. Simply because it was a new topic and because it had not yet reached the level of sales where it really became interesting for [Alpha]. (Test Engineer)</li> <li>In 2015 there were 20 people, and within the group, there was also this start-up character I would say. (Teamlead Quality)</li> </ul>
<b>Structural Changes</b>	Separation and Gestation Period	<ul style="list-style-type: none"> <li>[City of ABU office] is the home for the competence center of our [new industry] and at the same time a perfect environment for the new urban mobility (News Article)</li> <li>“In the [city of ABU office], you can see how the mobility market is developing,” says [Managing Director of ABU] in an interview with the [Name of Newspaper]. But that was not the only reason for producing the [components for the new industry] here. [Alpha] was founded in 1908 in [this city] and “also has a great affinity with [the city of ABU office] for historical reasons”(News Article)</li> <li>Well, we started out in 2014 as a component supplier, we built the [component], just like we did in the [core industry]. That was the notion. And accordingly, we have a lot of mechanical designers, we have a purchasing department, we have everything that we typically did in the [core industry] before. (Managing Director)</li> </ul>
<b>Tensions</b>	Process	<ul style="list-style-type: none"> <li>Yes, it’s just that we are currently experiencing relatively large quality problems, and from my point of view they can also be traced back to the fact that in my area, processes were not adhered to, the products were not independently evaluated, but rather it was not looked at very closely, more or less, to see whether the product now met the quality standards or the requirements that we had set for itself. (Teamlead Software)</li> <li>Often, when problems arose that were already visible during development or testing, the products were still waved through. And it was said, okay, we have to bring it to the market quickly and get the product out, we’ll take care of it later, the problem won’t be so bad. And that would have been difficult to imagine in the [core industry], from my point of view, to that extent, to that degree. (Teamlead Software)</li> <li>I mean, of course, there are always the engineers who would like to have everything double and triple-checked, so that nothing happens, because it could be checked and, there are the regulations that come from the [core industry][...], especially to engineers who come from the [core industry], that they would like to have very very very, at a best a fivefold safety net. (Sales Director)</li> <li>There used to be Excel lists. Individual Excel lists. Lists for each topic. An action tracking list for each topic, which everyone filed somewhere in a folder. You were then listed unknowingly in 50 different lists, with dates in them, which you then of course could not follow up on, because you were not informed at all that you had won [had been assigned] a task there. (Teamlead Quality)</li> </ul>

**Strategic Intent:** The aftermath of the financial crisis, stagnation of the core industry, and the impact of DT drove Alpha's diversification efforts. To cope with these challenges, they explored new ways of utilizing the established core competencies of the firm. The core competence is manifested in Alpha's excellence in manufacturing and its high efficiency in scaling up product volumes. For example, the initial new product was developed based on an existing product base that they had already manufactured and scaled for decades within their core business. Until this point, the product base was characterized by low degrees of digitization. Yet, the new product quickly demanded a higher digital integration. Digital integration in this context is understood as the need for a product to become part of a digital ecosystem. ABU initially produced a specific component for their customers. This component was then integrated into a digital ecosystem by the customer firms. Therefore, it was essential that ABU's product would have multiple connectivity features. Consequently, and in contrast to their core business, ABU faced a deviating, more dynamic environment with rapidly emerging product requirements. For example, the lifecycles and development times of products in the new market domain had to be quicker, and product requirements were not dictated by customers but rather had to be instigated by ABU. This created uncertainty and new needs for the strategy and respective digital strategy as a manager pointed out:

*We realized that, well, maybe that's one of the main differences, that in the [new] sector we have to think more from the customer's point of view than in the [core] sector, where the immediate customer gives us very clear guidelines. And there is no such leeway. In the [new] sector, I have to develop a solution that suits the customers. (Managing Director)*

**Structural Changes:** Alpha had to set up ABU as a structurally separate entity because the new market conditions and regulatory environment were fundamentally different. For example, while the core business of Alpha was shaped by customers requesting a large number of highly specified products, ABU's environment required the firm to actively research and try different product features without customer specifications. In the beginning, the activities of ABU were dominated by an explorative attitude and operations were rather

unbureaucratic. For instance, employees of ABU were encouraged to follow a more ‘start-up-like’ behavior. Furthermore, as Alpha’s strategic intent was to explore the new product domain and ABU was not critical for the success of the company yet, corporate processes did not have a huge imprint on ABU’s operations. Consequently, this first phase was characterized by an ‘entrepreneurial’ environment with the gestation of an initial team and relatively quick decision-making:

*I think it came out of this start-up track. We were also encouraged to work in this way to a certain extent. Simply because it was a new topic and because it had not yet reached the level of revenue where it really became interesting for [Alpha]. (Test Engineer)*

This approach was taken on purpose as the idea was to explore the new field and give freedom to the small team within ABU. The management team did not want to suffocate ABU in the lengthy and highly controlled environment of the core business:

*In the beginning, that was done on purpose because we started the project and we knew, okay, this is different, and we didn’t want to suffocate it with [core business] right away. And we simply have greater freedom. We simply do it. (Teamlead Software)*

**Process tension:** Given ABU’s operational freedom and low importance with respect to the whole business, tensions were minimal due to a lack of friction points with the main organization. However, the freedom to explore the new product domain did lead to the emergence of initial process tensions. The need to quickly bring products to market without clear demands of the customers was new. Thus, ABU was torn between fulfilling market demands and meeting its aspirations of quality. As a result, ABU partly abolished quality testing to compromise for shorter development circles.

*It was not looked at very closely to see whether the product met the quality standards or the requirements that the company had set for itself. And often, when problems arose that were already visible during development or testing, the products were still waved through. And it was said, okay, we have to go to the market quickly and get the product out, we’ll take care of it later, the problem won’t be too bad. And that would have been difficult to imagine in the [core business], [...] to that extent, to that degree. (Teamlead Software)*

This led to quality issues with the first products. Consequently, ABU started to face internal process tensions as self-proclaimed quality standards could not be met. Nevertheless, these process tensions seemed inevitable as market demand and research and development cycles in the new market vastly deviated from what the engineers of the core business were used to.

In summary, the first phase did not show any essential tensions and was driven by a start-up-like environment, set to explore the new business area (see also Table 2). Even though ABU faced initial process tensions in this phase, they did not account for major deficiencies. Furthermore, although the first products showed quality issues, they were met with rising demand in the market. Following this, ABU built up a good reputation in the market and quickly grew its business. Thus, management did not see a necessity to resolve the rising process tensions in the very beginning. This marked the beginning of the second phase.

#### **4.3 Phase 2 – ‘Caught up in the past’**

The second phase was triggered by the growing demand for ABU’s products in the market. Now the focus shifted to exploitation as Alpha managers joined ABU and applied established processes to efficiently scale the business. But these changes also reinforced existing tensions and gave rise to new tensions within ABU (see also Table 3).



**TABLE 3** Phase 2 – ‘Caught up in the past’

2 <sup>nd</sup> phase ‘Caught up in the past’		Representative Quotes
<b>Strategic Intent</b>	Exploitation	<ul style="list-style-type: none"> <li>▪ I know that just in the last three years in the [new industry] it's been, we sell what's possible and we would sell more if we wanted to produce more. So the focus lies on extremely expanding the production capacity (Product Manager)</li> <li>▪ From my point of view, [Alpha] has misjudged the topic of [new industry] in the past, at least in upper management, and has always had a large product roadmap and drawn a large curve showing where it wants to go, what it wants to have, what the company wants to sell. But the whole thing was not met with investments or the corresponding resources. It was more like a daydream. You wanted to cash in first and then invest a little of it afterward. (Test Engineer)</li> <li>▪ No, I would say that in sales the guidelines are not clear enough. Due to a lack of strategy and specifications, the salesperson just sold what he had in stock somewhere. (Director Product Development)</li> <li>▪ What the majority did here was to produce some singular components, i.e. they [management] say we need a new [component] now. And then there is a development team and they develop [this new component]. Analog with [component A, B, or C], analog with any other components. And all that together forms a complete system. And until now, ABU has hardly ever thought in terms of systems, i.e. they have always just looked at individual components, as [Alpha] knows and understands it in its core business. So [a customer] comes along and says I need a [new component], and then [Alpha] can just say: Yes, I know this component, I'll build you a [new component]. (Director Product Development)</li> </ul>
<b>Structural Changes</b>	Alpha Managers join ABU	<ul style="list-style-type: none"> <li>▪ At that time [I worked] as a quality planner, customer, in the business unit [core industry] [...], and then I moved internally to [the city of ABU office] in 2015 and worked at [ABU] since then. (Teamlead Quality)</li> <li>▪ I have been with the company for over 25 years. I work there in [a business unit for core industry] and have been involved in engineering for the [core business] for over 22 years. For slightly more than two years now, I have the managerial responsibility for [ABU]. (Managing Director)</li> </ul>
<b>Tensions</b>	Process	<ul style="list-style-type: none"> <li>▪ Until now, or in previous years, the processes were written somewhere, but work was not done accordingly. And to a large part, lead a life of its own. (Test Engineer)</li> <li>▪ For example, it's about processes that we have established today, how we purchase things, and how we take service providers on board. There are simply regulations from the [core industry] that either don't apply to us in their entirety or that block us. If you say that I would like to work with a small number of service providers who supply me with personnel, but they don't have the specific personnel that we need in our area, then there is a complex process for accepting new service providers, which is, of course, a major obstacle for us. However, this was clearly created in the [core industry] sector in order to bundle purchasing forces or to talk about how we can now proceed in order to include such companies that we might then need here without having to go through this entire process. And consequently, there are friction points again. (Head of Digital Transformation)</li> <li>▪ I don't think either side was really looking for that [solution for new processes]. The [new industry] was perhaps not so important for the [core business] because it was too small and not being pushed. And ABU said, oh god, all this fuss from the [core industry] isn't helping us, so they pushed it completely aside and tried to solve things differently. Many solutions were on the table then, and the [core industry] said we don't want to deal with the small stuff either. (Head of Digital Transformation)</li> <li>▪ Well, on the one hand, we have a certain inconsistency within our own company, because [Alpha's] revenue share is 96% [core industry] and we in the [ABU], I would say, account for 3 to 4% of revenue. But we have processes that deviate from the standard processes at [Alpha], and many people don't understand why we do that. (Managing Director)</li> <li>▪ Well, I have to confess, I just couldn't deal with things like that at all. I was so busy with other things that it was also sometimes a problem, how shall I say, if the workload here is too high, you actually have no freedom to be creative with any new ideas. It was certainly desired, but you did not do it. (System Integration Engineer)</li> </ul>

**TABLE 3** Phase 2 – ‘Caught up in the past’ – continued

2 <sup>nd</sup> phase ‘Caught up in the past’		Representative Quotes
Tensions	Relational	<ul style="list-style-type: none"> <li>▪ I’ll put it this way: creativity has been suppressed a bit. If you think, for example, there’s actually something cool that the customer works with. You have somehow found a good tool at the client’s site. Or you’re privately involved with something good, I think you quickly push the idea out of your mind when you think about how you could suggest it to [Alpha] to implement it now. There are certainly ways of doing this, but I would say that, in my opinion, it is relatively useless to do it through official channels. (Teamlead Quality)</li> <li>▪ We simply tried to update the management in the meantime, just set a reoccurring meeting, and said, okay, we would like to inform you during this development period, where do we stand with the development, are there problems, what do we notice. That’s what we did. Then we also, I think, invited to two weekly meetings to always inform on the one hand about the development status and at the same time demand management decisions, because technical things have arisen, we have seen risks that, for example, that the software development [...] is too far away from us. Mistakes were made and we had big problems with the software quality. And we said, sorry, we actually have to react to this [...] then everything was postponed, and also these meetings, to which we invited, they were then canceled more and more often, then people complained, we needed then at some point another 20,000 euros more to complete it, they [management] were then actually rather upset about [...] such prices. That it costs [money]. [...] We have always tried to point this out and to make it clear to our management here [at ABU] that we now also need a budget for this. [...] Complete lack of understanding [referring to management reaction]. Also complete lack of understanding that you can develop software in this way and that it should then be further developed all the time. (Product Owner)</li> <li>▪ Well, I always find this Apple quote quite nice. Apple once said that we actually hire people here who tell us what we have to do instead of us telling them what they should do. That was when I arrived here, they said: build a service tool, but do it the way [Alpha] does. There is a large product development process, which is intended to produce a component like a hundred million times and has been developed directly according to a specification for a [customer], a customer from the [core business]. (Product Owner)</li> <li>▪ But it has to be said that there are still people at the highest level who come from the [core industry]. And my feeling is that they like to have ready-made processes, they have defined everything clearly in advance, they want to know what it will cost, they want to know what will be there and what is good before a decision can be made. Before someone really backs it up. But I don’t think that’s possible in a digital transformation project. Because it won’t be that simple. I can’t say in advance how much exactly it will cost, I can’t say in advance what it will really bring me in the end. Now at the very, very end in five years, in ten years or so. It’s not going to be that way. (System Engineer)</li> </ul>

**Strategic Intent:** The rising interest in the new product led Alpha to shift its initial approach and pursue what it could do best: efficiently scale up product volumes and demonstrate excellence in manufacturing. ABU became an established player in the new market and acquired high stake customers that obtained the components. This was more and more recognized within Alpha, not only as margins in the new business area were more attractive compared to the core business.

*And the [new industry] [...] is really profitable, and suddenly other people want to get in on the act. And now there are also other people coming into this industry. (Product Manager)*

Consequently, the strategic intent became exploitative rather than explorative. Management saw the opportunity to quickly drive profitability and exploit the existing product base to also increase the relevance of ABU for Alpha.

**Structural Changes:** To further exploit the new business, senior managers of Alpha joined ABU to deal with the rising demand and efficiently scale the business unit. As the new senior management had no significant experience in ABU's industry, they relied on their existing knowledge regarding Alpha's core business. Consequently, the focus of ABU started to shift. In the first phase, ABU was exploring the new product domain. Since the first products gained traction, ABU's senior management quickly decided to further grow this market domain by ramping up production volumes and relying on Alpha's existing set of capabilities. This meant producing a single component as the Director of Product Development pointed out:

*What the majority did here was to produce singular components, i.e., they say we need a new [singular component] now, and then there is a development team and they develop a new [singular component]. Analog with [...] other components. And all that together makes a complete system. And until now, [ABU] has hardly ever thought in terms of systems, i.e., it has always considered singular components, as [Alpha] knows and understands it in its core business. So a [customer] comes along and says I need a new [component], and then [Alpha] can just say: Yes, I know this component, I'll build you a new [component]. (Director of Product Development)*

**Relational tension:** In order to cope with the overproportional growth and improve value capture, incumbent senior managers of Alpha joined ABU and increasingly imposed established corporate processes. This marked the beginning of the first relational tensions across and between hierarchical levels. As the processes of Alpha's core business were specifically designed to efficiently scale high production volumes of pre-defined components, there was a misfit with the new diverging industry environment of ABU. This in contrast required a more proactive trial-and-error approach. But, due to the new and uncertain environment, the senior management relied on already established processes such as lengthy decision rounds and jour fixe meetings, which they imposed on ABU.

*I think most of the time, they just say the process is different now. You have to adapt to the process and not we adapt the process to the new circumstances. That's how it is most of the time. I don't know where we have ever really adapted a process through a project. (Quality Manager)*

While this approach might be suitable for the core business of Alpha, it led to tensions between managers and employees as ABU required an inherently different approach. For example, Alpha normally produced large quantities of a few highly individualized products for a small number of customers. Customers send detailed product requirement specifications, and Alpha's core competence is to scale up production volumes and minimize error rates in the product. However, there was a different 'product philosophy' for ABU needed as a Quality Manager described:

*And I think that is attributed to the product domains [...] we have a different philosophy for [new product domain], I'd say, in terms of the product itself, and also different prerequisites. So we have one product and 50 customers. And not one customer and one product, like now, for example, in the [Alpha core business]. And then the [Alpha core business], in the best case [...] sell a product five million times in the next six years, signed once, and then that runs, but with us, it is [...] much more flexible. Everything is much more short-term and I must have [...] always the possibility to bypass the process. And to circumvent current processes, that someone has thought of at some point, they have to be followed, and if they are not followed, then you are often faced with a big problem that causes extreme additional work. (Quality Manager)*

**Process tension:** These rising relational tensions also played a role for existing process tensions. Senior management now actively reduced the initial ‘freedom’ within ABU and required employees to follow the rigid processes:

*Now that the business has become so important for the group because it is clearly profitable and more profitable than other, shall I say, business units. It is less tolerated by top management to step out of line. Or, I have the feeling that this is also established in our management, that it is not good to stand out through process deviations. (Teamlead Quality)*

Consequently, the initial process tensions shifted and became a part of daily business routines. In the beginning, process tensions caused quality issues due to the need for quick go-to-market times. Now the small team of employees got caught up in overwhelming daily administration and struggled to cope with the amount of work that was caused by standardization. Furthermore, there was little to no time for them to engage in creative or explorative tasks as a System Integration Engineer explained:

*The only problem was that in the last few years, we were simply far too few people [...] to deal with such issues. So I must admit, I simply could not deal with such things at all. I was so busy with other things that sometimes it was a problem [...] that you actually don't have any freedom to be creative with any new ideas. (System Integration Engineer)*

ABU now struggled with excessive standardization and neglect of exploration efforts pursued in the previous phase. Management demanded to stick to Alpha processes, even though they were not intended for the new market and did not fit the actual requirements. These requirements were not to deliver high volumes of pre-defined products but rather to develop and present new product developments. Thus, the understanding of ABU shifted: now they deliver an excellent component needed by customers and their main goal is to produce large numbers with low-quality issues. Furthermore, this also led to a neglect of DT efforts, as the integration needed for the digital system to work happened on the customer side and not at ABU. But due to the success of the current product portfolio, management seemed reluctant and saw no necessity to change:

*Up to now, [ABU] have seen themselves as the ones who supply the best [component], [...] they win prizes, and there are competitions up to world championships. But for the time being, we do not play a big role as a system provider. We are also in a very comfortable, but at the same time very risky situation [...] we make the majority of our sales with one large customer. To whom we simply supply the [component]. (Director of Product Development)*

Overall, the second phase was characterized by a shift in strategic intent. ABU started to focus solely on exploitation over exploration, mainly driven by new Alpha senior management and success with initial products. This shift further reinforced the initial process tensions to shift (see also Table 3). Senior managers relied on established corporate processes and imposed them onto ABU which caused a competing action pattern between emerging new operations relevant for ABU and established corporate operations. For example, the focus of the digital strategy, in the beginning, was on the digital connectivity of the product, fully neglecting crucial connectivity between processes, people, and departments to enhance and embrace the DT initiatives. In other words, while they focused on optimizing data flows between their components, they neglected to streamline operations and enhance collaboration between departments. New initiatives now needed to go through lengthy decision rounds across hierarchies, and data was maintained in local and individualized spreadsheets, causing information asymmetry between individual actors. Employees were constrained to stick to these processes and, as a result, felt overwhelmed with administrative efforts and excessive standardization, causing tensions between managers and employees to emerge. As a result, ABU got ‘caught up in the past’.

However, the market dynamics of the new industries eventually altered this understanding. Initially, customers required individual components, which they would then compile into a digitally integrated system. But, eventually, customer firms started to ‘outsource’ this to their suppliers requiring ABU to not deliver components but digital systems as a Product Manager noted:

*The big manufacturers, they just want to make [their product] and want to make money. And they are willing to give the system to the supplier. (Product Manager)*

Competitors of ABU quickly adapted to this new situation by developing fully integrated digital systems. But as ABU heavily relied on one customer firm that further demanded components, exploration efforts to develop such a system were only limited in the beginning. However, the ever-growing relevance of digitally integrated systems in the industry eventually increased awareness of ABU's senior management. This instigated the beginning of the third phase.

#### **4.4 Phase 3 – ‘Sharks and Hippies’**

The above-described industry shift gave rise to a competitive disadvantage for ABU. This marked the beginning of the third phase. In this phase, ABU's focus turned toward both, components and digital systems. In an attempt to deal with these new circumstances, they also hired new managers to drive digital development forward. However, also tensions in this phase started to pervade, shift and rise (see also Table 4).

**TABLE 4** Phase 3 – ‘Sharks and Hippies’

3 <sup>rd</sup> phase ‘Sharks and Hippies’		Representative Quotes
<b>Strategic Intent</b>	Exploration and Exploitation	<ul style="list-style-type: none"> <li>▪ We simply want to supply a complete system. And there is this innovative strength behind it, what is possible lies quite clearly with the supplier, the system supplier. And that's what we are. Or rather, that's what we want to be here. [Alpha] is just starting to do that. And the management, well, they're thinking about their key performance indicators, and they're doing something with that, but actually, the whole thing can still be scaled even more. (Product Manager)</li> <li>▪ In the last year, the focus was on building up the [system]. This means that we are no longer just developing the [key components] and placing them on the market accordingly, but also [other components], [...] and everything that goes with it, sensors, cables, and the complete package. And that means that we are very highly challenged (Test Engineer)</li> <li>▪ So they would like to, which I can understand, keep all their options. I think it also comes from the history of this [new business] because in the beginning they only delivered [components]. Now they want to deliver systems. (System Engineer)</li> </ul>
<b>Structural Changes</b>	Modified management team and new departments	<ul style="list-style-type: none"> <li>▪ I am currently setting up the product management department. This will probably be a team of about 5 employees who will then specify this whole topic for components and systems. (Director Product Development)</li> <li>▪ [Alpha] strengthens management team for [digitally integrated systems] in the [city of ABU office] (November 10, 2020). The [ABU division] of supplier [Alpha] is gaining two new managers. (News Article)</li> <li>▪ [ABU] has a new management effectively from August [2020]. (News Article)</li> </ul>
<b>Tensions</b>	Process	<ul style="list-style-type: none"> <li>▪ You first have to defend your justification at [Alpha] on several levels. This means it takes much longer, in that time a startup has already decided, no, we're not going to do that. And the fact that you have to invest so heavily in order to get a decision by all means, the potential for mistakes is also greater. (Head of Digital Transformation)</li> <li>▪ Yes, we always have the challenge which processes and systems are mandatory for us and which processes are not. Actually, no one has really set this up. [...] ABU was simply put there somehow and there are some [Alpha] processes and systems, which we just adopt. It was now considered that with this system, in these business processes, I actually have to build the whole thing up in such a way. For one topic, the [Alpha] process is used, and it is mandatory. With other processes partially. (Director of Product Development)</li> <li>▪ If we built [Alpha product] the way we build [ABU product], [Alpha products] would not work that long. And if we built [ABU products] like [Alpha products], everything would take 10 years longer and cost five times as much. Just to show the tension gap. (Project Manager)</li> <li>▪ We have, for example, a procurement process [...] And we developed a new logic [...] and you directly noticed that you have people who say: “Why? We have that already. It works, why are we putting energy and effort into it?”</li> <li>▪ And above all, other topics are organized differently and thus naturally follow a different rhythm, follow a different understanding, but access the same set of employees. (Project Manager)</li> <li>▪ For example, we have a database in which we document and evaluate our complaints. Only those who know how to handle this database can extract, evaluate and process the data at the end. [...] then an important question arises from the management [...] then the other colleagues say: We can't tell you that. We can't retrieve the data. We don't know how to do it or we have never done it before. (Quality Manager)</li> </ul>



**TABLE 4** Phase 3 – ‘Sharks and Hippies’ – continued

3 <sup>rd</sup> phase ‘Sharks and Hippies’		Representative Quotes
Tensions	Cultural	<ul style="list-style-type: none"> <li>▪ And this has directly brought a completely different managerial perspective to this [new industry]. First of all, we have to understand it. And now we have two, so to speak, as far as the social aspect is concerned [...] a quite interesting mix currently. On the one hand, the dreamers, who have power, but on the other, I say, the sharks, who have so far only swallowed up everything in life. And on the other side the hippie. That's how you can understand the [new industry] right now. (Product Manager)</li> <li>▪ Exactly, and I'm sitting here now with a shirt, yes, but actually I'm a hippie, too. So, that's how I see myself there. (Product Manager)</li> <li>▪ Honestly, there are a lot of sharks working here [...] and people coming from the [new industry] is very, very thin. Partly like me, look, I walk around here like this, yes, you would never see that I haven't used a belt until yesterday [...]. And that I have more or less only shoes with holes at home. I bought four new pairs of shoes, especially for this. [...] But that's just the difference. (Product Manager)</li> <li>▪ Maybe next week [the core business] will be the big thing again, and we will do that. Maybe next week we'll also say, I don't know, we're converting to a military production facility, we're now going to become a major arms importer. What will happen then? Then people up at [Alpha] will say, why do I care about anybody here with their stupid [new industry], no. I'm building rockets now. Then you can send all the sharks back towards the rockets. (Product Manager)</li> <li>▪ Oh well. First of all, they [new industry] are a nation of their own anyway. I'm going to talk about technology, this is sometimes really exciting, also in terms of ideas, because they speak a completely different language. I'm not one of them, and I also need a translator occasionally, who then translates what they want. (Teamlead Software)</li> </ul>
	Product	<ul style="list-style-type: none"> <li>▪ The only problem is, those two paths are actually pretty far apart. That is, you can do some things if you now say, I want to build a system structure, you exclude things that you do for [components] only. Or if I now say I want to be as variable as possible with the [component], I exclude functionalities that make my system good in the first place. And that is the problem at the moment (System Engineer)</li> <li>▪ In part, of course, this is strongly hardware-driven. [Alpha] has standardized processes for how to evaluate a business case and so on. And that is more or less put onto these digital products, and I have the feeling, that this is perhaps not always appropriate. (Sales Engineer)</li> <li>▪ Well, you have to decide, as [Alpha], what do you want. Do you want to sell a closed system on a large scale yourself, as [competitor] does, which certainly makes sense for certain customers? Or would you like to somehow create an individual product or individual systems for other customers? So far, I don't think a real decision has been made, because everything is happening at the same time. (Test Engineer)</li> </ul>
	Buyer – Supplier	<ul style="list-style-type: none"> <li>▪ So, for example, [one of our customers], who also has own structures, own app, everything. Of course, they are critical when you say, okay, watch out, let's build another system or app that is actually going to be competition. Because in fact, you compete further down the supply chain, I'm competing with my own [customer]. Which, of course, is not received that well. (System Engineer)</li> <li>▪ Now [one of our customers], which is a major customer of ours. There is a certain dependence there, but of course, you also want to try to keep this [customer], through this new [ system] that you want to build. Of course, there is also a fight over any exclusive rights. (System Integration Engineer)</li> <li>▪ Almost everyone, except for [this one customer], or some small ones [...] that are not to be taken seriously. They all say, dude, we sell [products], we produce [products] and we sell them. And we just want to deliver a complete system to them [customers]. And that is why there is innovation power behind it. What's possible, is clearly up to the supplier, the system supplier. And that is us. Or rather, that's what we want to be here. (Product Manager)</li> </ul>

**Strategic Intent:** Not only was the majority of customer firms demanding digital systems rather than components but also profits from selling digital systems were promising.

*Now [...] they thought about making much more revenue, much more profit if you sell the whole thing in one system. So it is actually like, if one sells such a [component] you can make maybe 3 to 4 % profit, if you sell whole systems, then you make up to 15 to 20% profit. (System Engineer)*

But due to the lack of interest in developing systems so far, ABU found itself in a position of competitive disadvantage, as the Head of DT pointed out:

*The original approach was that we realized we have a big gap in how we appear on the market with our products and what digital enhancements there are for them compared to the competition. And then we said, we have to get to work on that (Head of Digital Transformation)*

Realizing the deficiencies of their original approach and faced with increasing competitive disadvantage, senior management of ABU saw a call for action. The strategy should be refocused and digital capabilities developed to meet the changing market requirements. But they found themselves in a dilemma: On the one hand, the need to stay within the component business, the cash cow, and most important customer segments. On the other hand, the need to develop the digital system to be successful in the long run:

*And that's just such a balancing act. We can't ignore it because we need the component business. After all, this is how we earn our money right now. But it takes resources away from what we actually want to generate in the future. That is the biggest challenge we have right now. (Head of Digital Transformation)*

However, ABU did not fully commit to this strategic change but only reacted with incremental changes. For example, even though they committed to developing a digitally integrated system, the main focus remained on components. The main reason for not radically changing the strategy was the dependency on one major customer:

*So we will be both [component and system supplier]. We have this customer, [name of company], as the largest manufacturer in the world, and he is a component buyer, which means that we will of course continue to operate the business. But if we decide to expand the business, then we have to become a system supplier. Then we will do both. (Director of Product Development)*

**Structural Changes:** To further drive the development of digital systems and develop necessary digital capabilities, ABU hired new managers with an industry background in the new market:

*Since April, the industry-experienced specialists [new Director of Product Development] and [new Head of Customer Service] have been in charge of the development and service departments at [ABU]. While the [...] Director of Development is to drive forward the digitalization of [ABU] and expand the existing product portfolio, the [...] new Head of Customer Service is responsible for expanding the global service network and developing further service and product management processes. (News Article)*

However, through the focus on components over the last years, the new managers could not solely focus on the development of digital systems as the existing products were still essential for profitability and even though reported, no major strategic shift became evident. This upcoming, incremental strategy change posed a serious challenge for ABU and a fertile ground for the pervasion of process tensions, a shift in relational tensions, and the emergence of new tensions.

**Process tension:** In the third phase, process tensions became prevalent. First, the already embedded process tensions in daily operations continued to prevail. The new strategic approach required new processes that are in line with the industry environment of ABU. The competence and industry background of the new managers fuelled the implementation of processes fitted to the requirements of the industry. Up until this point, for example, ABU did not have a product management team. Indeed, Alpha's core business never required such a department. However, existing processes that were imposed by Alpha were further adhered to as the Head of DT related:

*Do we cut anything out? I always have the feeling that something is being added. I would say that communication and the effort required for it have continuously increased even more instead of cutting something out. Because we are increasing the complexity of the product with the architecture of the overall system, and so I can't think of anything off the top of my mind where I would say that we are now explicitly leaving something out. (Head of Digital Transformation)*

**Cultural Tension:** Furthermore, new hires with in-depth knowledge about the new industry shifted the relational tensions and extended to a cultural tension. People that had previously worked within Alpha's core industry were generally driven by efficiency and accuracy, whereas people from the new industry were characterized as 'dreamers', meaning people who care more about the vision and product rather than financial performance. This distinction was crucial with regard to the culture at ABU. Former Alpha employees were socialized by an environment that rewarded strong scaling abilities and adherence to processes and quality standards. However, the new market was predominantly driven by people that did not rely as much on these factors. Rather they are all about the product and creative thinking. These essential differences between the two industries provided grounds for the establishment of cultural tensions at ABU. Indeed, one employee used the analogy of 'Sharks and Hippies' to describe the two fundamental types of people when talking about the current working environment in ABU:

*On the one side, [...] the sharks who have only eaten away everything in life so far. And on the other side, the hippie. That's how you can understand the [...] industry right now. (Product Manager)*

These inherently different types provided multiple points of friction within ABU, as the new product manager further described:

*We don't know what's going to happen, but yes, currently, we're always two sandpapers [referring to Sharks and Hippies] here, grinding on each other. (Product Manager)*

**Product and Buyer-Supplier Tension:** The two divergent and often conflicting views also provided ground for product tensions: ABU could either stay a component supplier or become a system supplier as the approach and capabilities required to be either or are relatively different.

*The only problem is that those two paths are actually pretty far apart. That is, you can exclude some things if you say: I want to build a system structure. I exclude things that I do for [components]. Or if I say I want to be as flexible as possible with [components]. I exclude functionalities that make my system good in the first place. And that is the problem at the moment. (System Engineer)*

Remaining a component supplier, ABU could maintain what it can do best: efficiently scale product volumes into millions. However, this would also mean increasing the dependency on their main customers. Being a systems supplier would require ABU to change its strategy and risk resentment by some of the main customers, who potentially take this step as a competitive threat, as they develop digital systems themselves and do not want to out-source this step. But it would also open up the possibility of attracting new customers who search for digital systems to integrate into their products instead:

*We are now at a crossroads - we have to see whether we remain a component supplier [Exploitation] or become a system provider [Exploration]. (Director of Product Development)*

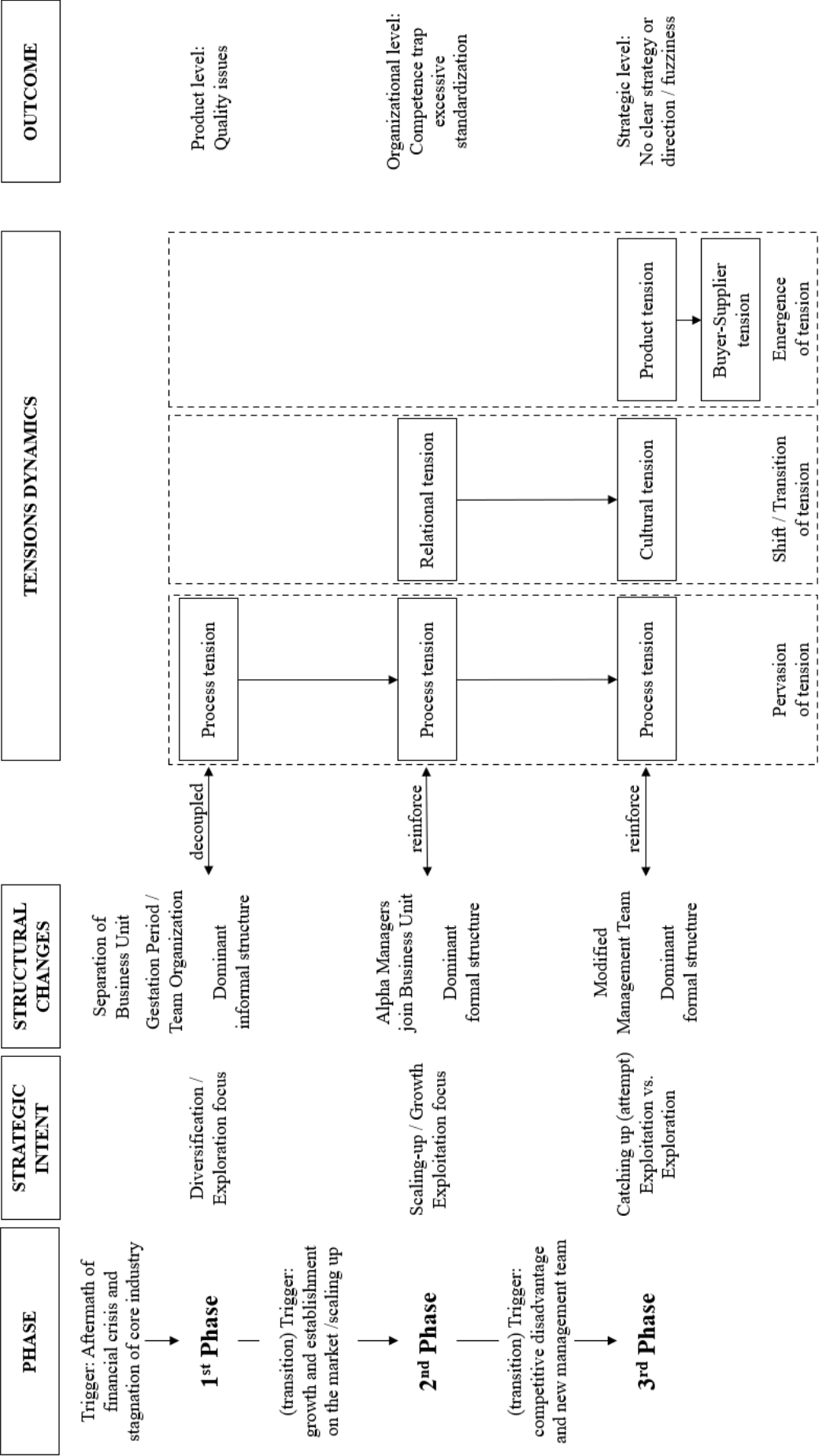
Thus, this emerging product tension might also shift into a buyer-supplier tension as the main customer of ABU sees the efforts to become a system supplier critical. But if ABU did not start to move towards digital systems, they might suffer in the long term as most industry players demand this type of product:

*So, for example, [biggest customer], who are after all our customers, also have their own structures, their own app, everything. Of course, they tend to take a critical view when you say: [...] let's build another system now or build an app that is actually competition. Because, in fact, you make competition further down the supply chain. I make competition with my own customers. Which, of course, doesn't come across so well. (System Engineer)*

#### **4.5 Escalating Tensions at ABU**

As a consequence of the above-described process, tensions at ABU escalated. The escalation of tensions at ABU is summarized in Figure 2.

FIGURE 2 Escalation of tensions at ABU



Overall, the tensions in ABU were rarely properly resolved. In the foundation phase of ABU, the strategic intent as well as structural changes were targeting the exploration of the new domain. Even though process tensions arose in the first phase, they remained decoupled from the strategic intent and structural changes. In particular, the exploration focus as well as the structural changes did not lead to the rise or reinforcement of tensions. However, shifts in strategic intent and structure in the second and third phases reinforced the existing tensions and fuelled the emergence of new tensions. For example, when Alpha managers switched to ABU in the second phase relational tensions emerged and process tensions were reinforced. In the third phase, these tensions were further reinforced through the switch in strategic intent and further structural changes. This led to a rise in ambiguity. People were torn between adherence to Alpha processes and further development of the business. Furthermore, management did not seem to be aware of the issues the escalating tensions caused and did not see a necessity to resolve any of the tensions. Consequently, the environment at ABU could be more described as firefighting than actual resolution as highlighted by a Product Manager:

*Here, everyone you talk to actually says that we play fire extinguishers [...] And with that, this creative freedom, [...] is not possible at all. Because you don't need to sit down here with a coffee and philosophize [...] if you still have problems. (Product Manager)*

As a result, ABU found itself in a state of flux. Torn between exploiting the established components business and becoming a system supplier, the strategy of ABU became more and more blurry. Even though the company clearly communicated that they shift towards digital system supplying, internally, this was not as clear:

*So to be specific, the developer asks himself: What should I actually develop? Is the focus more on the [component], or is the focus on the system? How do I prioritize that? [...] And the salesperson has the same challenge - is the salesperson now only required to market a complete system or is it also okay if the salesperson still finds some customer who now only buys [components]? That's a challenge for everyone involved. (Director of Product Development)*

This flux caused uncertainty within the team. Even though exploration efforts increased in the third phase, the actual goal was still not clear for most employees, as is expressed in the following quote by the sales director:

*You can feel the turmoil, you can feel the reframing, and you can feel the change from top to bottom throughout the company. On the one hand, of course, this creates a lot of room for change, but on the other hand, it also creates a lot of uncertainty. And that's where I would simply like to see a clearer line. To draw a clearer line, a bit of straightforwardness, this clear big picture, i.e. where are we really going? What does a five-year strategy plan look like? How do we position ourselves? (Sales Director)*

Consequently, ABU suffered from a lack of a clear strategy which put them in a challenging situation:

*We don't really have a clear corporate strategy. We have this attractive component business with one large customer. But then you do business with a large number of small ones, who get a system, but not really. (Director of Product Development)*

In summary, the third phase was characterized by further escalating tensions. This escalation became apparent by current tensions at ABU: First, the pervasion of process tensions. Second, the shift of relational toward cultural tensions. Finally, rising product and potential buyer-supplier tensions. The incremental changes that stretched across all three phases provided the basis for these escalating tensions. They provided room and time for tensions to arise and pervade within ABU. For example, process tensions, especially in the second phase, caused rigidity with regard to further product development and led to a competitive disadvantage in the third phase. Consequently, the DT efforts of ABU were hindered and progressed only slowly. Furthermore, escalating tensions caused a state of firefighting rather than actual resolution, and management attention shifted more towards emerging tensions, neglecting already established ones.

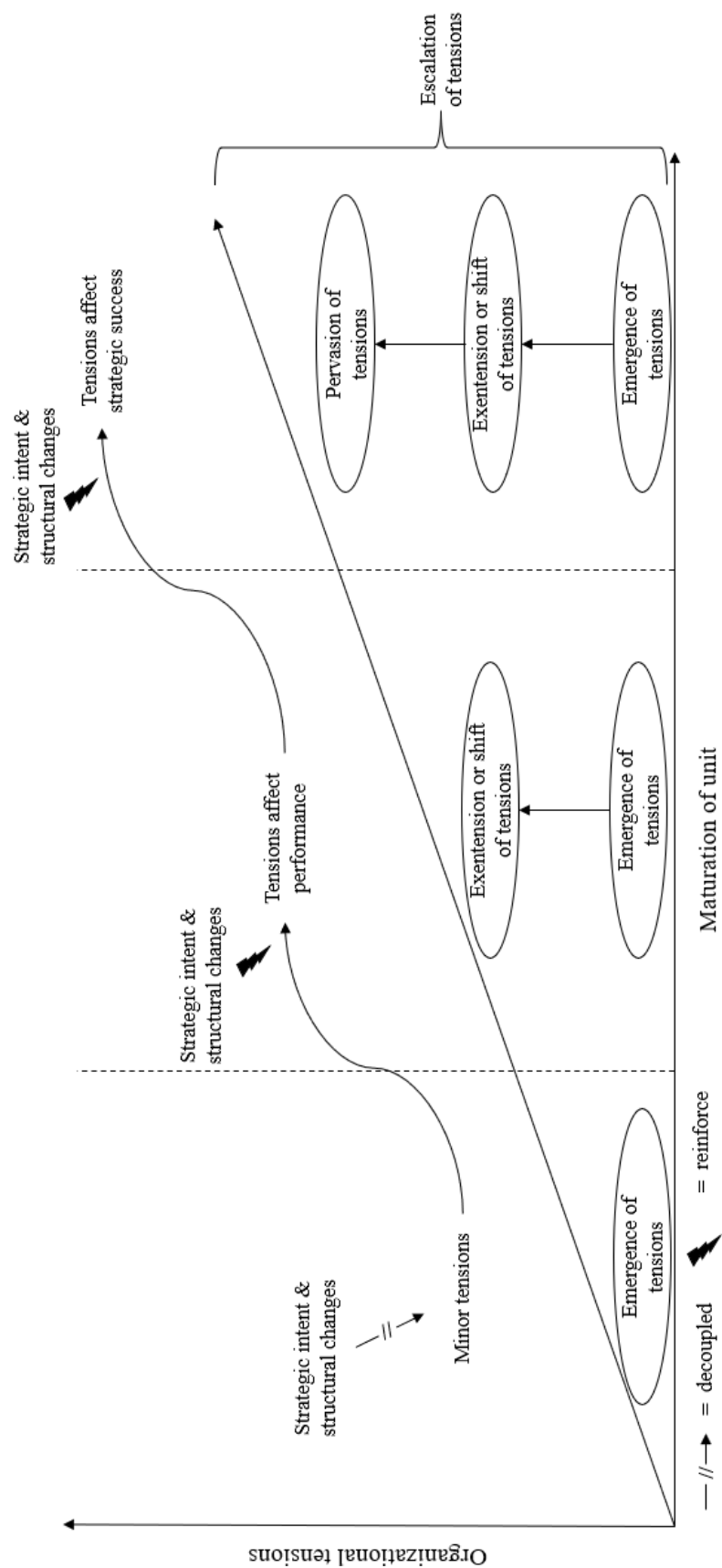


## **5. Theoretical Implications and Discussion**

### **5.1 Conceptual Interpretation**

Revisiting the premise of the paper that “strategy, not technology, drives digital transformation” (Kane et al., 2018, p3), this study reveals the impact of escalating tensions in structural ambidextrous solutions. This is especially relevant in the context of incumbents DT as the case study shows that escalating tensions might hinder the successful digital transition or affect the implementation of digital strategies in the first place. It also depicts a more nuanced picture of the complexity around the DT efforts of incumbents. In particular, the study shows that escalating tensions are an outcome of three interrelated underlying mechanisms (see Figure 3 for an overview).

FIGURE 3 Conceptual model of escalating tensions



First, in the beginning, tensions in ambidextrous solutions might emerge, e.g., through different internal objectives and priorities or shifts in the market in the gestation period of the new structurally separate unit. For example, in the case of ABU process tensions emerged in the beginning through different priorities between departments. However, neither strategic intent nor structural changes affected the rise of these tensions and were thus decoupled. Second, if emerging tensions remain unresolved over time, they can extend or shift and become prevalent in the organization. For example, emerging tensions between managers and employees regarding digital strategy and operations at ABU remained unresolved. These tensions extended to cultural tensions with the further growth of ABU and manifested with the characterization of ‘Sharks and Hippies’ in the third phase. Here structural changes such as new Alpha managers joining ABU and the strategic intent reinforced these tensions. This led to the competence trap in the second phase and affected firm performance. Third, if shifted or extended tensions are not resolved, they can become pervasive over time. For instance, the initial process tensions were never overruled and even reinforced structural changes rather than dissolved by developing inherently new processes suitable for the new market conditions. Instead, new or slightly modified processes were introduced and existing ones were adhered to, which led to ever more increasing complexity and workload while undermining DT efforts. This caused the pervasion of process tensions. The combined presence of these mechanisms represents escalating tensions. Thereby escalating tensions potentially alter not only performance but strategic success in the context of DT. For example, in the second phase, where tensions did not pervade yet, organizational level outcomes were affected. In this particular case, Alpha found itself in a competence trap driven by excessive standardization. In the third phase, the ever-more escalation affected strategic level outcomes and created a state of strategic flux.

## 5.2 Theoretical Implications

This study finds that escalating tensions are the result of the combination of emerging, shifting, and pervasive tensions. Thereby structural changes and strategic intent might be decoupled or reinforce the escalation of tensions. Escalating tensions can negatively affect organizational or strategic level outcomes in the context of DT. Based on these findings, we make the following contributions to the growing literature around DT.

First, while ambidextrous solutions are a means to resolve frictions between firms existing and future strategies and directions (Andriopoulos & Lewis, 2009; Papachroni et al., 2016; Raisch et al., 2009), the implementation of these solutions may also be fraught with difficulty. It is these emerging tensions over time that remain ill-understood. This paper shows how tensions escalate over time by describing an in-depth case of how tensions in the context of DT emerge, evolve, shift, pervade, and consequently escalate over time. This matters as the escalation of tensions potentially alters incumbents' performance and strategic success in the context of their DT. Multiple studies have started to investigate tensions incumbents face in the course of DT. For example, Svahn et al. (2017) show that incumbents need to balance four competing and interrelated concerns: existing vs. requisite capabilities, product vs. process focus, internal vs. external collaboration, and control vs. flexibility with regard to governance. Furr et al. (2022) identify three core tensions incumbents face in the context of DT - products vs. platforms, firms vs. ecosystems, and people vs. tools. By doing so, they provide ground for effective DT strategies. This study further adds to this by showing an in-depth case of how these tensions in the context of DT emerge, evolve, shift, pervade, and consequently escalate over time. Thereby this study goes beyond the mere focus on structural separation as a means to resolve tensions and shows the nuances of how tensions emerge, shift, pervade, and consequently escalate over time. This matters, as the successful establishment of structurally separate units is vital for incumbents' survival (Vial, 2019).

Second, the desired alignment of an incumbent's new strategic intent and structure necessary for competitive purposes may have the unintended consequence of fuelling the escalation of tensions. In line with existing research, this study shows that DT entails structural changes (Porter & Heppelmann, 2014), which potentially fuels the emergence of tensions that need to be balanced (Smith & Beretta, 2021). Furthermore, this study also shows how strategic intent and structural changes play a pivotal role in influencing escalating tensions in structurally separate units. By doing so, structural changes and strategic intent can act as a catalyst for tension escalation. Even though incumbents might achieve strategic and structural alignment, not taking organizational tensions into account might cause the pervasion and escalation of tensions which in turn affects organizational level or strategic level outcomes. For instance, Alpha's structural changes were predominantly the response to further growth. Even though this was mostly aligned with strategic intent, the responses neglected emerging and shifting tensions within ABU. Over time this reinforced such tensions and caused an escalation of tensions which negatively affected organizational and strategic level outcomes. This matters, as even when strategy and structure might be aligned (Miles & Snow, 1984; Rumelt, 1974) they can also act as a catalyst for the escalation of tensions. Consequently, even though incumbents might achieve alignment of strategy and structure escalating tensions might hinder the success of DT initiatives. Thus, digital strategies and accommodating strategic intent and structural changes, therefore, need to take emerging and existing tensions into account.

Finally, and in line with Smith and Beretta (2021) and Furr et al. (2022), this study also highlights the importance and distinctiveness of research on DT. Recently scholars described it as a very "complex transformation" (Smith & Beretta, 2021: 188). While research suggests that DT is a unique phenomenon, current literature on DT lacks in-depth case descriptions which support this claim. This paper provides a rich, in-depth case study of an incumbent firm undergoing DT. Thereby, the study emphasizes the complexity of DT and gives an

illustrative picture and nuanced understanding of an incumbent's ambidextrous solution to push their DT initiatives. These insights matter as they reveal potential pitfalls and explanations of incumbents' struggle around successful DT. For instance, even though Alpha sets up a structurally separate and semi-autonomous entity, the path-dependent processes of the core business dilute into ABU, hinder the execution of DT initiatives and ultimately create a state of strategic flux. Furthermore, ABU's dilemma over staying a component supplier and or simultaneously becoming a system supplier emphasizes this complexity. Thus, this study contributes empirically to the question of how DT is actually different (Adner et al., 2019).

The case of Alpha and ABU highlights that DT does inherently require new approaches, structures, and processes. Indeed, the complexity accompanied by DT and the pervasion of digital technologies fundamentally challenges the way organizations operate and create value. For example, ABU found itself in the dilemma of staying a successful component supplier over becoming a system supplier. So “[w]hile the basic conceptual tools of our trade [...] remain invaluable, a new set of frameworks may be useful” (Adner et al., 2019: 259) going forward.

### **5.3 Limitations and Avenues for Future Research**

As with all research, this study is not without limitations. The major limitation of this paper is with regard to the generalizability and transferability of findings to other settings due to the single case study. This bears the risk of overstating the significance of the findings in this paper. Thus, it is unclear if the findings apply to other environments or populations of firms. Future research should therefore consider larger multiple case study samples or quantitative methods to advance this line of research. Furthermore, while this study shows how and why tensions might escalate over time, it does not provide a detailed account of how firms can properly deal with escalating tensions. Therefore, to advance the concept of escalating tensions further, scholars could explore potential strategies for how incumbents can cope with or anticipate escalating tensions in ambidextrous designs, especially in the context of DT. Finally, while the paper is a step forward toward showing the distinctiveness and importance of addressing DT as a new phenomenon (Adner et al., 2019), much more research is needed on DT in general and especially in the context of incumbent firms (Furr et al., 2022).

## 6. Conclusion and Practical Implications

This study also has practical implications for senior management in corporate centers as well as business unit management. This paper highlights the complexity and pitfalls of setting up new semi-autonomous business units. First of all, even though strategy and structure are aligned, they might be compromised if tensions in the context of DT are neglected. Management teams, therefore, need to anticipate and respond to exploitation-exploration tensions as awareness of such tensions might potentially decrease the risk of failing or slow-moving DT initiatives. Secondly, incumbents predominantly rely on incremental changes and their existing set of capabilities. Thus, when setting up structurally separate units, incumbent management needs to be aware of overspilling path dependencies that potentially alter the success of DT initiatives. Consequently, considering possible tensions should play a more pivotal role when it comes to tackling the challenge of DT. Finally, considering management team composition and cultural aspects of existing and new business is a crucial determinant for success in the context of DT. Overall, DT will continue to play a key role in the strategy agendas of incumbent firms (Warner & Wäger, 2019). Managing the challenges and designing strategies and structures to cope with the complexity of DT is therefore essential for firms' future survival. Similarly, it is essential for scholars to accompany this process.



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## **6. The Digital Readiness Matrix: Being ready is half the battle to master digital transformation**

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- Submitted to Digital Business

Status quo: under review (1<sup>st</sup> round)

### **Abstract**

Awareness about different attitudes or perceptions between managers and employees positively impacts the establishment of ‘digital readiness’, which is seen as a precursor and underlying condition for a successful implementation of DT projects. However, there is only little knowledge as to what extent perceptions within (managers and employees) and across (buyer and supplier) organizations impact digital readiness. The findings in this paper reveal that digital readiness perceptions of managers and employees as well as buyers and suppliers are crucial for a firm’s digital readiness. The development of the Digital-Readiness-Matrix supports managers in spotting potential gaps between perceptions and anticipating obstacles in the course of their DT initiatives.

## 1. Introduction

In any sport, a team is only as good as its weakest member. Similarly, an organization's digital transformation (DT) efforts might be only as good as the 'weakest' link involved. Thus, not surprisingly, it is estimated that at least two-thirds of DT projects do not live up to their expectations (De la Boutetière, Montagner, & Reich, 2018). A crucial factor that might determine the potential success or failure of initiatives is the 'level of (digital) readiness', as individuals opt out or commit based on their readiness with regard to a change initiative (Stevens, 2013). Building on the work of Gfrerer and colleagues (2021) as well as Holt et al. (2007: 326), the level of readiness is conceptualized as "an individual's attitude toward a particular change". Indeed, digital readiness is not just a matter of technology. More importantly, it is also a relational phenomenon as undetected differences in intraorganizational perceptions might hinder the establishment of digital readiness. Increasing the awareness about different attitudes or perceptions between managers and employees positively impacts the establishment of 'digital readiness'. It thus represents a precursor and underlying condition for the successful implementation of DT projects (Gfrerer et al., 2021).

But the relationship between employees and managers might only be half the story. After all, companies also cater to their buyers' appreciation, making them a crucial yet often overlooked constituent of successful DT. A main objective of DT is to introduce new products or services in order to create and capture new value by utilizing digital technologies (Mata-razzo, Penco, Profumo, & Quaglia, 2021; Verhoef et al., 2021). Consequently, buyers represent a crucial component in terms of successful DT. For example, buyers can resist changes even though they are considered worthwhile and essential (Ram & Sheth, 1989). Thus, considering the perceptions in buyer-supplier relationships represents another main determinant regarding the potential success of those initiatives. Recent studies have dealt with the topic of different perceptions and the influence of customers in multiple ways, such as varying perceptions between employees across organizations (Solberg, Traavik, & Wong, 2020),

differences in perceptions between managers and employees within firms (Gfrerer et al., 2021; Schneider & Sting, 2020) or the influence of certain buyer groups in the context of DT (Denoo, Yli-Renko, & Clarysse, 2021). However, none have considered management-employee as well as buyer-supplier relationships simultaneously.

Extending the work of Gfrerer and colleagues (2021), this research suggests that considering perceptions of managers and employees as well as buyers and suppliers is crucial for a firm and ‘digital readiness’, which can only be achieved if there is relative consistency between intra- and interorganizational perceptions. For instance, if perceptions between managers and employees are relatively consistent but buyer-supplier perceptions or expectations towards DT differ, initiatives might be well implemented but are likely to fail when buyers reject them. Also, if perceptions are relatively inconsistent between management and employees but consistent on the buyer-supplier side, buyers might adapt well, however, the initiatives might suffer from poor or lengthy implementation due to internal misunderstandings or conflicts that arise from disagreements. Therefore, this article explores how consistent or inconsistent perceptions between managers and employees or suppliers and buyers impact the digital readiness of firms.

In an attempt to shed more light on the described phenomenon, this paper draws on recent studies about DT and, in particular, about differing perceptions. The introduction of the ‘Digital-Readiness-Matrix’ (DRM) aims to support managers in spotting potential gaps between perceptions and anticipate obstacles in the course of their product- or service-related DT initiatives. The matrix builds on two dimensions, relative intra- and interorganizational consistency of perceptions about digital readiness. This is assessed through six qualitative factors. Ultimately, the matrix reveals four distinct types of digital readiness: ‘Digital Apprentice’, ‘Digital Collaborator’, ‘Digital Team Player’, and ‘Digital Synchronizer’, including specific descriptions and consequent calls for action. To illustrate the conceptual approach, data is collected from four firms based in Germany and utilized to operationalize the DRM



and derive practical implications. In total, the study entails 33 semi-structured interviews across the firms and their respective business clients. Overall, the DRM provides managers with a tool to assess digital readiness and gives them guidance and direction for launching digital initiatives. Indeed, making perceptions of key parties involved in DT projects transparent can potentially improve digital strategies by revealing discrepancies that need closing and commonalities that can be leveraged.

## **2. Theoretical Background**

### **2.1 The Importance of Digital Readiness for Digital Transformation**

DT puts firms under pressure to change, adopt and integrate digital technologies to introduce new products and services or even reinvent entire business models (Correani, Massis, Frattini, Petruzzelli, & Natalicchio, 2020; Cozzolino, Verona, & Rothaermel, 2018; Matarazzo et al., 2021). Consequently, firms need to succeed in their DT endeavors and transform processes and products successfully (Ferreira, Fernandes, & Ferreira, 2019). In this context, DT as a specific type of change requires the parties involved to be ready to break with existing and adopt new behaviors (Hanelt, Bohnsack, Marz, & Antunes Marante, 2021). To cope with the DT challenges firms face, leaders attempt to initiate change that aims to realize concrete objectives (Volberda, Khanagha, Baden-Fuller, Mihalache, & Birkinshaw, 2021). Thereby, being ready for change reflects an important factor as it entails the initial support of parties involved in the change process. In the course of such efforts, management teams might be confronted with different perceptions or even resistance regarding the initiative. Consequently, to establish readiness and successfully implement change, these issues must be resolved, and perceptions between management and employees need to be aligned (Armenakis, Harris, & Mossholder, 1993).

In general, a change process broadly entails three subsequent stages: readiness, adoption, and institutionalization (Cummings, Bridgman, & Brown, 2016). Holt and colleagues point out that “readiness occurs when the environment, structure, and organizational member’s

attitudes are such that employees are receptive to a forthcoming change” (2007: 290). This is followed by adoption when behaviors and attitudes transit and are in line with the prospects of the particular change initiative. Finally, institutionalization is the establishment of change as an integral part of employees’ activities. When looking at change as a process, readiness as a first step is critical because a lack of it could compromise subsequent stages. Hence, the assessment of readiness can provide guidance for managers when following their DT endeavors. When assessing readiness, managers can identify potential gaps between their own perceptions and others. If substantial gaps exist and no appropriate countermeasures are taken to close them, they can be met with resistance and even jeopardize a successful implementation (Holt et al., 2007).

Going further, digital readiness is seen as a ‘specific change scenario’ which, at the core, is driven by digital technologies. Hence, digital readiness reflects a contextualized operationalization of change readiness, putting DT challenges, capabilities, and perception at the center stage (Gfrerer et al., 2021). First and foremost, to achieve readiness, those involved need to perceive themselves as capable of fulfilling the expectations that come with the initiatives. However, if the parties involved have different perceptions regarding what digital readiness entails, it could likely cause misunderstandings or resistance from any side. Thus, management focus should consider the individuals' perceptions and, more importantly, the need to establish relative consistency between the parties involved.

## **2.2 Why consistent intra- and interorganizational perceptions are essential for digital readiness**

To achieve digital readiness decision-makers need to take the individual perceptions of different stakeholders into account. This is because product- or service-related change initiatives simultaneously affect the routines of employees and customers. Unawareness about differences in perceptions might therefore undermine the success of DT efforts. Various studies have already highlighted the importance of management awareness regarding different perceptions for the potential success of DT. For instance, Schneider and Sting (2020) point out the significance of understanding the thoughts and feelings of employees across different hierarchical levels about DT. They conclude that managers need to pay more attention towards employee perceptions and the communication around DT initiatives to establish consistency about digital readiness across hierarchical levels. Also, Solberg et al. (2020) dealt with employees' perceptions of DT. Their study on digital mindsets implicates that managers need to be aware of heterogeneous mindsets within the organization. One of their roles is to understand their different perceptions and tailor communication to best address inconsistency amongst employees. Furthermore, Gfrerer and colleagues (Gfrerer et al., 2021) highlight shared perceptions of employees and managers as a precursor for successful DT initiatives by studying differences in perceptions across hierarchies within firms. They emphasize that managers need to pay close attention to different perceptions within the firm and enable employees to widen their digital competence. But this might be only half the story. Kane et al. (Kane, Palmer, Phillips, Kiron, & Buckley, 2017) point out that some of the companies having the greatest success also take into consideration how their customers and partners use digital technologies and change accordingly.

Indeed, prior literature suggests that customers represent an important source of knowledge for firms (Ethiraj, Kale, Krishnan, & Singh, 2005; Helfat & Raubitschek, 2000) and have a critical impact on a firm's strategic direction (Burgelman, 2002). For instance,

Denoo and colleagues (2021) found that the specific customer portfolio actively shapes a firm's business model in the digital age. The study thus highlights the importance of taking specific customer groups into account when setting up a new logic for creating and capturing value. Furthermore, product- or service-related DT initiatives cause a certain degree of change and potentially force customers to break with their established routines as well. If they do not feel prepared or ready, these circumstances create a powerful source of resistance against the initiative (Ram & Sheth, 1989). Consequently, customer resistance could endanger the successful adaptation and institutionalization of firms' DT efforts. It is important to take customer perceptions into account and anticipate the potential obstacles of different readiness perceptions in buyer-supplier relationships to reduce this risk. This implicates that considering buyer-supplier perceptions might be equally important as management-employee perceptions. Conversely, firms that do not might not be able to succeed in the future when customers resist a DT initiative despite an internal alignment between managers and employees.

In summary, digital readiness as a relational phenomenon entails two major considerations. On the one side, specific digital readiness perceptions of managers and employees are important as differences might interfere with a successful implementation and adaptation in the organization DT. On the other side, differences in buyer-supplier perceptions are essential as customers' acceptance or resistance of digitally-induced products or services are crucial for a firm's survival. However, in extant literature, perceptions and digital readiness with regard to buyer-supplier relations did only play a secondary role or were not considered at all so far. To address this lack of knowledge, this paper takes management and employee perceptions as well as buyer-supplier perceptions into account. In essence, to achieve 'digital readiness', perceptions need to be relatively consistent between parties within and also across organizations involved. In the following, the understanding of digital readiness is

described in-depth and six factors that managers need to consider when attempting to assess the digital readiness of the parties involved are proposed.

### **3. Research Design**

#### **3.1 Research Context**

As this paper aims to provide a nuanced understanding of digital readiness, I adopted a qualitative research approach. Indeed, a qualitative approach is suitable as the main goal was to understand what people think and perceive regarding digital readiness. Hence, in-depth semi-structured interviews offered a fruitful instrument to conduct research and operationalize the concept of the Digital-Readiness-Matrix (DRM) in this paper. While case studies often are strong with regard to internal validity, they might suffer in terms of external validity. More specifically, this means that generalizability outside of cases is limited (Ferlie, Fitzgerald, Wood, & Hawkins, 2005). Thus, to increase the external validity, I adopted a comparative case approach (Eisenhardt, 1989), and the data was collected in close exchange with a senior scholar (Ferlie et al., 2005). In total four cases were investigated. These four cases entail the respective focal firms and their business clients to capture the buyer-supplier aspect.

I relied on theoretical sampling by choosing a suitable case for each cell of the DRM. Using this sampling strategy, I chose firms for theoretical rather than statistical reasons to represent each type of the DRM and provide examples for polar types (Eisenhardt, 1989). All four case firms are German-based companies operating in traditional industries. Alpha is a family-owned mid-sized company and is considered a major player in its segment. Their core business involves reselling physical products to a broad spectrum of customer firms. Beta is an autonomous business unit of a multinational cooperation. Beta started by solely delivering components for a product. However, recently they started developing a more comprehensive digitalized system instead. Similar to Alpha, Gamma is a mid-sized family-owned company and is considered a major player in its industry. The firm's core business is

also to sell physical products that per se cannot be digitalized. Finally, Delta is the industry leader in its segment and sells physical products in combination with digital services to a diverse group of customer firms. All firms in this sample initially sold physical products to their customers, and are long-established players in traditional industries.

### 3.2 Data Collection

I used multiple data sources for this research: I conducted semi-structured interviews with key informants of the case firms and respective buyer firms. These interviews were then supplemented through detailed notes from informal meetings and secondary data such as legally required management reports (accessible via ‘Bundesanzeiger’) or press articles. Initially, the managing directors of Alpha, Beta, Gamma, and Delta were contacted and interviewed. In close exchange with the managing directors, further interviewees in and outside of the respective firms were identified. In total, I conducted 33 semi-structured interviews across 12 firms (for an overview see Table 1). To provide a broad spectrum of perceptions and high data quality, interviewees from multiple hierarchies and diverse backgrounds were chosen. All interviews included the same open-ended questions but had additional questions based on the individual responsibility and role of the interviewee. All interviewees were recorded and then transcribed verbatim.

**TABLE 1** Case Overview

Focal firm	Type of firm	Revenue	Founded	No. of employees	Number of Interviews
Alpha	Wholesale	< 200 mil. €	1800s	~ 600	Focal Firm: 6 Customer Firm: 3
Beta	Manufacturing	< 200 mil. €	1900s	~ 300	Focal Firm: 9 Customer Firm: 1
Gamma	Manufacturing Wholesale	< 200 mil. €	1900s	~ 300	Focal Firm: 7 Customer Firm: 2
Delta	Wholesale	< 200 mil. €	1900s	~ 600	Focal Firm: 3 Customer Firm: 2

### 3.3 Data Analysis

For this research, I use inductive top-down theorizing as an analytical framework. The model of inductive top-down theorizing is top-down as it is informed by literature and inductive as it starts with the literature from which problems and solutions emerge (Shepherd & Sutcliffe, 2011). Using inductive top-down theorizing is especially appropriate when existing research is complex. Specifically, literature on DT shows this complexity as “constructs, relationships between constructs, the nature of the paradox, and potential resolutions of the paradox are not simple [and] require considerable cognitive effort to understand” (Shepherd & Sutcliffe, 2011: 374).

The analysis started by focusing on existing literature on digital readiness (Gfrerer et al., 2021) and perceptions about DT (Schneider & Sting, 2020; Solberg et al., 2020). In this step, it became apparent that digital readiness as a relational phenomenon entails two major considerations, specific digital readiness perceptions of managers and employees and differences in buyer-supplier perceptions. The core research problem emerged from this: the operationalization and description of simultaneously taking intra- and interorganizational perceptions about DT into account. The subsequent analysis offered emerging solutions in the literature to resolve the research problem. In this process, I used literature notes. Literature notes build on the notion of field notes (Eisenhardt, 2021) as they aim to document emerging impressions during the analysis (Shepherd & Sutcliffe, 2011). I found that, inherently, digital readiness is focused on achieving digital maturity. Consequently, my attention focus shifted specifically toward the literature on digital maturity as a resolution to describe and operationalize the intra- and interorganizational consistency of perceptions.

In a next step, I derived the factors and levels for assessing the relative consistency of intra- and interorganizational perceptions. In this instance, I utilized established constructs from the digital maturity literature. For example, Kane et al. already highlight important aspects from their study on how companies can achieve digital maturity. This step of analysis

led to Table 2 as well as Table A.1 and A.2 (see Appendix). As digital readiness is seen as a necessary precursor to digital maturity, I chose to assess the digital maturity factors for achieving digital readiness. During analysis, it became apparent that communication is a central theme with regard to digital readiness (Gfrerer et al., 2021; Hanel & Grabensee, 2021). This, however, was not considered in their digital maturity classification. Consequently, I supplemented Kane et al.'s key lessons with what I refer to in this study as digital communication. Furthermore, to ensure consistency, I adapted the same scale of early, developing, and maturing stages to assess the consistency between readiness factors (Kane et al., 2017) (see 4. Six Factors for Digital Readiness, for a detailed overview).

After this, I developed a sampling strategy and initial main constructs to guide my multiple case study approach. This is especially suitable as preconceived notions increase the effectiveness of building theory from cases (Eisenhardt, 1989; Shepherd & Sutcliffe, 2011). Analysis guided me toward two dimensions (intra- and interorganizational consistency), which are relevant to consider in the context of digital readiness. Thus, similarly to Ferlie et al. (2005), I built a two-by-two matrix to explore consistency and inconsistency across intra- and interorganizational perceptions.

Consequently, I relied on theoretical sampling rather than random sampling by choosing a suitable case for each cell. Building on these, I derived a conceptual representation of the DRM. With the identification of each of the four cases, I wrote up detailed case narratives to test the initial conceptual representation of the DRM. In a subsequent step, I then consistently analyzed and revised the concept of the DRM by utilizing the case vignettes given the reported status quo and dangers as well as perception with regard to DT. The step-by-step guide on how to use the DRM was the result of this process. After this, I also conducted a proof of concept. In this step, I had informal meetings with the managing directors of Alpha and Gamma as well as the managing director of a consultancy with a focus on DT. This



proof of concept strengthened and validated the DRM to ensure its practical usefulness and appropriateness.

#### **4. Six Factors of Digital Readiness**

To assess and make sense of the relative consistency of intra- and interorganizational perceptions, the DRM is introduced. The Matrix builds on the work of Gfrerer and colleagues (2021). Their recent study points out that individuals must perceive themselves and the organization as capable of meeting the expectations that come with individual DT initiatives. Differences in those perceptions are a crucial determinant and knowing as well as addressing them is important for managers to successfully implement DT projects. Their ‘digital readiness framework’ distinguishes between two different factors. ‘Individual difference factors’ explain perceptions around individuals’ beliefs and characteristics involved in the change process, and ‘structural factors’ relate to the conditions and organizational capabilities. These two dimensions again can be viewed on an individual and organizational level.

The DRM extends existing work in two important ways: In addition to the relationship between management and employees, the DRM also considers buyer-supplier perceptions. This is essential as product- or service-related DT initiatives directly affect and are affected by customers, and thus the potential success also depends on the digital readiness between buyers and suppliers. Moreover, by building upon the digital readiness framework and the digital maturity classification of Kane et al. (2017) six factors (see also Table 2) are derived that assess perceptions between manager-employee as well as buyer-supplier relationships. Although in the paper they do not refer to ‘digital readiness’ per se, digital maturity is described as “how organizations systematically prepare to adapt consistently to ongoing digital change” and “adapting the organization to compete effectively in an increasingly digital environment” (Kane et al., 2017: 5).

To do so, they argue that managers need to take five key lessons for DT into account: First, the organization's approach to collaboration and utilization of digital technologies. Second, the linkage between the digital strategies and the company's core business. Third, the scope of initiatives, whether it be small experiments, enterprise initiatives, or a combination of both, and the directionality of DT initiatives. Fourth, the attraction and employment of digital talent to foster building digital capabilities and empower employees. Fifth, the investment allocation and vision from leaders with regard to the DT of the organization (Kane et al., 2017). However, in this list, one important component seems to be missing. Communicating and breaking down clear objectives while providing appropriate channels is essential as it helps to understand the direction and rationale behind the DT efforts. In fact, scholars suggest that communication in the context of DT is a crucial but often overlooked factor for a successful DT (Hanel & Grabensee, 2021). Therefore, especially in product- or services-related DT efforts, communication reflects an essential part of DT.

*Six factors of digital readiness.* As the digital readiness framework from Gfrerer and colleagues (2021) is composed of individual difference factors and structural factors, three factors of the DRM respectively relate to each of them. Individual difference factors on an individual level and organizational level are represented in the factors 'centrality of digital to core business', 'usage of digital technologies' as well as 'digital communication'. The **centrality of digital to core business** describes the individual's perceived importance of digital technologies with regard to the business strategy at a given point in time. This might be perceived as not central yet, playing a role or being central to the current business strategy. **Usage of digital technologies** relates to the perceived level of using digital tools on a day-to-day basis. The perception ranges from not essential to vital part of day-to-day business activities (Kane et al., 2017). Finally, **digital communication** assesses the perceived clarity and coherence of DT objectives through suitable communication channels to enhance a mutual understanding between individuals (De la Boutetière et al., 2018; Gfrerer et al., 2021).

Structural factors are reflected in the constructs ‘digital initiatives’, ‘digital investments’, and ‘digital talent’. **Digital initiatives** explain the structure of DT projects in the organization. Whether it is mostly small experiments, large enterprise efforts, or a combination of both. It further describes the directionality of initiatives within the organization. Are they solely top-down initiatives? Are employees expected to seize digital opportunities? Is there a strong perceived digital business culture that strives for a collaborative approach? **Digital investment** refers to the planned and already existing allocation of resources with regard to digital investments. **Digital talent** describes whether individuals perceive the organizational support towards building digital know-how and skills as sufficient to empower employees and attract new digitally competent employees (Kane et al., 2017).

**TABLE 2** Six factors of digital readiness

Factor	Early	Developing	Maturing
<b>Centrality of digital to core business</b>	“More time talking about digital is spent than doing something about it.”	“Digital initiatives help us achieve particular business goals, but they are not central to our overall strategy.”	“Digital activities are an important aspect of our business strategy.”
<b>Usage of digital technologies</b>	“Digital tools are not a necessary part of day-to-day operations.”	“Digital tools are becoming more prevalent in day-to-day operations.”	“Digital tools are an important aspect of day-to-day operations.”
<b>Digital communication</b>	“Lack of appropriate institutions and communication mechanisms to improve mutual understanding.”	“Transferring from abstract to concrete challenges and coherent explanation of DT objectives.”	“Structures and communication channels help employees and managers to comprehend objectives.”
<b>Digital initiatives</b>	“Mostly small experiments mandated from management and employees are expected to be motivated to embrace digital opportunities.”	“Mostly big enterprise-wide efforts, expecting employees to embrace digital opportunities but also cultivating a strong digital business culture.”	“Small experiments and big enterprise-wide efforts, cultivating a strong digital culture that strives for risk-taking, collaboration, and continuous learning.”
<b>Digital investment</b>	“The organization does not spend or does not spend enough time, resources, and energy on digital initiatives.”	“The organization is planning to and already increased investment in digital business opportunities.”	“The organization is planning to and already increased investment in digital business opportunities significantly.”
<b>Digital talent</b>	“Today, there isn't enough talent to support the company's digital strategy.”	“Provides resources and/or opportunity for its personnel to succeed in a digital business.”	“Employees' digital knowledge, abilities, interests, and experience are effectively utilized.”

Based on Kane et al. (2017) and Gfrerer et al. (2021)

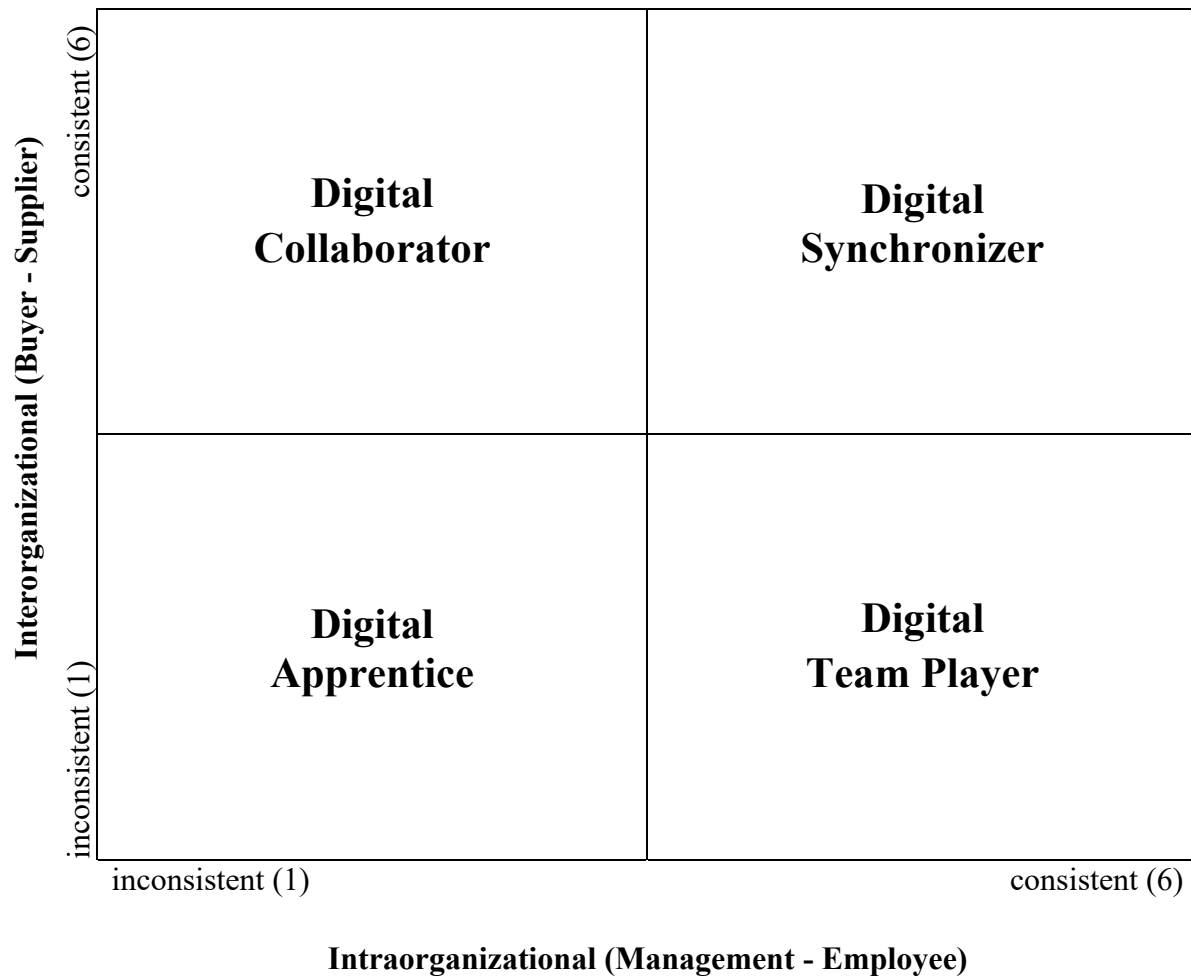
*Assessing Digital Readiness.* In line with the digital maturity classification, the factors can be assessed at three different levels: early, developing, and maturing (Kane et al., 2017). Accordingly, the six factors are subdivided in these stages and assigned distinct quotes that build on Kane’s study to make them accessible for practical use (see Table 2). At this point, it is important to note that the factors do not attempt to measure the developmental stage of DT but rather the relative consistency of perceptions between different parties involved in or affected by the DT initiative. In case of relative inconsistency (e.g., early vs developing), digital readiness is potentially compromised through differing perceptions about DT. If these are not resolved, they might cause resistance or unintelligibility in the relations of the parties involved. Unlike digital maturity classifications, which attempt to measure the progress of DT efforts (Klötzer & Pflaum, 2017), the DRM assesses the potential success of DT initiatives at any given point. Thereby, the potential success is not dependent on the particular

stage early, developing, or maturing but, more importantly, on the relative consistency of perception between the parties involved.

## **5. The Digital-Readiness-Matrix**

The DRM is based on the two dimensions, intra- and interorganizational perceptions and the six factors of digital readiness. It is a tool to analyze the relative consistency of perceptions regarding the digital readiness of organizations to determine the potential success of their product and service-related DT initiatives. The purpose of the DRM is to help managers analyze the differences between perceptions and identify possible areas where misunderstandings could interfere with the successful implementation of DT projects (see Appendix Chapter III for further instructions on how to use the DRM). It is based on the observations that digital readiness seems to be a relational phenomenon as inconsistent perceptions between managers and employees or buyers and suppliers impede the successful implementation of DT initiatives. Therefore, it builds on the following two dimensions: intraorganizational and interorganizational perceptions.

**FIGURE 1** The Digital-Readiness-Matrix



The resulting DRM reveals four specific types of digital readiness: ‘Digital Apprentice’, ‘Digital Collaborator’, ‘Digital Team Player’, and ‘Digital Synchronizer’. In the following, each quadrant will be described in detail and enriched with a practical case and possible managerial actions for each type afterward.

*The Digital Apprentice.* Firms in this quadrant are characterized by relatively inconsistent manager-employee and buyer-supplier perceptions. In general, this position can be considered the least favorable for organizations with regard to digital readiness. As intra- and interorganizational perceptions about the nature and direction of DT diverge, digital initiatives are likely to become a major challenge. On the one hand, misunderstandings between management and employees can cause implementation errors or delays, while buyers could resist or have different expectations towards digital initiatives from suppliers. Consequently, due

to the varying perceptions of digital readiness, a Digital Apprentice might not be able to utilize the full potential of their DT initiatives just yet.

*The Digital Collaborator.* Digital Collaborator firms are characterized by inconsistent manager-employee yet consistent buyer-supplier perceptions. In this case, buyers are accepting or even actively demanding digital initiatives. However, because of intraorganizational inconsistency, employees or managers might not feel as prepared and may thus show resistance, causing them not to commit or opt out completely. The consequence of this behavior is likely to raise internal but also external issues that need to be considered. Internally, resistance to digital initiatives could lead to misunderstandings, conflicts, or delays and cause critical errors in the implementation phase. This again might endanger customer satisfaction as projects are not delivered on time or errors cause downtimes on the buyer side. In summary, a Digital Collaborator's DT initiatives are fueled by aligned buyer-supplier perceptions, but they face the danger of poor implementation and/or customer dissatisfaction due to internal misalignments and conflicts.

*The Digital Team Player.* Digital Team Players show consistent manager-employee but inconsistent buyer-supplier perceptions. Unlike the Digital Collaborator, the Digital Team Player has good prospects in terms of implementation due to the ability to align internal resources. Yet, the misalignment on the buyer side risks losing touch with customers. As perceptions between managers and employees align, the likelihood of meeting internal expectations is higher compared to Digital Apprentices or Digital Collaborators. However, the misalignment between buyers and suppliers could cause the buyers to work against the planned change. This, again, could lead to several issues during the implementation phase or endanger it completely. Overall, the Digital Team Player is likely to meet internal expectations but faces a threat in terms of buyer resistance which can ultimately cause the DT efforts to fail.

*The Digital Synchronizer.* The position of the Digital Synchronizer is seen as the most desirable with regard to the potential of DT initiatives. They distinguish themselves from the other types by relatively consistent manager-employee and buyer-supplier perceptions. Thus, firms are more likely to succeed with their planned DT endeavors. First, as managers and employees have a similar perception in terms of readiness, misunderstandings are reduced, and the likelihood of meeting desired expectations increases. Furthermore, the potential acceptance from customers is given since management teams on buyer and supplier side have similar perceptions as well. Hence, being in a Digital Synchronizer position is advantageous in terms of the DT efforts through the alignment of perceptions across buyers, suppliers, managers, and employees and the success rate might be relatively higher than Digital Apprentice, Digital Collaborator, and Digital Team Player initiatives.

## **6. Ready, Set, Go! – Managerial Implications of the Digital-Readiness-Matrix**

The following section will discuss the managerial implications of the four types in the DRM in detail. To operationalize the theoretical concept of the DRM, anonymized real-life examples are elaborated. By doing so potential obstacles for firms are highlighted as well as possible management actions to encounter the challenges and development paths for each type are provided. To do so, I draw on data samples from a wider study on DT that includes in-depth interviews with managers and employees of four case companies and managers of respective customer firms. This unique data sample allows us to take all perspectives and relations (management vs employees and supplier vs buyer) into account. Further, the analysis was reassured through feedback loops with the respective managers of the four case companies.



**FIGURE 2** Managerial implications and operationalization of the Digital-Readiness-Matrix

Interorganizational (Buyer - Supplier)	consistent (6)	<b>Digital Collaborator</b> <b>Status Quo:</b> Consistent interorganizational and inconsistent intraorganizational perceptions – semi-high potential  <b>Danger:</b> Initiatives might underperform due to internal misunderstandings (causing customer dissatisfaction if not resolved)  <b>Management Action:</b> Internal communication and breaking down of objectives and involvement to get employees on board – manifestation/institutionalization in organizational culture	<b>Digital Synchronizer</b> <b>Status Quo:</b> Consistent intra- and interorganizational perceptions – high potential  <b>Danger:</b> Diversification in new customer segments and onboarding of new employees or managers might throw the firm off balance  <b>Management Action:</b> Maintain and ensure consistent onboarding and manifestation of perceptions in organizational culture as well as continuous exchange and involvement of customers
	inconsistent (1)	<b>Digital Apprentice</b> <b>Status Quo:</b> Inconsistent interorganizational and inconsistent intraorganizational perceptions – low potential  <b>Danger:</b> Initiatives might underperform due to employee resistance/misunderstandings or customer resistance or both  <b>Management Action:</b> More transparent communication in both directions is necessary, potentially diversification of customer segments, reworking digital strategy, and alignment with internal and external stakeholders	<b>Digital Team Player</b> <b>Status Quo:</b> Consistent intraorganizational but inconsistent interorganizational perceptions – semi-high potential  <b>Danger:</b> Might cause customers to refuse valid initiatives due to misunderstanding, loss of customers if not resolved  <b>Management Action:</b> Communication with customers and active involvement in digital initiatives from day one, involve key customers or digitalize for the customers to leverage their digital readiness
		inconsistent (1)	consistent (6)

**Intraorganizational (Management - Employee)**

### 6.1 Alpha – Digital Apprentice

*Status Quo:* Alpha is a family-owned mid-sized company and is considered a major player in its segment. The management team of Alpha is aware that ‘digital’ is becoming more and more important for the business strategy that is mainly designed around selling physical products. Hence, and primarily driven by management, they introduced several product- and service-related digital initiatives. A major share of Alpha Inc’s employees has been with the company for many years. Thus, the established pre-digital day-to-day activities are deeply engrained in their perceptions, and the notion of “we have always done it like that” is widespread. This causes a misalignment of multiple factors and resistance between management and employees.

*But some say I'm not interested, this has nothing to do with my business. I sell [physical] products. And your ERP stuff is just an accessory for me, a means to an end. [...] The purpose of the company is still to sell [physical] products, to solve [real] problems. And everything that has to do with IT, with digital, that is at best an auxiliary tool. (Managing Director of Alpha)*

Furthermore, the diverse customer structure ranges from small regional firms to large multinational corporations. The small customer firms have been with the company for years, and most of them are not yet threatened by digital technologies. In contrast, bigger multinationals have already made advanced DT progress. Thus, the management finds itself torn between multiple forces that hinder them from unlocking the full potential of their DT efforts. Smaller customer firms' and employees' digital readiness is lower than management's digital readiness, which causes resistance and delayed adaptations, while bigger firms are developing faster, demanding more digital services than the company can offer yet.

*The big ones are so huge that you don't even get involved in such huge topics and actually have their own digital transformation topics and there's less with us. (Managing Director of Alpha)*

*Danger:* As the management team is faced with inconsistent intra- and interorganizational perceptions, DT initiatives fall behind the anticipated expectations even though Alpha has major potential for DT. This might come with several dangers when these gaps are not addressed. The time-consuming projects are relatively costly for the firm and potentially discourage employees. Furthermore, customers could still reject the proposed changes or errors, and delays can cause customer dissatisfaction and ultimately lead them to change suppliers if not resolved. To address these challenges, it is most important to find an internal alignment before addressing discrepancies between buyer-supplier relations.

*Management Action:* Managers of Digital Apprentice firms need to resolve inconsistencies on both the intra- and interorganizational dimensions. First, more transparent internal communication and breaking down of objectives and purpose can help employees understand objectives better and change their perceptions. Also, increasing exchange and emotional involvement with employees by, e.g., providing appropriate internal communication

platforms can help to understand employees' perceptions regarding non-aligning factors better (De la Boutetière et al., 2018). Undergoing these actions could leverage a digital Apprentice to a Digital Team Player position. As a result, DT initiatives would face less resistance from employees, and the internal alignment of perceptions can decrease misunderstandings and errors in the course of implementation.

However, these actions do not resolve an interorganizational misalignment. Therefore, managers must customize digital initiatives to customers' perceived digital readiness or win them over. This challenge can be tackled in multiple ways. For example, the active involvement of key customer firms from start to end in the project helps to advance the initial design of product- or service-related DT initiatives. In addition, offering different services based on particular customer needs and perceived readiness could decrease resistance. However, this comes with high costs and operational efforts. In summary, a Digital Apprentice might strive best by, e.g., starting a first pilot project and gaining the commitment of crucial employees. Further, some customer firms that show consistent perceived digital readiness should be involved to achieve initial success. Only then these initiatives can be spread out and ultimately lead to a synchronization across the dimensions.

## 6.2 Beta – Digital Collaborator

*Status Quo:* Representing a Digital Collaborator company, Beta is an autonomous business unit of a multinational cooperation. Beta started by solely delivering components for a product. However, they started developing a more comprehensive digitalized system instead of just selling components to stay competitive. The management team of Beta is convinced that digital initiatives are a core part of the organization's strategy and thereby meet buyer firms' perceptions.

*The topic [digital transformation] is being dealt with more and more openly, and management is now pushing more and more for initiatives and changing processes to take place. So I don't know if you've heard about this yet. This "Future [Beta]" topic, that we are currently driving, is exactly that. Digitalizing processes, increasing efficiency and thus freeing up resources for more important tasks [...] reducing planning processes, all these things are involved. And this is now being driven by management. (Head of Digital Transformation)*

But with the recent shift, employees still perceive 'digital' only as supportive for now. Furthermore, employees believe that being digital is not yet essential in day-to-day business, and digital communication channels are limited.

*So, when I look at the status quo, we have a lot of island solutions that are also carved out by ourselves somewhere and here and there and everywhere, which are already digital, but no one writes in production anymore - or we do, we actually still have a piece of paper in production where the double checks and failures are documented. This is not done digitally at all [...]. (Quality Manager)*

The management of Beta sees these factors as more advanced and again has similar perceptions to their customers' management. Due to the misalignment between managers and employees, Beta struggles with timely implementation as employees widely differ in their perceived digital readiness. As a result, the firm lags behind the competition due to time-consuming errors and uncertainty about implementation.

*Danger:* Managers of Digital Collaborator firms, such as Beta, face consistent interorganizational but inconsistent intraorganizational perceptions concerning digital readiness. This causes the DT initiatives to be popular with customers, but the firm lags behind the competition about time to market due to internal ambiguity. As such, even though customers

accept the new digital initiatives or are even in demand, they might underperform due to internal misunderstanding of objectives and timely implementation. Ultimately this causes a higher error rate, delay in projects, or both. If these circumstances are not resolved, and the state of lagging becomes persistent, customers might become dissatisfied. In the long run, they might even switch suppliers as expectations in the buyer-supplier relationship cannot be met while employees might leave as well.

*Management Action:* Managers of Digital Collaborators, therefore, need to address the internal issues and close the perception gaps between them and employees to unlock more potential from their product- and service-related DT initiatives. Again, internal communication is the first step to identifying and tackling the aforementioned dangers for Digital Collaborator firms. Amongst other things, it is important to instigate communication channels and exchanges between managers and employees as well as across employees. Similar to the involvement of customer groups, an attempt to increase the participation of employees could potentially benefit in aligning perceptions. For example, an internal ‘innovation hub’ can provide a physical space for exchange away from day-to-day business activities and helps employees understand objectives, exchange ideas and opinions, and contribute to digital initiatives. While doing so, however, management does need to keep an eye on potential changes in buyer perceptions. In conclusion, management teams of Digital Collaborators need to focus on the internal misalignment by breaking down objectives and especially addressing key employee groups to unlock more potential of their product- and service-related DT efforts.

### 6.3 Gamma – Digital Team Player

*Status Quo:* Similar to Alpha Inc., Gamma is a mid-sized family-owned company and is considered a major player in its industry. The firm's core business is also to sell physical products that per se cannot be digitalized. Hence, the management team of Gamma is convinced that digital initiatives support certain business objectives but are not yet a core part of the business strategy. Also, employees have a similar perception of product- and service-related DT initiatives. Thus, investments and communications are designed around these assumptions, and the company successfully launched enterprise-wide initiatives. This is illustrated in the following quote from Gamma's managing director, in which he explains the company's approach:

*We're doing a lot, especially dialog with our coworkers. Ideally, we also look for an external speaker here and there. One example is also the sponsoring group. Here the junior staff is then supposed to go for two years, I'll call it a kind of assessment center. That is very important to us. And these young executives will also be confronted with the topic of digital transformation. Very deliberately. And at that moment, people will also have to deal with this topic detached from daily business. This will then also help to open up again. And I think that is the task. To take people out of the normal daily routine and say: "Get involved with the topic of digital. What does that mean for us? For our business model. But above all, what does it mean for our customers?" (Managing Director Gamma)*

However, the customers' perception of digital readiness differs from that, as their business is less affected by DT and consistently in high demand. Thus, they are not as ready to adopt the new services yet.

*Of course, I'm not saying that the [customer] doesn't want digital at all, but the willingness to change at this speed is just not there at the moment. (Managing Director Gamma)*

Consequently, Gamma's potential success of their DT efforts' is undermined due to a low number of customers using the established digital services.

*Danger:* The dangers of a Digital Team Player firm become evident through the example of Gamma Managers face consistent intraorganizational but inconsistent interorganizational perceptions. Projects of Digital Team Players might be implemented well and internally are

perceived as necessary. However, they are potentially set to fall short of expectations when customers do not use or even resist them due to different perceptions of digital readiness. Thus, firms' investment in their DT efforts is threatened not to create the anticipated value and, more importantly, might even destroy value when gaps in the buyer-supplier relationship are not resolved. Also, customer firms can feel misunderstood and ultimately turn their backs and engage with competitors instead. Additionally, the management team must be aware that through the resistance of customers, employees' perceptions might change and endanger the internal balance of perceived digital readiness.

*Management Action:* To tackle this danger, managers of Digital Team Player firms need to anticipate the specific customer needs and perceived digital readiness in order not to demand too much or too little with regard to the buyer-supplier relationship. This can be achieved by increasing exchange and communication with customer firms and their active involvement in setting up DT initiatives. For instance, organizing site visits at firms representing a “best-practice” case offers the opportunity for customers to observe first-hand the added value anticipated by an initiative. Another approach could be to digitalize for customers. This means introducing products and services that do not demand direct adaptation or changes in customers' daily routines but are targeted to leverage their business. For example, new and enhanced features in existing digital services could change the perceived digital readiness of customer firms. In summary, Digital Team Player companies, like Gamma, need to focus on aligning buyer-supplier perceptions while maintaining a balanced intraorganizational perceived digital readiness.

#### **6.4 Delta – Digital Synchronizer**

*Status Quo:* Delta is the industry leader in its segment and has proven to be highly adaptive in recent years. The management perceives digital as a core part of their business strategy and, in line with their employees, are aware that digital tools are an essential part of their

day-to-day business. Furthermore, the structures established in the firm enhance the mutual understanding of employees and the particular management objectives.

*Now I have to say honestly, [...] the acceptance [regarding digital initiatives] or also forms of work such as home office and so on has become much, much greater. Of course, that also accelerates the reduction of resistance to implementation. (Managing Director Delta)*

By doing both small experiments and big enterprise-wide efforts, the firm was able to include their customers and respond to individual and collective customer needs. As their customer base mainly consists of small and medium-sized firms, the underlying motto from the CEO is, ‘if our customers cannot digitalize, we do it for them’. Following this strategy worked well. The reserved customer base is now increasingly receptive to digital initiatives and perceives digital as core to their business strategy as well.

*It doesn't always have to be the next Unicorn, so to speak. It's nice when you find that. But you also have to find real use cases. And not always just looking for the next big leap. The same goes for the quality of life. The best thing for us is potentially little effort for the customers and maximum benefit. Finding these things strengthens the acceptance of digital transformation internally and externally very, very strongly. (Managing Director Delta)*

*Danger:* The initial situation of Digital Synchronizer firms is seen as most desirable compared to other types in the DRM due to consistent intra- and interorganizational perceptions. However, all positions only represent a snapshot in time and do not take a changing and dynamic environment into account. Changes in employees, management, or customer groups might endanger the advantageous position and throw the company off balance by misaligned perceived digital readiness on either dimension. For example, the establishment of new buyer-supplier relationships or overproportional engagement of personnel can cause such imbalances. Thus, Digital Synchronizer firms need to be aware of the potentially misleading static nature each type represents and constantly reassess the status of aligned perceptions internally as well as externally.

*Management Action:* To maintain and ensure sustainable and consistent perceptions across both dimensions, a Digital Synchronizer needs to have a thorough hiring and



onboarding process of new employees, ensure a manifestation of perceptions in organizational culture and focus on continuous exchange and improvement processes with customers. Again, especially crucial are communication channels and internal dialogue. Furthermore, diversification strategies that, e.g., cause changes in customer portfolios, need to take into consideration that changes in perceived digital readiness might occur and entail adequate countermeasures, as discussed above. However, in the end, the potential for successful DT initiatives of Digital Synchronizer firms is relatively higher as intra- and interorganizational perceptions are consistent, and thus the parties involved are more likely to be receptive to product- and service-related DT efforts.

### **6.5 Summary of Managerial Implications**

In summary, the digital readiness types demand different approaches of managing DT. While Digital Team Players and Digital Collaborators need to pay special attention to intra- or interorganizational perceptions, Digital Apprentice firms should move forward focusing on intraorganizational alignment to unitedly tackle the interorganizational differences. Digital Synchronizers need to focus on maintaining aligned perceptions within and beyond the firm. Overall, increasing awareness about differing digital readiness perceptions can potentially improve flow and outcome of product- or service-related DT initiatives. The DRM thereby represents a tool that guides managers through this process by giving reference points as to where specific perceptions might misalign and provide possible management actions.

The DRM is an easy to understand and simple to use management tool. Based on intra- and interorganizational perceptions, the qualitative framework reveals what factors or parties involved in the change process might be critical to consider in ongoing or upcoming DT endeavors. It allows managers to quickly screen for potential discrepancies between the perceived digital readiness of managers, employees, as well as buyers, and suppliers. Thus, it allows managers to reflect and utilize the recommended actions to achieve or maintain

relatively consistent digital readiness perceptions. This, again, can leverage the potential success of a firm's DT efforts. But the tool also has its limitations. While it might be helpful when starting on a project, the analysis is based only on two dimensions, intra- and interorganizational perceptions. Often projects, as well as power and politics in and between firms, might be more complex. Therefore, it is important to note that other stakeholders, e.g., competitors or governmental regulation, might also be critical to consider for the success of DT projects. The same might be true for different discrepancies between digital readiness factors. Furthermore, managers should bear in mind that the DRM is a static tool that only provides a snapshot in time and does not consider the possible dynamics of the environment.

## 7. Conclusion

This study intended to show the importance of considering intra- and interorganizational perceptions of digital readiness. Based on the work of Gfrerer et al. (2021) and Kane et al. (2017), the Digital-Readiness-Matrix is developed, a tool to assess digital readiness (see also Appendix Chapter III for further instruction) and give guidance as well as direction for the launch of digital initiatives. The results show that varying constellations of perceived digital readiness between managers and employees and also buyers and suppliers demand different foci to be resolved. For example, while Digital Team Player firms can rely on internal digital readiness, inconsistent interorganizational perceptions need to be addressed to launch product- or service-related DT initiatives successfully. On the other hand, Digital Collaborators need to focus on aligning internal perceptions to decrease the risk of errors or misunderstandings in the course of implementation. Indeed, making perceptions of key parties involved in DT projects transparent seems to have the potential to improve digital strategies for products and services by revealing discrepancies that need closing and commonalities that can be leveraged. Even though it is widely known that communication is key, it still seems to be rarely applied in practice (De la Boutetière et al., 2018). Managers, therefore, should bear in mind that talking about what ‘digital’ really means for the organization can be a powerful leverage for digital readiness, as “people are the real key to Digital Transformation” (Kane, 2019: 44), and being ready is half the battle to master digital transformation...

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## Appendix Chapter III

### A step-by-step guide on how to use the DRM

The six factors of digital readiness are used to assess the relative consistency of intra- and interorganizational perceptions. In the following, you can find a step-by-step guide on how to apply the DRM.

#### Step 1: Assess the relative consistency of management and employee perceptions

The six readiness factors can be assessed in three different stages, early (e), developing (d), or maturing (m), depending on the individual perceptions of managers and employees. Inconsistency between a factor (e.g., developing and maturing or early and maturing) accounts for the value 0, whereas consistency (developing and developing or maturing and maturing) represents the value 1. After all, six factors have been assessed, the total sum represents the position on the x-axis.

**TABLE A.1** Relative consistency of managers and employees (template)

Factor	Employees	Managers	Consistency
Centrality of digital to core business	'e', 'd', or 'm'	'e', 'd', or 'm'	'0' or '1'
Usage of digital technologies	'e', 'd', or 'm'	'e', 'd', or 'm'	'0' or '1'
Digital Communication	'e', 'd', or 'm'	'e', 'd', or 'm'	'0' or '1'
Digital Initiatives	'e', 'd', or 'm'	'e', 'd', or 'm'	'0' or '1'
Digital Investment	'e', 'd', or 'm'	'e', 'd', or 'm'	'0' or '1'
Digital Talent	'e', 'd', or 'm'	'e', 'd', or 'm'	'0' or '1'
Total			<b>0 - 6</b>

## Step 2: Assess the relative consistency of buyer and supplier perceptions

The six readiness factors can be assessed in three different stages, early (e), developing (d), or maturing (m), depending on the individual perceptions of buyers and suppliers (with regard to the buyer-supplier relation the respective decision makers/management perceptions are considered). Inconsistency between a factor (e.g., developing and maturing or early and maturing) accounts for the value 0 whereas consistency (developing and developing or maturing and maturing) represents the value 1. After all, six factors have been assessed the total sum represents the position on the y-axis.

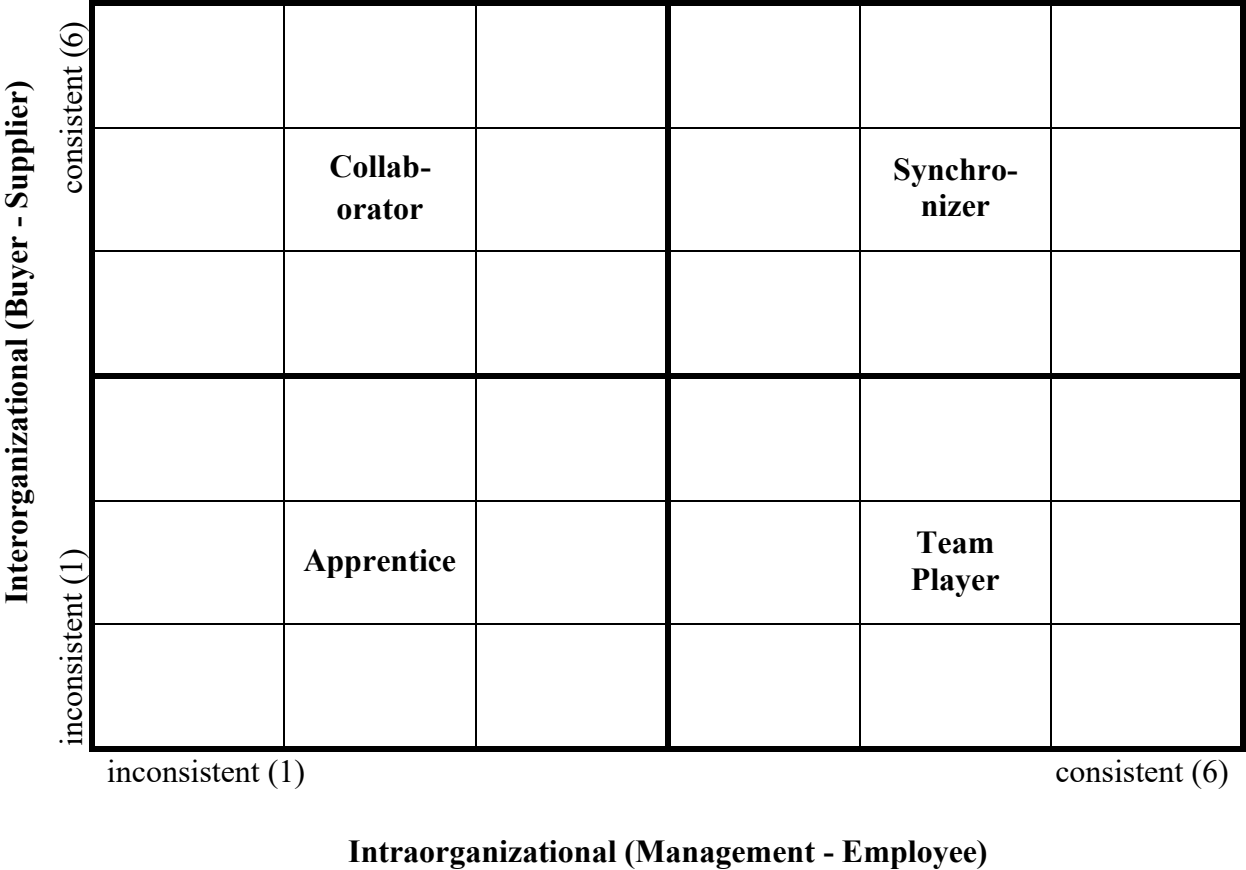
**TABLE A.2** Relative consistency of buyers and suppliers (template)

Factor	Supplier	Buyer	Consistency
Centrality of digital to core business	'e', 'd', or 'm'	'e', 'd', or 'm'	'0' or '1'
Usage of digital technologies	'e', 'd', or 'm'	'e', 'd', or 'm'	'0' or '1'
Digital Communication	'e', 'd', or 'm'	'e', 'd', or 'm'	'0' or '1'
Digital Initiatives	'e', 'd', or 'm'	'e', 'd', or 'm'	'0' or '1'
Digital Investment	'e', 'd', or 'm'	'e', 'd', or 'm'	'0' or '1'
Digital Talent	'e', 'd', or 'm'	'e', 'd', or 'm'	'0' or '1'
Total			<b>0 - 6</b>

## Step 3: Integrate values into DRM

After both intra- and interorganizational perceptions have been assessed, the values can be added to the matrix. Both axes range from 0 (inconsistent) to 6 (consistent). The intersection of the intra- and interorganizational value determines the type of digital readiness. The result does not attempt to measure the developmental stage of DT but rather the potential success of digital initiatives, which can occur at any stage early, developing or maturing.

**FIGURE 3** The Digital-Readiness-Matrix (template)







## 7. Excursus - Why Digital Transformation is not just 0 and 1...

Authors: Erik Hanel, Lea Grabensee

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### Abstract

Digital transformation is a multi-stage process that involves much more than just the use of digital technologies. Accompanying employees during this transition has become a central aspect of the journey toward digital transformation. None of this is really new. The fact that a manager cannot reach the goal without his or her team should no longer surprise anyone. What is surprising, however, is the limited communication about how to implement such projects. In this article, we recommend three approaches transparency, emotional intelligence, and activation which is intended to help managers to navigate their employees through the fog of digital transformation.

Digital transformation (DT) is a multi-stage process that involves much more than just the use of digital technologies. Accompanying employees through this transition has become a key aspect of the journey toward DT. Therefore, it is important to develop a sense of urgency for implementing changes in this context. This is the only way to motivate employees, activate their commitment, and implement measures. None of this is really new. The fact that a manager cannot reach a goal without his or her team should no longer surprise anyone. However, what is surprising is the limited communication about how to realize such plans.

Organizations in which leaders share a clear vision of DT with their employees triple their success rate - but such leadership communication is only actually in place in 24 % of cases (De la Boutetière, Montagner, & Reich, 2018). Navigating your team through the fog of DT is not an easy endeavor, but companies like Tesla, Netflix, and SAP are demonstrating it, using transparency and emotional intelligence to consciously activate their employees. Their leadership approach equally offers clarity, freedom, and structure - and thus becomes a catalyst for DT projects.

### **Digital transformation triggers uncertainties**

We can no longer avoid the buzzword DT. The megatrend has led to increasing complexity in the business environment, which organizations have to face now. The ongoing DT holds many promises for us: we expect increasing efficiency, faster innovation cycles, and a new service orientation. It all sounds wonderful, or does it?

However, we frequently forget that there are also many uncertainties associated with it. What happens if we fail to adequately address DT and get off course? Inefficiency and slower growth are just some of the consequences. Often, investments in new technologies fail to deliver the expected productivity or profitability gains because they're insufficiently exploited (Becker, Burggraf, & Martens, 2019). The world of work today is characterized by volatility, uncertainty, complexity, and ambiguity, confronting organizations with a volatile environment (Burchardt & Maisch, 2019; Parviainen, Kääriäinen, Tihinen, & Teppola,

2017; Vial, 2019). Consequently, employees are also exposed to constant uncertainties and insecurities. If employees lack a feeling of security, efficiency, and performance might suffer. Thus, there is an appeal to create and maintain a coherent understanding of DT to enable collective action.

### **Headstart through the establishment of a digital mindset**

Organizations are advancing in their DT at varying rates and with different degrees of success (Burchardt & Maisch, 2019). A new attitude toward work, a digital mentality, a holistic view – the critical success factor is establishing a digital mindset. It is not the use of technology per se, but about developing overarching behavioral approaches. These must be geared toward changing the way people think and work in an organization.

Simultaneously, it is necessary to build a new work culture. Creating ways for more flexible work, dismantling hierarchies, decentralization and, above all, building digital expertise are important. Your team must realize that everyone is in the same boat and follow a common purpose to optimize organizational performance and thus achieve an advantage. For a successful DT, it is therefore essential that leaders show a clear vision and communicate clearly how they are changing the organization. You must be able to navigate the tension between continuing uncertainty and creating clarity for your employees.

## **Digital transformation as a team effort**

From a knowledge management perspective, it is anything but surprising that employees are regarded as an essential factor in DT. However, in practice, sensitivity about this factor still needs to grow significantly. The power and knowledge of individuals have been replaced by democratic decision-making of the entire team. Employees are no longer just 'human resources'. They are more autonomous and self-determined - and their individual skills support the organization on its way to achieving its goals. This also means that workplaces are increasingly losing their purely utilitarian nature and instead start to focus on employees.

Decision-makers initiate this change, but DT is by no means a purely top-down process. Executives merely set the boundaries within which employees should be free to move. In this way, they steer the DT and at the same time empower their workforce to make their own decisions and carry out tasks.

## **Digital transformation at Tesla, Netflix, and SAP**

Creating a bigger picture of DT and moving into the future with a clear course is not easy. In their role as digitally minded leaders, executives and project managers should therefore take the following three approaches to heart to navigate their employees through the fog of DT.

*1. Be transparent:* Openly communicate your vision of DT, how the organization should evolve, and how this will impact employees. A step-by-step action plan can help give employees a clear guideline. Previous, current, and future actions must be taken into account. It is important to keep employees aware of what has already been achieved, what actions should be receiving the most attention right now, and what still needs to be accomplished. Further, planning regular meetings in which an exchange takes place between you and your employees makes it possible to avoid ambiguities and to anticipate potential uncertainties; through doing this, security is generated for employees and orientation is provided to them.

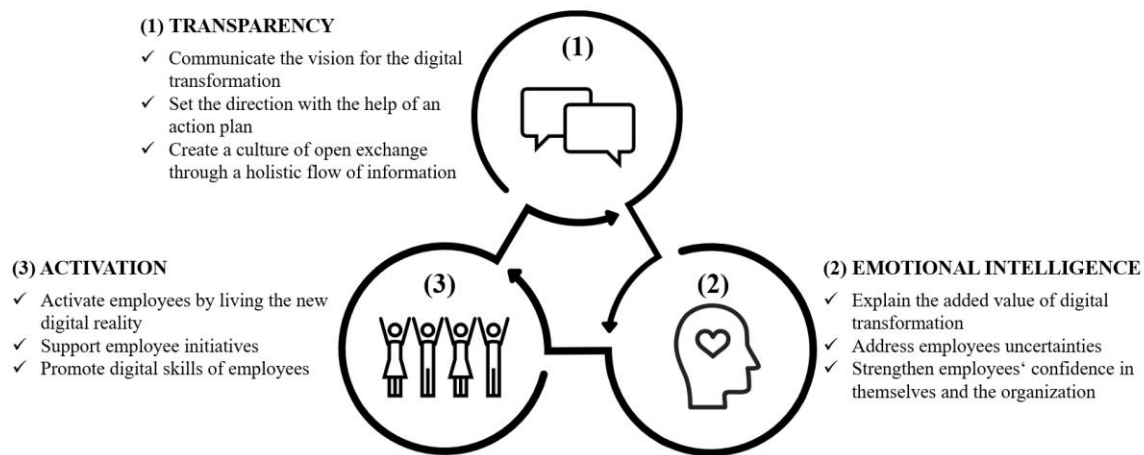
Tesla's CEO, Elon Musk, has recognized how damaging a lack of transparency is for an organization: rigid communication hierarchies hinder the flow of information and hinder quick decision-making. Musk, therefore, calls for breaking down traditional chains of command and patterns that only reinforce the power of executives but do not serve the organization as a whole (Kane, 2017). What works differently at Tesla - progress is based on effective communication. Tesla builds on a flat organizational hierarchy and a culture that enables flexible and frictionless communication. Of course, this is easier said than done (Bariso, 2017), but simply raising awareness to combat an 'us vs. them' mentality unleashes potential and drives collective organizational success. This is simply because it means that all voices are heard and discussions are based around the actual pain points (Tabrizi, Lam, Girard, & Irvin, 2019). The first step to change is, thus, to create a shared knowledge base for everyone. Even though digital technologies offer opportunities to increase efficiency, without the right attitude toward change and comprehensive communication, DT will not succeed.

2. *Utilize your emotional intelligence:* Show your employees the added value of DT for the entire organization and for everyone personally. Because even the best vision fails to reach its potential if it lacks initial support. Therefore, it is essential that you 'walk in your employees' shoes' and consider their possible fears and uncertainties. Try to show that the organization and also you are up to the challenges of DT. 'Emotional' is the keyword here - boost your employees' confidence by highlighting your organization's achievements and justifying why you are confident about the future together. Your employees should feel that their efforts are worthwhile and that their work is meaningful; only then a successful transformation is possible.

Ingrained in Netflix's organizational culture is recognizing that employees are at the very center of any transformation. Thus, leaders need to acknowledge the uncertainties and emphasize that the transformation process is an opportunity for personal growth (Putter, 2018). Netflix's values can be described as 'people over process'. This means that Netflix believes

that valuing each employee will lead to highly effective collaboration, resulting in an agile and successful organization. Here, their focus is on the following ten corporate values: judgment, communication, curiosity, courage, passion, selflessness, innovation, inclusion, integrity, and impact. To actually live these aspects in the organization, they are explained in detail in a cultural manifesto that provides employees with a clear course. First and foremost are soft skills, emotional intelligence, and empathy, as well as honesty in the entire team and across all hierarchical levels (Netflix Inc., 2022). Because without transparency and trust, employees will not actively participate in the transformation process. Therefore, follow Netflix's maxims for action: promote independent employee decision-making, conscious and comprehensive information sharing, and open interaction.

3. *Activate your employees:* live the new digital reality, be a role model, and leverage it to achieve individual self-reflection. Empowerment and support of employee initiatives help to elicit such a process, as employees can get involved and contribute to the organization's vision. Such a network can lead to successful initiatives being heard throughout the organization and drive the necessary institutionalization of DT. A central component is also further training measures that are adapted to the needs of employees and thus promote individual digital skills. Workshops in which specific, practical examples are highlighted are particularly effective here. Simultaneously, you should also offer employees the opportunity to support each other - for example, through internal platforms. Explicit attention should also be paid to the organizational structure: develop it into a network that you and your employees jointly support. "Digital together" is the motto of DT; to actually realize this, the commitment of your employees is essential.



An organization's culture is critical for digital maturity. Creating a space for employee engagement increases satisfaction and, as a result, the overall performance of the organization (Oswald, Proto, & Sgroi, 2015). To transform successfully, organizations are therefore dependent on employee feedback. SAP has recognized this connection between culture and process-oriented change in the DT (McInnis, 2018). Two particular things stand out here: empowering employees and changing the mindset within the organization. SAP places great emphasis on training that enhances the skills of their employees and provides appropriate tools to change, learn, and adapt. Initiated by a workshop attended by SAP executives, the company's culture was gradually transformed. An environment was created that accepted failure and used failures to learn and develop (Digital Marketing Institute, 2020). Hence, transparency and emotional intelligence are necessary to motivate and activate employees so that they want to become part of the DT.



## **Embracing digital transformation**

DT is a multi-stage process that affects the entire organization. Here, the journey is the reward. Above all, it is a cultural change where employees and managers have to leave their comfort zone and think in new ways. As a manager, you should defuse any arising uncertainties and bridge between old and new ways of thinking and approaches. This can be achieved best through a balance between flexibility and fixed structure.

Employees need guidelines to keep them on course. After all, too much freedom can lead to excessive demands and uncertainty. As a manager, you need to set an example of the new digital reality and not just communicate it. Setting an example in this way will accelerate the transformation process of your organization. However, do not interpret your vision too narrow, but empower and delegate tasks to your employees. After all, relinquishing control doesn't mean losing control – it usually acts more as a motivating factor. Instead of clinging to rigid rules, challenge and encourage employees and redefine how they approach tasks and make decisions. Provide your employees with leadership that balances clarity and support with the freedom for personal development.

DT is much more than the use of digital technologies because, in the end, it is the mindset of employees and their commitment to cultural change that determines success or failure. Ultimately, employees are at the heart of an organization, driving its future, not just the digital tools themselves.

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## **8. Conclusion**

The research in this thesis sheds new light on issues and challenges around incumbents' DT – a topic that has received growing attention in the strategy domain (Warner & Waeger, 2019) and “undoubtedly offers exciting times ahead for strategy researchers” (Adner et al., 2019: 260). In particular, this thesis focuses on fundamental challenges around incumbents' DT, with the research's results having multiple theoretical implications for research on DT as well as practical implications. In the following section, I will present an overview of the particular contributions of each paper to literature on DT.

### **8.1 Theoretical Implications**

Based on the identified challenges of incumbents' DT, this thesis has crucial theoretical contributions to literature on DT, largely in relation to the DT of incumbent firms (Chanas et al., 2019; Hess et al., 2016; Roy et al., 2018; Svahn et al., 2017; Verhoef et al., 2021). Scholars agree that DT has fundamentally affected incumbents' value creation and capturing (Volberda et al., 2021). In particular, this dissertation highlights that incumbent firms are affected by a multitude of DT triggers and drivers within their environmental setting, such as changing buyer and supplier demands, changing competitive landscapes, and the diffusion of digital technologies. As this thesis shows, these require strategic action. Furthermore, the organizational context of incumbents stems from various key challenges, such as crucial capability-level differences, rising organizational tensions, and differing perceptions between key players and individuals. To address this, incumbents need to initiate suitable strategic actions that enable them to achieve or maintain their competitive advantage. Thus, strategic action needs to fit both the environmental and organizational context (Zajac, Kraatz, & Bresser, 2000). In this dissertation, three particular strategic actions in context of DT were discussed: first, the utilization of varying capability-level differences; second, the reorganization of organizational structure; third, the adaptation of organizational culture.

Overall, the individual contributions of the papers underline the contingencies of incumbents' DT.

The first paper – “Digital capability gaps in traditional industries: Influencing factors and strategic responses” – provides a better understanding around the nuances of capability-level differences between incumbents and their customers, in the context of DT, by conceptualizing DCGs. DCGs describe the difference of a focal firm's ability (in relation to their customers) to design and control products, services, and processes by utilizing digital technologies – crucially, it should be noted that DCGs may vary in size. While extant research already reveals that firms can be at different stages of DT (Kane et al., 2017; Volberda et al., 2021), this paper shows that digital capabilities need to be considered not only with regard to the overarching idea of maturity (Kane et al., 2017), but in relation to other firms as well. This matters because DCGs may have crucial strategic implications. On the one side, large DCGs might constitute diversification opportunities. On the other side, moderate or small DCGs might require mitigation (via ‘digital parenting’ or ‘digital collaborations’) to develop existing customer relationships into the digital sphere.

The second paper – “Digital Transformation of incumbents via structural ambidexterity: A case study of escalating tensions” – shows how tensions escalate over time by describing an in-depth case of how tensions in ambidextrous solutions, in the context of DT, emerge, evolve, shift, pervade and, consequently, escalate over time. While ambidextrous solutions are a means to resolve frictions between firms' existing and future strategies (Andriopoulos & Lewis, 2009; Papachroni, Heracleous, & Paroutis, 2016; Raisch et al., 2009) and drive incumbents' DT efforts (Smith & Beretta, 2021), the implementation of these solutions may also be fraught with difficulty. This matters as the escalation of tensions potentially alters incumbents' performance and their strategic success, in the context of their DT. Furthermore, and similarly to existing research, this study shows that DT entails structural changes (Porter & Heppelmann, 2014), with such changes being able to fuel the emergence of tensions that

incumbents need to balance (Smith & Beretta, 2021). In particular, even though strategy and structure might be aligned (Miles & Snow, 1984; Rumelt, 1974), they can also act as catalyst for the escalation of tensions. Consequently, even though incumbents might achieve alignment of strategy and structure, escalating tensions might hinder the success of DT initiatives.

The third paper – “The Digital Readiness Matrix – Being ready is half the battle to master digital transformation” – adds to research on DT by extending the work of Gfrerer and colleagues (2021). The results show that varying constellations of perceived digital readiness between managers and employees, and also buyers and suppliers, demand different foci to be resolved. For example, the paper reveals different types with regard to digital readiness; while Digital Team Player firms can rely on internal digital readiness, inconsistent interorganizational perceptions need to be addressed to successfully launch DT initiatives related to products or services. On the other hand, Digital Collaborators need to focus on aligning internal perceptions to decrease the risk of errors or misunderstandings in the course of implementation. In line with Kane (2019), this paper shows that making perceptions of key parties involved in DT projects transparent seems to have the potential to improve digital strategies for products and services by revealing discrepancies that need closing and commonalities that can be leveraged.

In summary, the three core chapters of this dissertation show crucial macro, meso, and micro level considerations for strategy research on incumbents DT, respectively. Future research can build on these findings and should address the phenomena with larger industry-level data sets. Finally, and in line with Smith and Beretta (2021) and Furr et al. (2022), this dissertation highlights the importance and distinctiveness of research on DT. In particular, it highlights the complexity incumbents face within the context of their DT and thus contributes empirically to the question of how DT is actually different (Adner et al., 2019). In fact, while this dissertation is a step forward toward showing the distinctiveness and importance

of addressing DT as a new phenomenon (Adner et al., 2019), much more research is needed on DT in general and especially in the context of incumbent firms (Furr et al., 2022).

## **8.2 Managerial Implications**

In addition to its theoretical contributions, this thesis also has practical implications. As the intent of this research is to support individuals, teams, and organizations involved in shaping incumbents' strategies around DT, there are crucial practical implications one can draw from the individual papers in this dissertation.

The first paper offers practical insights for managers both within organizations and in facilitative settings such as industry associations. Considering different capability levels between one's own firm and one's customer firms is a crucial component and a main driver for the success and performance of DT related initiatives. This shifts the salience to managers' attempts to gauge capability dependencies and to develop ways to mitigate any gaps. Furthermore, it provides insights on how the composition of customer portfolio and competitive landscape constrain or enable opportunities in the context of DT. This has substantial implications for practice, as firms may want to deliberately shift their approach to capability development in the context of digital capabilities to avoid such constraints. Moreover, the digital pressure with regard to customers (vertical) and competitors (horizontal) provides an orientation for managers on whether to engage, support or invest with customer firms. Increasing awareness about these issues has therefore the potential to ease firms' DT path.

The second paper has practical implications, especially for senior managers in corporate centers as well as business unit managers. It highlights the complexity and potential pitfalls of setting up new, semi-autonomous business units with the means to drive DT. In particular, even though strategy and structure are aligned, they might be compromised if tensions in the context of DT are neglected. Thus, management teams need to anticipate and respond to exploitation-exploration tensions, as awareness of such tensions might potentially decrease the risk of failing or slow-moving DT initiatives. Furthermore, incumbents seem to

predominantly rely on incremental changes and their existing set of capabilities when it comes to their DT. Thus, when setting up structurally separate units, incumbent management needs to be aware of path dependencies that potentially alter the success of DT initiatives.

The third paper highlights the importance of considering intraorganizational and interorganizational perceptions of digital readiness. Here, the DRM is a tool to assess digital readiness and give guidance as well as direction for the launch of digital initiatives. Overall, the DRM provides managers with a tool to assess digital readiness and gives them guidance and direction for launching digital initiatives. Indeed, making perceptions of key parties involved in DT projects transparent can potentially improve digital strategies by revealing discrepancies that need closing and commonalities that can be leveraged. For instance, if perceptions between managers and employees are relatively consistent, but buyer-supplier perceptions or expectations towards DT differ, initiatives might be well implemented but are likely to fail when buyers reject them. Also, if perceptions are relatively inconsistent between management and employees but consistent on the buyer-supplier side, buyers might adapt well – though initiatives might suffer from poor or lengthy implementation due to internal misunderstandings or conflicts that arise from disagreements.

Overall, the results implicate that successful DT does not solely depend on digital technologies as such, but more importantly on how incumbents can drive digital strategies within their unique contexts. In conclusion, this thesis makes it undoubtedly clear that “strategy, not technology, drives digital transformation” (Kane, Palmer, Phillips, Kiron, & Buckley, 2015: 3).



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