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Guiding incumbent companies in navigating digital transformations: A qualitative study on structural ambidexterity and strategic leadership

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Abstract

PURPOSE: *Despite digital transformation being a focus topic for incumbent companies, organizational structures are a significant barrier to their success. Referring to the positive correlation between ambidexterity and digital innovation, our research provides guidance on structural ambidexterity for incumbent companies. Previous research has barely differentiated between exploration and exploitation in digital transformation. In the present paper, we fill part of this research gap by focusing on structural ambidexterity in digital transformations and providing guidance on how incumbent companies can overcome organizational challenges.* ***METHODOLOGY****: Our research is based on an explorative research design with 33 semi-structured interviews that allow in-depth information. The interview partners were selected using purposive sampling and represented different industry and hierarchy levels. All of them have been in a position related to digital transformation in an incumbent company for the last two years. We ensure scholarly rigor using thematic analysis to analyze our data.* ***FINDINGS:*** *Our decision tree guides separation or integration based on the closeness of digital activities to the core business and the association of the activities to exploration or exploitation. Additionally, we recommend considering the digital maturity grade in the decision-making. Developing a cross-functional digital transformation strategy and pursuing a balanced portfolio fosters ambidexterity in digital transformation. Clear responsibilities, collaborative decision-making, candidate selection, and collaboration with IT are essential leadership activities.* ***IMPLICATIONS*** *for theory and practice: Our research expands the existing research on digital transformations of incumbent companies. We specifically contribute to the limited details on how to separate digital activities considering an exploration/exploitation perspective. Our study guides practitioners to address one of their major challenges in digital transformations with the help of our decision tree.* ***ORIGINALITY AND VALUE****: Based on the positive correlation between ambidexterity and digital innovation, our study contributes to the existing research by providing in-depth knowledge of structural ambidexterity in digital transformations. This detailed information is essential to provide knowledge on enabling the positive correlation between ambidexterity and innovation in the context of structural ambidexterity.*

Keywords: *digital transformation, digitalization, organizational structures, structural ambidexterity, temporal ambidexterity, incumbent companies, guidelines*

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INTRODUCTION

Digital transformation has become a primary concern for many incumbent companies (Hess et al., 2016; Kane et al., 2015). Incumbent companies no longer question the decision to digitally transform as this is no longer an option to stay competitive (Brunetti et al., 2020; Mirković et al., 2019; Paulino, 2022; Verhoef et al., 2021). Facing market disruptions enabled by digital technologies and new market entrants, companies need to derive a strategy to embrace digital transformation (Hess et al., 2016). Incumbent companies require answers on leveraging opportunities supported by digital technologies (Westerman et al., 2014). Despite the growing interest, the research on incumbent's digital transformation is still quite narrow (Gregory et al., 2015; Oberländer et al., 2021). The availability of new technologies provides companies across multiple industries (Soto Setzke et al., 2023) with new opportunities (Göbeler et al., 2020) to change their value propositions (Soto Setzke et al., 2023). Nevertheless, incumbent companies also face challenges in that process (Klos et al., 2021; Mirković et al., 2019; Zhang et al., 2023). Often, companies fall behind on the expected financial improvements despite investments in digital offerings (Gebauer et al., 2020; Klos et al., 2021). Even if the majority of the existing literature addresses the impact of technologies on digital transformation (Coreynen et al., 2020; Mirković et al., 2019; Soluk & Kammerlander, 2021), technological know-how is not identified as a significant barrier to digital transformation (Mirković et al., 2019). Studies show that planning, developing, and implementing the technological aspects of digital transformations is most evident, but technological know-how alone is insufficient for success. Instead, the required organizational changes confront incumbent companies with additional tasks (Bjoerkdahl, 2020; Mirković et al., 2019). Developing new digital value propositions, such as digital services, requires incumbent companies to adjust processes, working models, and organizational structures (Soto Setzke et al., 2023). Therefore, aside from technological aspects, the managerial aspect of digital transformation might have substantial implications (Soluk & Kammerlander, 2021). The definition of digital transformation shows that it includes improving the existing by raising efficiencies of existing processes and enhancing products and services by integrating digital technologies. It also contains aspects with a higher level of change impact, such as rethinking business models in a radically new way (Alghamdi, 2018; Hess et al., 2016; Schiffer, 2021; Vesna Bosilj Vukšić et al., 2018; Wu et al., 2021). Also, Soto Setzke et al. (2023) point out the fundamental change character of digital transformation and the differentiation to prior technology changes.

Therefore, digital transformation comprises incremental and radical innovation activities (Hoessler & Carbon, 2022; Ismail et al., 2017) and can be linked to the concept of ambidexterity (Duncan, 1976; March, 1991). Ambidexterity is about being able to address current business needs but also addressing future developments. Ambidextrous companies can balance conflicting demands (Duncan, 1976; Gibson & Birkinshaw, 2004; Michael. Tushman & O'Reilly III, 1996). Whereas there is individual research on digital transformation or ambidexterity, research has not focused too much on ambidexterity (Brauer et al., 2021; Wu et al., 2021). Suppose ambidexterity is connected with digital transformation; in that case, the focus is often on individual aspects such as performance impact (Del Giudice et al., 2021), technical aspects (Shao et al., 2021; Wu et al., 2021), or IT structures (Iho & Missonier, 2020; Jöhnk et al., 2020; Montealegre et al., 2019). Nevertheless, research shows a positive correlation between ambidexterity and digital innovation (Del Giudice et al., 2021). One differentiating factor of the different concepts of ambidexterity is separation and integration via organizational structures, and digital transformation efforts often require structural changes (Hess et al., 2016; Soto Setzke et al., 2023). Multiple researchers explain that digital transformation influences organizational structures (Holotiuk, 2020; Schiffer, 2021), and it has been identified as a challenge for incumbent companies (Bjoerkdahl, 2020; Mirković et al., 2019). Nevertheless, this has received little research attention so far, especially not providing in-depth details. Also, a recent study highlights the need for more research on the centralizing and decentralizing dynamics in digital transformation (Plekhanov et al., 2023).

We aim to address this research gap. To guide how to manage one of the major challenges in digitally transforming incumbent companies, we focus on structural ambidexterity in digital transformations. With this, we address the research gap on how incumbent companies can overcome organizational challenges (Smith & Beretta, 2021). Addressing the lack of details on how to separate, we investigate exploration/exploitation separation, its driving factors, and how to separate or integrate digital / core business. As leadership is required to create or reinforce ambidextrous behavior (Alghamdi, 2018; Bell & Hofmeyr, 2021; Jansen et al., 2008; Keller & Weibler, 2015; Lin & McDonough III, 2011; Mueller et al., 2020; Probst et al., 2011), we add needed strategic leadership activities to frame our research objective. Our study aims, therefore, to answer the following research questions (RQs):

RQ1) How can incumbent companies apply the concept of structural ambidexterity to navigate digital transformation?
RQ2) What elements of strategic leadership do leaders in incumbent companies need to implement when navigating digital transformation considering structural ambidexterity?

We first develop the theoretical background, make our methodology transparent, and illustrate our results, and will then discuss the results in the face of already existing findings to draw practical conclusions for entrepreneurship, management, and innovation leadership (Hoessler & Carbon, 2022; Ismail et al., 2017).

LITERATURE REVIEW

Digital transformation

Digital transformation has gained increasing interest from researchers and practitioners (Klonek et al., 2020; Vesna Bosilj Vukšić et al., 2018; Westerman et al., 2014). Lacking one unified definition (El Sawy et al., 2020; Haffke et al., 2016), existing understandings have similarities, which we use for our combined definition in this paper. Digital transformation goes beyond technologies (Eberl & Drews; El Sawy et al., 2020). It is a leadership challenge to enable the necessary change to transform the business successfully (Hensellek, 2020). Compared to new digital start-ups, incumbent companies have already established external relationships, defined internal processes (Zhang et al., 2023), and preserved core competencies (Klos et al., 2021). Therefore, their reaction to digital transformation is different. In our study, we focus on incumbent companies to address this distinction. Digital transformation aims to create radically new ways of doing business (Berghaus & Back, 2016; Holotiuk; Nambisan et al., 2019). A fundamental change in value proposition through, for example, new business models is characteristic of digital transformation (Zhang et al., 2023). The existing way of doing business is either substituted, extended, or transformed with the help of digital technologies and leadership (Pihir et al., 2018). Especially recent developments in three-dimensional printing (Klos et al., 2021) and artificial intelligence are seen as enablers for transforming decision-making processes or business models (Klos et al., 2021; Zhang et al., 2023). Digital transformation can be seen as the most advanced stadium of a three-phase process (Hoessler & Carbon, 2022; Verhoef et al., 2021). This is a long path achieved by combining incremental and radical innovations shown in different maturity phases (Goerzig & Bauernhansl, 2018; Porfírio et al., 2021). This transformation process needs to be guided by a strategic setting (Klos et al., 2021). The first phase of digital transformation is digitization (Tekic & Koroteev, 2019). This phase is limited to technology (Yoo et al., 2010). The second phase is an intermediate stage between the initial digitization and the final target of a digitally transformed business. Words like digitalization, digital innovation, and digital business model change describe phase two. Automated, extended, or substituted business processes with higher efficiency or higher value added for the customer is the outcome (Cavalcante et al., 2011; Florek-Paszkowska et al., 2021; Li, 2020; Sousa & Rocha, 2019). Whereas there is no clear key performance indicator, when the next phase is achieved, it is more about clustering different activities on the path to digital transformation. Therefore, Saarikko et al. (2020) describe the three clusters as domains instead of stages. In this paper, we use the term "phase," as we can see them as consecutive but not as clearly moving upwards as the term "stage" would imply. Those phases can be connected to digital maturity grades (Ifenthaler & Egloffstein, 2020). Nevertheless, digital transformation is not a final stage. Instead, it is a path that includes multiple choices with potentially different outcomes (Furr et al., 2022). With the given definition, we identify that digital transformation is a process that includes incremental and radical innovations and, therefore, can be linked to the concept of ambidexterity. In the following section, we will first generate a general understanding of ambidexterity, its concepts, and how to achieve it independently of the digital context. This is followed by an analysis of the literature on ambidexterity in digital transformation.

Ambidexterity in general

Companies that balance exploration and exploitation are ambidextrous organizations (Duncan, 1976; Michael. Tushman & O'Reilly III, 1996). Exploration is characterized by experimenting and investigating radically new topics (March, 1991) and is associated with radical innovations (Beckman, 2006; Benner & Tushman, 2003). A higher level of risk is associated with exploration due to the unknown (March, 1991). Exploitation can be described as improving the existing, focusing on efficiency and productivity gains. Exploitation is closely connected to established processes or products, so the results

are more obvious and risk-averse (March, 1991). Achieving balance should be the target as too much exploration can result in high costs with no results, but too much exploitation is unfavorable as it leads to stagnation (March, 1991). Existent research proves the positive relationship between ambidexterity and a company's long-term performance (Brix, 2019). Especially in a fast-changing environment, one characteristic of digital technologies is that a long-term balance of exploration and exploitation is essential (O'Reilly III & Tushman, 2013; Yoo et al., 2012). As those activities are paradoxical, managing them is highly challenging for companies—they often have problems achieving ambidexterity. For example, companies find it difficult to find an applicable balance (Chen & Katila, 2008), not prioritizing one of the activities, especially exploitation (Chen & Katila, 2008), responding to changing environments (Halevi et al., 2015), achieving ambidexterity in superior management (Keller & Weibler, 2015) and establishing new mindsets and skills (Michael Tushman & Euchner, 2015). There is no unique definition of ambidexterity, mainly resulting from different understandings if exploration and exploitation are complementary or fundamentally incompatible and in competition. In addition, scholars represent different opinions if ambidexterity means achieving a simultaneous balance of exploration and exploitation (balanced ambidexterity) (Cao et al., 2009; Gupta et al., 2006; Levinthal & March, 1993) or if it also can be switching between them over time (combined ambidexterity) (Cao et al., 2009). Based on those various definitions, multiple concepts of ambidexterity have evolved (Cao et al., 2009). In the original literature on ambidexterity, the main concepts are *structural ambidexterity* (Benner & Tushman, 2003; Duncan, 1976; Gibson & Birkinshaw, 2004; O'Reilly III & Tushman, 2013), *sequential ambidexterity/punctuated* equilibrium (Boumgarden et al., 2012; Cao et al., 2009; Gupta et al., 2006; Simsek, 2009) *and contextual ambidexterity* (Gibson & Birkinshaw, 2004). Reasoned by the interdisciplinary characteristics of digital innovation and the fast-changing character of digital technologies, Holotiuk and Beimborn (2019) introduced a new form of ambidexterity called *temporal ambidexterity.* The different concepts of ambidexterity are not mutually exclusive but can be combined (Brauer et al., 2021; Jöhnk et al., 2020). If structural separation occurs and employees are guided to pursue exploration and exploitation activities (contextual), companies combine structural and contextual ambidexterity. This concept of ambidexterity is called *hybrid ambidexterity* (Jöhnk et al., 2020; Ossenbrink et al., 2019). We do not list this concept separately as it involves the combination of structural and contextual ambidexterity, which would duplicate the individual aspects.

Ambidexterity is often connected to dynamic capabilities, and especially in the digital context, this connection is justified. Dynamic capabilities help to address changing environments and gain competitive advantage (Teece et al., 1997). Dynamic capabilities are split into three primary activities: 1) Sensing, 2) Seizing, and 3) Transforming (Teece, 2007). On the one hand, sensing can be connected to exploration as it is about identifying new things (Birkinshaw et al., 2016; Teece, 2007). On the other hand, seizing is related to exploitation as it is about improving the existing through execution (Birkinshaw et al., 2016; Teece, 2007). Connecting dynamic capabilities with exploration, exploitation, and ambidexterity leads to the lower-level concepts of sensing (exploration) and seizing (exploitation). Those are associated with the higher-level concept of transformation, which is about splitting resources (Birkinshaw et al., 2016). Table 1 illustrates the differences between the four concepts of ambidexterity based on the main differentiating factors and dynamic capabilities perspective.

Table 1. Characterizations of concepts of ambidexterity

	Structural ambidexterity	**Sequential ambidexterity**	**Contextual ambidexterity**	**Temporal ambidexterity**
Responsibility split regarding exploration and exploitation	Separation of organizational units	Shift of focus on the firm level	Employees to split time	Employees to shift between organizational units
Way of managing trade-off between exploration and exploitation	Separation	Consecutive	Integration	Temporal separation and Alignment
Dedicated exploration or exploitation organizational unit	Either / Or	Either / Or – changes over time	Both	Both – limited time
Team structure within organizational Unit	No details available – tendency towards more fix structures	N/A as no different organizational units	N/A as no different organizational units	Flexible team structure – Employees shifting between units

	Structural ambidexterity	Sequential ambidexterity	Contextual ambidexterity	Temporal ambidexterity
Dynamic capabilities	Separated sensing/ seizing units via resource-linking capability	Sensing and seizing managed via focus-shifting capability	Sensing and seizing managed via context-shaping capability	Separated sensing/ seizing units via resource-linking capability, temporal focus-shifting capability

Source: Birkinshaw et al. (2016), Hoessler and Carbon (2022), and Holotiuk and Beimborn (2019).

With the help of dual structures, such as separating by setting up business units dedicated to either exploration or exploitation, the two competing activities can be balanced when following the concept of *structural ambidexterity* (Duncan, 1976; Gibson & Birkinshaw, 2004). Separated sensing/seizing units are managed via a resource-linking capability (Birkinshaw et al., 2016). When a company's focus is set to either exploration or exploitation over a more extended period and then shifted consecutively on a company level, companies pursue *sequential ambidexterity* (Gupta et al., 2006; Simsek, 2009). Sensing and seizing are managed via a focus-shifting capability (Birkinshaw et al., 2016). Companies enabling employees to split their time between exploration and exploitation choose *contextual ambidexterity* by integrating exploration and exploitation. There is no focus on exploration or exploitation (Gibson & Birkinshaw, 2004). Sensing and seizing are managed via context-shaping capability (Birkinshaw et al., 2016). *Temporal ambidexterity* combines structural, sequential, and contextual ambidexterity as selected employees shift to the digital innovation lab for a limited time and focus on exploration during this time. With this flexible team structure, employees return to their original business and concentrate again on exploitation (Holotiuk & Beimborn, 2019). Separated sensing/seizing units are managed via resource-linking and focus-shifting capability for employees shifting between units (Birkinshaw et al., 2016). Overall, there is no universal right decision. Instead, the leadership is responsible for placing the company in a suitable composition of exploration and exploitation to gain a competitive advantage (Keller & Weibler, 2015). This also highly depends on the context, such as industries and other environmental factors (Bell & Hofmeyr, 2021; Havermans et al., 2015; Wasono & Furinto, 2018). Empirical research proves a positive relation between ambidexterity and superior company performance (Brix, 2019), and leadership is required to create or reinforce ambidextrous behavior (Alghamdi, 2018; Bell & Hofmeyr, 2021; Jansen et al., 2008; Keller & Weibler, 2015; Lin & McDonough III, 2011; Mueller et al., 2020; Probst et al., 2011). Leadership in this paper implies "lead[ing] oneself and human communities […] into an innovative and creative future in open and complex situations under unclearly defined and dynamic conditions" (Faix et al., 2020, p. 61). Aside from motivating people to change, providing direction and vision and aligning people are leadership responsibilities (Kotter, 2017). This definition also considers the requirements and specifics of current times (Faix et al., 2020). According to (Samimi et al., 2020, p. 3), leadership includes "managing conflicting demands," implicating a connection to ambidexterity.

Ambidexterity in digital transformation

IT ambidexterity is a research stream covering a portion of ambidexterity in digital transformation (Park et al., 2020). It does not cover the full scope of digital transformation. Instead, it is limited to the paradoxes of IT transformations, such as IT portfolio decisions or IT architecture (Gregory et al., 2015) and infrastructure changes (Montealegre et al., 2019). In addition, IT ambidexterity applies the described concepts of structural, sequential, or contextual ambidexterity to the IT context (Park et al., 2020). Nevertheless, those concepts are limited to the technology character and purpose of IT without considering the full intent of digital transformation. For example, Park et al. (2020) refer to digitization as not covering the aspects of digital transformation. Individually, sequential ambidexterity (Smith & Beretta, 2021) and contextual ambidexterity (Hoessler & Carbon, 2022; Hron et al., 2021) are only sporadically brought into the context of digital transformation. Smaller companies, mainly, have limited resources and, therefore, pursue a path of digital transformation with different focus areas over time (Bjoerkdahl, 2020). This concept can be indirectly linked to sequential ambidexterity. Asking leaders to provide the context for employees to focus on suitable activities can be indirectly mapped to contextual ambidexterity (Göbeler et al., 2020; Hoessler & Carbon, 2022; Hron et al., 2021).

The highest popularity within the digital transformation context receives structural ambidexterity, mainly focusing on digital innovation labs (Holotiuk, 2020; Raabe et al., 2020) or separating the traditional from the new digital business (Kaiser & Stummer, 2020). Structural ambidexterity is described as a concept especially applicable to incumbent companies, allowing them to continue the existing but also step into the digital world (Schiffer, 2021). In addition,

we see the closely associated concept of temporal ambidexterity due to its origin in the digital context as a focus area (Holotiuk & Beimborn, 2019). This paper focuses on structural ambidexterity as organizational structures are identified as one major challenge of digital transformations of incumbent firms (Mirković et al., 2019). We identified the literature connecting digital transformation with ambidexterity, mainly focusing on structural ambidexterity, and analyzed the existing research. We selected "Web of Science" as the scientific platform using the databases CPCI-SSH , CPCI-S , SCI-EXPANDED , SSCI for our research. "Digital AND ambidex*" is the search topic we used to identify research connecting digital transformation and ambidexterity. As digital transformation is an emerging research field that has started growing in the last 15 years (Hoessler & Carbon, 2022; Pihir et al., 2018), we limited our search to 2008-2023. Our initial search results included 193 articles. After eliminating the non-accessible ones, we reviewed 174 articles. Our exclusion criteria removed articles with no digital context, different focus areas, no or minimal ambidexterity qualitative context, limited to technologies, no business context, and not related to incumbent companies. The result was 23 articles. Details can be found in Figure 1.

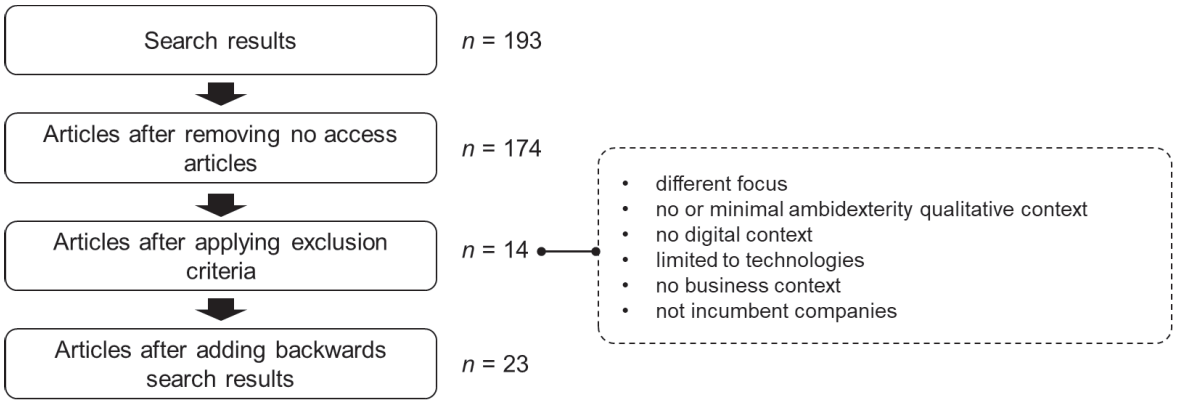

Figure 1. Process of literature review

Combining the traditional understanding of separating exploration/exploitation activities via organizational structures as structural ambidexterity, we categorized the 23 articles into four categories:

1) Not distinguished between exploration/exploitation in digital business (7).
2) Fuzzily distinguished exploration/exploitation in digital business (7).
3) Clear distinguished exploration/exploitation in digital business (4).
4) N/a; no details provided (5).

The comparison of the categories shows that most of the existing research either provides no details, neglects the differentiation of exploration/exploitation in digital business, or provides only minimal information about the separation. Only 4 out of 23 analyzed papers clearly distinguish between exploration/exploitation in digital business. Here, the authors clearly state the separation of exploration from exploitation in digital business (Brauer et al., 2021; Holotiuk & Beimborn, 2019; Hron et al., 2021). An example of providing a low level of distinguishing between exploration/exploitation in digital business is the work of Hess et al. (2016). Hess et al. (2016) recommend separating new digital products and integrating hybrid products related to the core business in the core organization. Sia et al. (2021) and van den Buuse et al. (2021) extend the scope from product to offerings and propose separating them. Nevertheless, there is no indication of how incremental or radical the new offerings are. From a process perspective, Sia et al. (2021) provide clear guidance to integrate automation activities into the core organization. This aligns with the literature review of Hoessler and Carbon (2022), who classified the automation of existing processes as exploitation. In addition, existing literature suggests considering innovation stages (Hellmich et al., 2021), focus areas (Jöhnk et al., 2020), and levels (Jaspert & Ebel, 2022). 7 out of 23 papers do not distinguish between exploration/exploitation in digital business. Even if a lot of the research does not label it structural ambidexterity (Schiffer, 2021), research is showing that companies separate new digital businesses with the help of separate business units (Sund et al., 2021) or sub-companies (Kaiser & Stummer, 2020). So-called digital units or digital innovation labs are separated to conduct digital innovations. Nevertheless, there is no distinction between exploration

and exploitation within digital innovation (Åkesson et al., 2018; Göbeler et al., 2020; Holotiuk, 2020; Kaiser & Stummer, 2020; Schiffer, 2021; Smith & Beretta, 2021; Sund et al., 2021). A case study conducted by Göbeler et al. (2020) shows problems arising from separating all digital activities. In addition to the four categories mentioned above, we analyzed the literature to see if they mention details on how organizational structures can change over time. It is brought up by some authors that a digital innovation hub can be a temporary separation and dissolved over time (Åkesson et al., 2018; Göbeler et al., 2020; Hron et al., 2021; Svahn et al., 2017). Also, we identified that more than half of the existing studies focus on one industry. As digital transformation affects a wide range of industry sectors (Hess et al., 2016; Kane et al., 2015), we see this as a limitation and recommend a study not limited to one specific sector. Table 2 summarizes the results of our literature research on digital transformation and structural ambidexterity.

Table 2. Literature research on digital transformation and structural ambidexterity

	Number (%)	**Details and sources**
Not distinguished exploration/exploitation in digital business	7 (30%)	Everything related to digital separated (Åkesson et al., 2018; Göbeler et al., 2020; Holotiuk, 2020; Kaiser & Stummer, 2020; Schiffer, 2021; Smith & Beretta, 2021; Sund et al., 2021) but closely connected to core organization (Smith & Beretta, 2021) or integration of exploration outcome (Holotiuk, 2020) Case studies show problems arising from separating all digital activities (Göbeler et al., 2020)
Fuzzily distinguished exploration/exploitation in digital business	7 (30%)	Hybrid products related to core business integrated into the core organization and new digital products are separated (Hess et al., 2016) Automation core business (Sia et al., 2021), new digital offerings separate unit (Sia et al., 2021; van den Buuse et al., 2021) Renewal and refinement units (limited to digital platforms) (Montealegre & Iyengar, 2021) Different set-ups depending on the innovation stage (Hellmich et al., 2021), focus areas (Jöhnk et al., 2020) and levels (Jaspert & Ebel, 2022)
Clear distinguished exploration/exploitation in digital business	4 (17%)	Exploration in a separate unit (Brauer et al., 2021; Holotiuk & Beimborn, 2019; Hron et al., 2021; Raabe et al., 2020) but drift to exploitation (Hron et al., 2021)
N/a; no details provided	5 (22%)	No details overall on the responsibilities of separate unit (e.g., innovation hub) vs. core (Kronblad et al., 2023; Soto Setzke et al., 2023; Svahn et al., 2017) No separation (Gastaldi et al., 2018; Oberländer et al., 2021)
Total	*23*	
Change over time	4 (17%)	Dissolvement of innovation hub (Åkesson et al., 2018; Göbeler et al., 2020; Hron et al., 2021; Svahn et al., 2017)
No details on change over time	19 (83%)	No details on changes in separate hub (Brauer et al., 2021; Hellmich et al., 2021; Hess et al., 2016; Holotiuk, 2020; Jaspert & Ebel, 2022; Jöhnk et al., 2020; Kaiser & Stummer, 2020; Kronblad et al., 2023; Montealegre & Iyengar, 2021; Raabe et al., 2020; Schiffer, 2021; Sia et al., 2021; Smith & Beretta, 2021; Soto Setzke et al., 2023; Sund et al., 2021; van den Buuse et al., 2021)
Total	*23*	
One industry	13 (57%)	(Åkesson et al., 2018; Gastaldi et al., 2018; Göbeler et al., 2020; Hron et al., 2021; Jaspert & Ebel, 2022; Kaiser & Stummer, 2020; Kronblad et al., 2023; Schiffer, 2021; Sia et al., 2021; Smith & Beretta, 2021; Sund et al., 2021; Svahn et al., 2017; van den Buuse et al., 2021)
Multiple industries	9 (39%)	(Brauer et al., 2021; Hellmich et al., 2021; Hess et al., 2016; Holotiuk, 2020; Holotiuk & Beimborn, 2019; Jöhnk et al., 2020; Oberländer et al., 2021; Raabe et al., 2020; Soto Setzke et al., 2023)
Unclear	1 (4%)	(Montealegre & Iyengar, 2021)
Total	*23*	

METHODOLOGY AND RESEARCH METHODS

The underlying method to answer our research question is based on Mayring (2001) and enriched with guidance provided by Braun and Clarke (2006) for code development. Figure 2 displays the method used in the present paper.

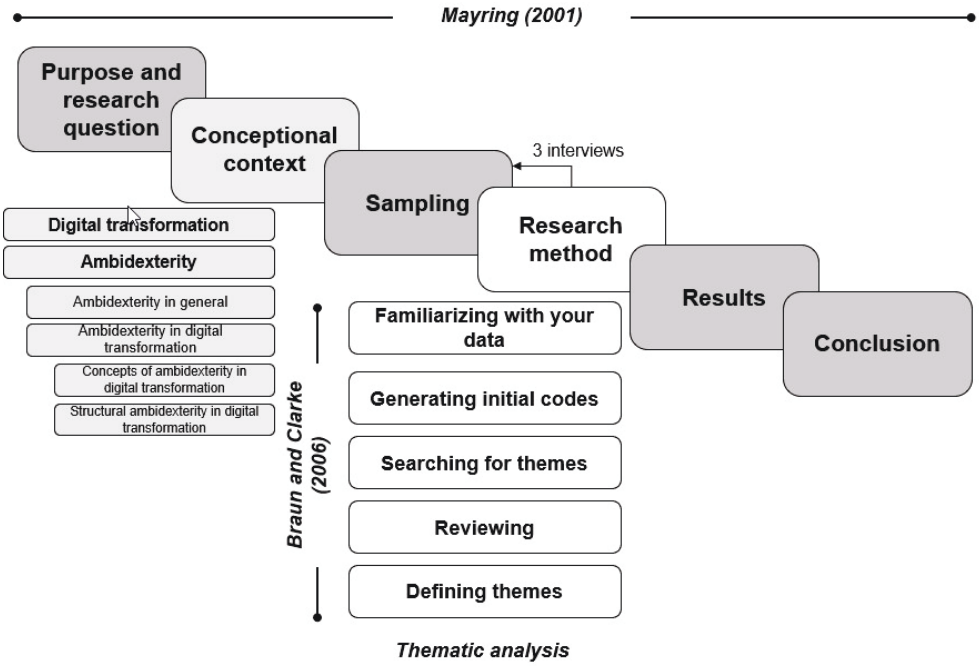

Figure 2. Research design for a qualitative study
Source: Mayring (2001) and Braun and Clarke (2006).

Our study has the *purpose* of addressing the research gap on how to overcome organizational challenges (Smith & Beretta, 2021) and master structural ambidexterity in digital transformations. Therefore, we provide guidance for incumbent companies on achieving structural ambidexterity in digital transformations. Therefore, one of our two research questions is: How can incumbent companies apply the concept of structural ambidexterity to navigate digital transformation? In our study, we investigate exploration/exploitation separation and its driving factors, as well as how to separate or integrate digital/core business. The baseline for those focus areas in our research is the literature research illustrated in Table 2. Explained by the necessity of leadership to achieve ambidexterity (Alghamdi, 2018; Bell & Hofmeyr, 2021; Jansen et al., 2008; Keller & Weibler, 2015; Lin & McDonough III, 2011; Mueller et al., 2020; Probst et al., 2011) we also consider needed strategic leadership activities in our research objective. Related to this, our second research question is: What elements of strategic leadership do leaders in incumbent companies need to implement when navigating digital transformation considering structural ambidexterity? After defining the purpose and research question, as a second step, we provide insights into the *conceptional context* by providing definitions of the affected research streams digital transformation and ambidexterity. In addition, we combine the two topics, focusing on structural ambidexterity following our research questions.

Sampling: One aspect of our purposive sampling (Etikan et al., 2016) was ensuring our 33 interview partners work in incumbent companies, not digital startups (Misoch, 2019). Another characteristic of the expertise of the selected participants is the job title. Our selection criteria of being in a position related to digital transformation in an incumbent company in the last two years ensured familiarity with the research topic. Different hierarchy levels provide a heterogeneous sample for the leadership aspects we address with our research. In addition, we identified that a perspective on multiple industries is beneficial, so we clustered our interview partners using the Global Industry Classification Standard. Interviewing study participants from different industries increases the robustness and credibility of our findings as we allow a holistic view considering multiple industries. This is especially relevant due to the wide-spread impact of digital transformation on multiple industries. In addition to industry experience, we included researchers or lecturers in our study to cover the research side. Split by the variables sector experience and hierarchy levels, Table 3 shows the composition of our interview partners.

Table 3. Study participants

Variables	Variable description	Number (%)
Sector experience	Consumer Discretionary Sector (Automobiles & Components)	5 (15%)
	Healthcare (Pharmaceuticals, Biotechnology & Life Science)	5 (15%)
	Industrials (Electrical Equipment, Machinery, Transportation, Construction and Engineering)	10 (30%)
	Materials (Chemicals, Construction Materials)	3 (9%)
	Information Technology (Technology Hardware & Equipment, Software & Service)	4 (12%)
	Consultancy	3 (9%)
	Research	3 (9%)
	Total	*33*
Hierarchy level	Senior Executive	3 (9%)
	Vice President	3 (9%)
	Director	7 (21%)
	Head of	10 (30%)
	Manager	4 (12%)
	Consultant	3 (9%)
	University Professor	3 (9%)
	Total	*33*

Research method: While research on ambidexterity and leadership often uses a quantitative research design (Baškarada et al., 2016), we decided to use a qualitative research design followed by a thematic analysis (Braun & Clarke, 2006). As we addressed the research gap in in-depth detail on structural ambidexterity in digital transformation, the explorative research design offers this possibility. In addition, as there is still limited research combining the individual research streams of digital transformation and structural ambidexterity (Holotiuk & Beimborn, 2019; Jaspert & Ebel, 2022), the explorative research design fits our study requirements. After coding each batch of three interviews, we examined whether we accomplished code saturation (Hennink et al., 2017). We reached code saturation after 11 rounds of reviewing three interviews in a batch, which resulted in 33 interviews. Driven by our sample size and as we suggest further testing our study results with a quantitative or longitudinal study, our research can be treated as a pilot study (van Teijlingen & Hundley, 2001). To increase the robustness of our study, one researcher did the initial coding of the transcripts, and the second researcher performed an inter-coder check (Mayring, 2014). The research partner acted as supervisor with unlimited access to all material related to the research. The second reviewer confirmed the suggested coding and conclusions. To ensure consistency (Misoch, 2019) we conducted semi-structured interviews as a qualitative research approach. Based on the main findings of our literature research on digital transformation and structural ambidexterity, our open-ended questions focused on separation/integration in digital transformations of incumbent companies as well as associated leadership aspects and what could trigger changes over time. The software MicrosoftTeams allowed us to interview study participants globally. Between May 2023 and July 2023, the first author conducted all interviews using Microsoft Teams©. To be able to familiarize with the data, we transcribed all interviews. MicrosoftTeams enabled the first raw transcription which we imported into MAXQDA (VERBI Software, 2021). The naturalized/ intelligent verbatim approach helped us generate easily readable transcripts from the raw transcripts (McMullin, 2023). We used timestamps to connect the transcripts with the recorded audio files from Microsoft Teams and anonymized all data. The steps described in Figure 2 following "Familiarizing with data" are described in the following section.

RESULTS

Our literature research on organizational structures, displayed in Table 2, served to set the level of abstraction. We are therefore focusing in our thematic analysis on how the separation is done (exploration/exploitation, digital/core business), driving factors behind the separation, changes over time, and aspects of temporal ambidexterity. The guidance for code development provided by Braun and Clarke (2006) is the baseline to answer our research question. Appendix (Tables 4, 5, and 6) displays the details of our process, from our initial coding to defined themes (Braun & Clarke, 2006). To enhance our

research from a scholarly rigor perspective, we applied the procedure described by Gioia et al. (2013) for code clustering and illustration. As a first step, we generated initial codes, which were revised by either rewording, summarizing, or deleting. The result of this process step is 1st order concepts. Those are reviewed and combined in 2nd order themes (Gioia et al., 2013). As a final step, we aggregated all 2nd order themes into aggregated dimensions (Gioia et al., 2013). Figure 3 visualizes the summary of our results.

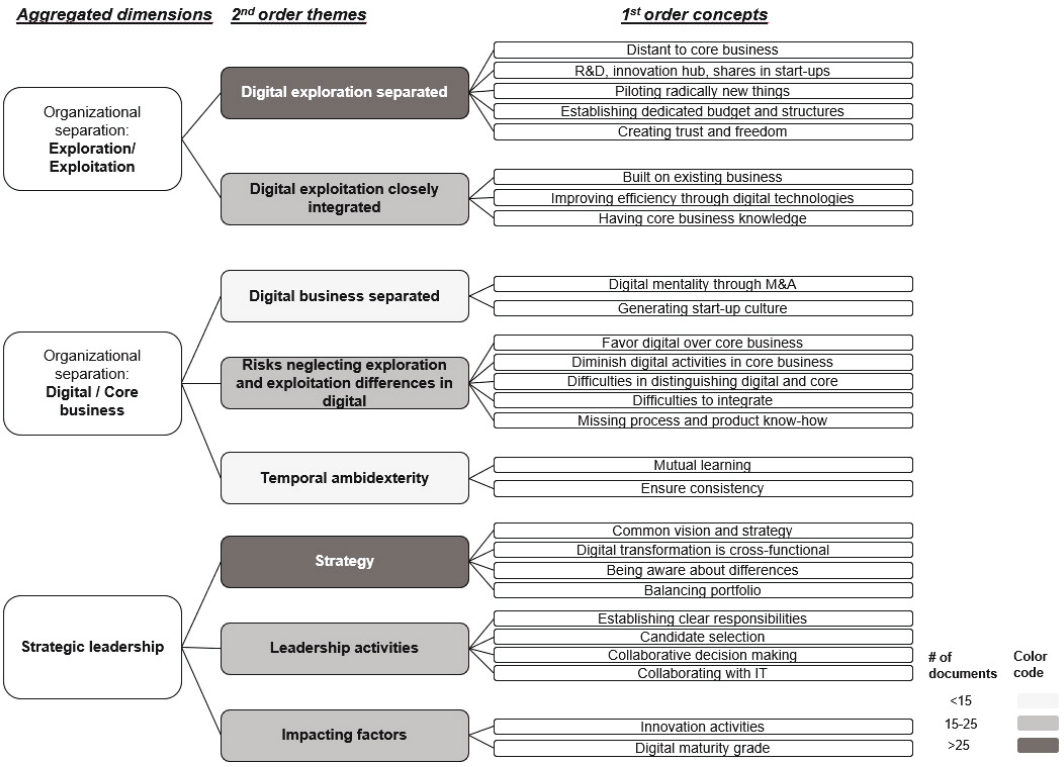

Figure 3. Structural ambidexterity in digital transformation and strategic leadership aspects

Organizational separation: Exploration/Exploitation

Following the literature on ambidexterity (March, 1991), structural separation of exploration and exploitation is one of the main concepts to become ambidextrous (Benner & Tushman, 2003; Duncan, 1976; Gibson & Birkinshaw, 2004; O'Reilly III & Tushman, 2013). Separation is also the most addressed concept in the context of digital transformation. Based on our interview results, we provide insights on when to separate and integrate digital business in terms of exploration and exploitation and the details explaining the rationale.

Digital exploration separated: Our study results show that one decision criterion to separate or integrate is how close the digital business is to the core business. Our interview partners suggest that if the digital exploration is *distant to the core business,* separate it. With these distinguishing criteria of closeness to business, we can provide further details on the differentiation made in the literature of new digital products (Hess et al., 2016) and offerings (Sia et al., 2021; van den Buuse et al., 2021). One of our interview partners states it with the following words: "Running digital initiatives, more on the exploration area, [***] do[ing] something fundamentally different, doing that through a separate group [***] or even legal entity." The recommendation is even to place the separate digital exploration unit geographically distant. Separate units can be carved out internally within a *Research and Development organization*, an *exploration (digital) innovation hub,* or a *think tank* for explorative activities. All those set-ups allow employees to focus on explorative digital activities. Aside from internal separation, externally *buying shares of startups* also enables incumbent companies to have digital exploration activities separated. The activities of a separate digital innovation unit are characterized by *piloting radical new things*. According to our interview partners, the separation allows "try[ing] something completely new" and "always keep[ing]

the pipeline of ideas filled" by scouting new technologies. We also found out that the aspect of piloting by "start[ing] small and [***] try[ing] very different things" is needed to think outside the box and possibly within a separate unit.

When separating, our interview partners suggest that incumbent companies *establish dedicated budgets and structures*. Having a dedicated budget was especially important as, without a budget, improving existing topics wins over digital exploration due to short-time prioritization and quicker and more known returns. As the budget is often allocated through performance achievement measured by KPIs, digital exploration units would risk not getting the needed funding. We suggest implementing different processes and structures in a separate digital exploration unit to ensure the needed speed and flexibility. Ideas brought up are flat hierarchies or product owner structures instead of hierarchical organizations. Associated with different processes is the need to create *trust and freedom*. One of our interview partners described it with the following words: "Create the atmosphere, the room for that explorational task [***], give the freedom to the people on different levels to work on the future." It is essential not to overwhelm employees with too much guidance and control mechanisms, especially in the early stages of exploration. Instead, leaders should create a safe space to explore new solutions without fear. The separation of digital exploration enables leaders in incumbent companies to develop that trust and freedom and not get wound up in the follow-up culture of the core business.

Digital exploitation closely integrated: Following the same logic as for separation, our study results suggest not separating but instead integrating digital exploitation closely connected to the existing business. When, for example, digitizing the existing product portfolio or automating processes with the help of digital technologies, the baseline are the existing products or processes of the incumbent company. Digital exploitation is *built on the company's existing business*. Therefore, integrating digital exploitation is recommended by our interview partners. One study participant summarizes this with the following statement:" [It] would not make [***] sense to separate this from each other structurally. You need the process expertise and the digitalization expertise in this field [***] and you must bring this as closely together as possible and not separate this:" Detailed examples are integration in business units via centralized departments or even closer to the day-to-day business via support functions or directly in the business. This integration and close connection to the existing core business is essential to understanding processes to *improve efficiency through digital technologies*. Also, as digital technologies are one enabler to more efficient processes, integration can be explained by the business ownership to improve. Even if there is a high priority on improving internally incrementally, as one interview partner stated: "Make my daily work better and not do[ing] something completely radical," it is not limited to internal aspects but also addressing product improvements. The necessity of *having core business knowledge* is one major result in our study explaining the recommendation for integration. Our interview partners further distinguish in process, product, and customer knowledge. It can be described in the words of one of our study participants: "The functional experience has a more important role because [***] we focus on the current status and [***] you're discussing on a process level. You need to know how the processes are built, what are some standards [***] and what are the pain points." Also, having customer relationships and knowing how the company engages with customers is important and explains the integration.

Organizational separation: Digital/Core business

Aside from separating exploration and exploitation in digital transformations, our literature research shows that some authors refer to a separation of all digital activities (Åkesson et al., 2018; Göbeler et al., 2020; Holotiuk, 2020; Kaiser & Stummer, 2020; Schiffer, 2021; Smith & Beretta, 2021). Nevertheless, the existing research lacks details here, and our study results provide insights on occasions supporting this separation and associated risks.

Digital business separated: Our study shows that one reason for separating all digital activities from the core organization is to build up a *digital mentality through merger & acquisitions (M&A)*. One interview partner explained it in the following words: "That's why we decided to use the resources from outside, use startups [and] disruptive technologies." More specifically, startups in the digital area are often acquisition targets to bring a digital mindset into an incumbent company. Similar to building up a digital mentality through a merger, M&A is the idea of separating a unit to *generate a startup culture internally*. Benefits related to the digital context are that those startups within an incumbent company can be more flexible, agile, dynamic, and faster. All requirements are often mentioned in the context of fast-changing technologies. The separation explains how incumbent companies can focus on necessities specific to the digital context they have not been growing with.

Risks neglecting exploration and exploitation differences in digital: Building up a digital mentality through M&A and generating a startup culture are reasons we identified justifying separating all digital activities. Nevertheless, our study results show, similar to the work of Göbeler et al. (2020), that there are risks associated with this kind of separation. One

risk with separating digital from the core business is that incumbent companies could *favor digital over core business*. Digital is often associated with something new, fancy, and something people want to belong to. Not educating people enough about what digital means, especially the link to the core business for digital exploitation, can lead to the fact that the digital unit is favored over the core business. Some injustice could arise as the core business feels like being alone and responsible for the company's profit, and digital is seen as the part of the company that is getting investments such as new office spaces. One of our study participants summarizes this: "How do you feel belonging to the legacy part, to the classic part? While the others are the ones getting the invest[ments] and the others are [***] asked for more EBIT to support them? [***] You can either be on the sunny side [and] spend the money, or you can [***] be on the maybe classical side." Also, Oberländer et al. (2021) describe the tensions between the core business and the digital business. As mentioned above, we identified that digital exploitation needs to be closely connected or integrated into the core business. If the separation is now based on digital/core business, we identified a risk of *diminishing digital activities in the core business* due to the separation. Without a close connection, knowledge about new technologies and mindsets cannot be transferred to the core organization, resulting in increased efficiencies. One of our interview partners condensed it by saying: "If you have a digital hub where everything digital happens, the old company will stay in the non-digital world." In addition, separating all digital activities could lead to a focus on more radical new activities, and no digitalization activities are performed for the existing business, neglecting the ambidexterity concept. We also identified that in the current stage of having a lot of digital technologies readily available, with the speed of new developments increasing and somehow already integrated into the business, we see *difficulties in distinguishing digital and core* for a separation. The non-digital and digital world continuously merges, and as one study participant said: "Nowadays, digital is a necessity. I can't imagine one workshop where you try to develop your existing portfolio where you don't think about incorporating digital." Therefore, we see a risk in drawing a clear line between digital/core business, especially the more advanced a company is in its digital transformation.

Another risk associated with *difficulties distinguishing digital from core* is that scaling up new digital ideas, such as new products or business models, does not require to be ringfenced anymore but instead requires a sales organization and more structures. Therefore, our interview partners stated the necessity of integrating digital at one point to gain efficiencies and grow the business. One study participant summarizes the thoughts of this risk: "If this is too much disconnected from the core business, tr[ying] to exploit [***] and try[ing] to make things more efficient, then you have [a] challenge." This risk becomes even more relevant for digital exploitation as the digital unit could explore technologies that are not feasible for the use cases. *Integration into the core business* is seen as a challenge if the core business needs are not addressed. This risk is closely connected to the risk of *missing process and product know-how*. If a digital unit is separated without or low interaction with the core business, there is a lack of the needed process and product know-how from experienced employees. One interview partner explained this aspect: "They might not be that good [in] being creative or experimenting with technology or building prototypes. [Instead] they are good in having a product or a service and scaling that, dealing with customers, having operational sales divisions and customer exchange. This [***] explains why in acceleration it is better to be closer to existing business again." Separating all digital activities could lead to the fact as one study participant states: "That you create something that the market is not looking for."

Temporal ambidexterity: Temporal ambidexterity is an aspect brought up less in the interviews; nevertheless, it was mentioned by multiple participants and justifies that we include it in our results. We follow the definition of temporal ambidexterity given in the Literature review section. With a flexible team structure, employees work in the digital innovation lab for a limited time, and employees return to their original business (Holotiuk & Beimborn, 2019). The study of Holotiuk and Beimborn (2019) assumes that the digital innovation lab is only responsible for exploration. Following this understanding, our interview partners see temporal ambidexterity as helpful for *mutual learning*. On the one hand, it helps mitigate the risk of difficulties integrating innovations later. The words of one of our interview partners illustrate this: "I think the success of the exploration also depends on if the ideas can be brought back to the process. If they can be brought to the exploitation. So maybe it would help to have colleagues [***] working on already existing processes that they get some time, [for example] one day a week time to work in the innovation hub." On the other hand, assuming temporal ambidexterity can also be applied to the separation of digital/core business, this can help foster mutual learning in terms of process and product knowledge for the employees in the digital lab, but also digital skills and work methods for employees located in the core business. Again, this mitigates the risks of missing process and product know-how and diminishes digital activities in the core business. Nevertheless, it was mentioned multiple times that leaders must *ensure*

consistency in flexible structures. This is explained by having a stable core team to ensure processes are known, and it is not always a starting from scratch.

Strategic leadership

As it is a leadership challenge to enable the necessary change in digital transformations (Hensellek, 2020) and reinforce ambidextrous behavior (Alghamdi, 2018; Bell & Hofmeyr, 2021; Jansen et al., 2008; Keller & Weibler, 2015; Lin & McDonough III, 2011; Mueller et al., 2020; Probst et al., 2011), we will cover strategic leadership topics associated with structural ambidexterity.

Strategy: Our study results show that a clear *company vision* and how digital transformation is embedded is crucial. The vision makes the targeted future of the company transparent, including aspects such as where the company wants to be active and how the company wants to be seen. The strategy and road map are associated with a vision, detailing how the company intends to achieve the target picture. This also includes organizational structures and innovation activities exploration and exploitation. One interview partner states: "Have a clear vision of where they [want to] go and what they want, [for example] the different steps they need to take in the exploration and in the exploitation to get there and then keep on track [of] both" as important. Our study results emphasize that digital transformation activities need to be aligned with the corporate and digital transformation strategy covering exploration and exploitation based on the vision. Our interview partner sees the top management responsibility as the following: "C-level needs to provide some kind of strategic framing. So simply to avoid that [***] innovation [focused employees] are working on topics that are not in line with the strategic route of the company." In addition, we want to highlight that transparency and continuous communication of the vision and strategy is crucial. Aside from *having a common vision and strategy, cross-functional collaboration* is vital in digital transformation. Having diverse teams and collaborating with different functions and departments to pursue the strategy and vision was mentioned as relevant. The fast-changing character of digital technologies forces companies to not rely on individuals but instead cross-functional teams to leverage the most of it. Closely associated with ambidextrous leadership, our study results provide evidence about the necessity of *awareness about differences of exploration and exploitation* in the top management. Different leadership is required for exploration and exploitation; not everything in digital should be treated the same way. One study participant phrased it like this: "I think it's awareness and also teaching the organization that there are different things and not digital is digital." Aside from knowing the difference, keeping in mind that both activities are relevant for long-term success and, therefore, achieving a long-term balance was emphasized as an essential topic for top management. We can connect this aspect to the vision and strategy as top management should integrate both activities. This can be summarized with the words of one of our interview partners: "A leader must be conscious or must know for himself that these two tasks that he has need to be balanced." Closely associated with this is the 1st order concept *balancing portfolio*. Regarding balancing exploration and exploitation in digital transformation, our interview partners referred to balancing activities with the help of portfolio management. This means ensuring that activities in digital transformation related to exploration with a higher level of risk are more future-oriented while also exploiting the existing business with the help of digital technologies. The innovation portfolio should be composed of both. Exploitation activities ensure the current product portfolio continues to deliver a constant cash flow, which can be allocated to invest in exploration activities. A balanced portfolio is seen as crucial, as one interview partner described with the following words: "If you just exploit it and don't explore, you will die from lack of innovation. If you just explore, not exploit, you will starve." Our interview partners combined this recommendation with the product life cycle and connected the approach with the Boston Consulting matrix (BCG). One study participant explained it that way: "If you take the classical BCG matrix [***], then you [***] would consider the stars or sometimes even the cash cows to be your products which are in your portfolio really established and you still have to work on these products to improve them and to still earn money with them [***]. And [***] it's more the direction or the positioning of these question marks to be considered as the more innovative products where [***] exploration activities will happen in [***] your portfolio."

Leadership activities: Aside from creating a strategic framework, we identified further leadership activities as relevant for structural ambidexterity in digital transformations of incumbent companies. Our study results indicate that leaders need to establish *clear responsibilities*. This includes being clear about what precisely exploration and exploitation mean. Especially in cases of separation, the scope and task of the separate unit need to be clearly defined and communicated to avoid the feeling of injustice. Establishing leaders with clear job descriptions for separate entities supports this suggestion. Closely connected to responsibilities, top management must ensure they *select fitting candidates* for exploration and exploitation responsibilities in digital transformation. One study participant explains this with the words: "Leadership

needs to identify what people are [***] best for and put the right people in the right [***] position [***] or organization." Different skill sets and personnel preferences are required on the individual employee level, especially when it comes to exploration and exploitation. It can be further detailed with the words of one of our interview partners: "[Who] is very innovative should be focusing on explor[ing] things and the ones that are very structured, of course, you need to be a little bit innovative [***] for exploitative things, but if you are a researcher, for example, that isn't the best choice for that." Of course, a mindset that fits the digital context should also be considered for candidate selection. Knowing that most leaders similar to employees have slight preferences for exploration or exploitation, our interview partners suggest *collaborative decision-making* as a countermeasure to foster ambidexterity. Based on the study results, we suggest having a sounding board and increasing diversity in the leadership team to support ambidexterity. One interview partner explained that "[the leader] needs to find where he is good in and needs to get the others [***] helping him to do the other thing." Connected to skill set, candidate selection, and cross-functional projects, we identified the importance of *collaborating with IT*. Due to the nature of digital transformation in digital technologies, some digital literacy is crucial and involves experts from the IT department.

Impacting factors: We identified in the Literature review section that only a view paper focus on changes over time in terms of separation and integration (Åkesson et al., 2018; Göbeler et al., 2020; Hron et al., 2021; Svahn et al., 2017). We have been focusing on this aspect in our research to gain more insights. Our interview partners argued that exploration and exploitation should not be isolated in the sense of incremental and radical innovations. Instead, an innovation can be looked at as having different *innovation phases*. The innovation can start with an exploration phase and then mature with exploitation at one point. Therefore, we recommend establishing a minimum level of collaboration, especially when separating exploration and when it is close to the core business. One study participant summarized it with the following statement: "[There] [s]hould be a[n] [***] intense link to the exploitation organization, that the transfer is fast because otherwise, the benefit out of the exploration [***] is maybe not that big." Therefore, we identified that the shift from exploration to exploitation can be a trigger to integrate activities into the core business. In addition, we identified the maturity grade incumbent companies within digital transformation as an impacting factor on separation and integration decisions. The *digital maturity grade* is a trigger point to rethink separation decisions. This can be connected to the three-phase approach we described in the Literature review. Similar to the guidance we provided in generating a startup culture, at the beginning of the digital transformation, a separation of all digital activities is recommended based on our study results. One of our interview partners explained this with the words: "In the beginning, it was very [***] central because that knowledge did not exist in the organization." So, generating digital literacy and creating first successes can help establish a digital mindset and acceptance with the company by having a dedicated separate unit. Depending on the closeness of the core business, the more mature companies become, the more pull for digital improvements for the core business is generated, which is a trigger to dissolve the digital hub.

Connecting to the color coding displayed in Figure 3, we identified that the traditional way of structural separation focusing on exploration and exploitation is associated with most counts. The comparable lower number of counts related to "Digital business separated" and the medium number of counts linked to the risks let us conclude that separating all digital activities can be recommended at certain times as a solution, but leaders need to be aware of the risks. As the risks are often closely associated with exploration and exploitation, which are different activities requiring different skills and leadership, this justifies the importance of the traditional ambidexterity concept. Therefore, we recommend that leaders monitor the impacting factors and risks to make a suitable decision on separation.

DISCUSSION

As the significant challenge of incumbent companies in digital transformation is related to organizational structures (Bjoerkdahl, 2020; Mirković et al., 2019) and limited in-depth research on organizational ambidexterity, our study answers this research gap. Our research addresses the lack of details on separation by investigating exploration/exploitation separation, its driving factors, and digital/core business separation. Figure 4 illustrates our main findings regarding separation and integration in a matrix. As our literature research in Table 2 illustrates, most authors do not distinguish between exploration/exploitation in digital transformation or provide only minimal details. Questioning our 33 interview partners enabled us to generate deeper insights and advance the research. We identified that the closeness of the digital activities to the core business and whether the activities are related to exploration or exploitation should drive the decision to separate or integrate those activities. We recommend separation if incumbent companies set an exploration focus for

digital activities that are far from the core business. Concrete examples include a Research and Development organization, an exploration (digital) innovation hub, or a think tank for explorative activities. Separating distant digital exploration activities enables companies to ensure freedom, establishing different processes and dedicated budgets to drive digital exploration successfully. We see two options if incumbent companies target exploring digital activities but still have some closeness to the core business. On the one hand, companies can separate those activities but ensure collaboration with the core organization. On the other hand, incumbent companies can integrate those activities into the core organization but ensure enough freedom and a dedicated budget. This recommendation is based on our findings on exploration/exploitation distinguishing and closeness/distance to the core business. As the constellation of exploration of digital activities close to the core business affects both aspects, we see two options regarding organizational structures. In addition, our interview partners identified risks for integrating exploration activities closely connected with the core business, which are separated, but also recommended a dedicated budget and structures for exploration activities.

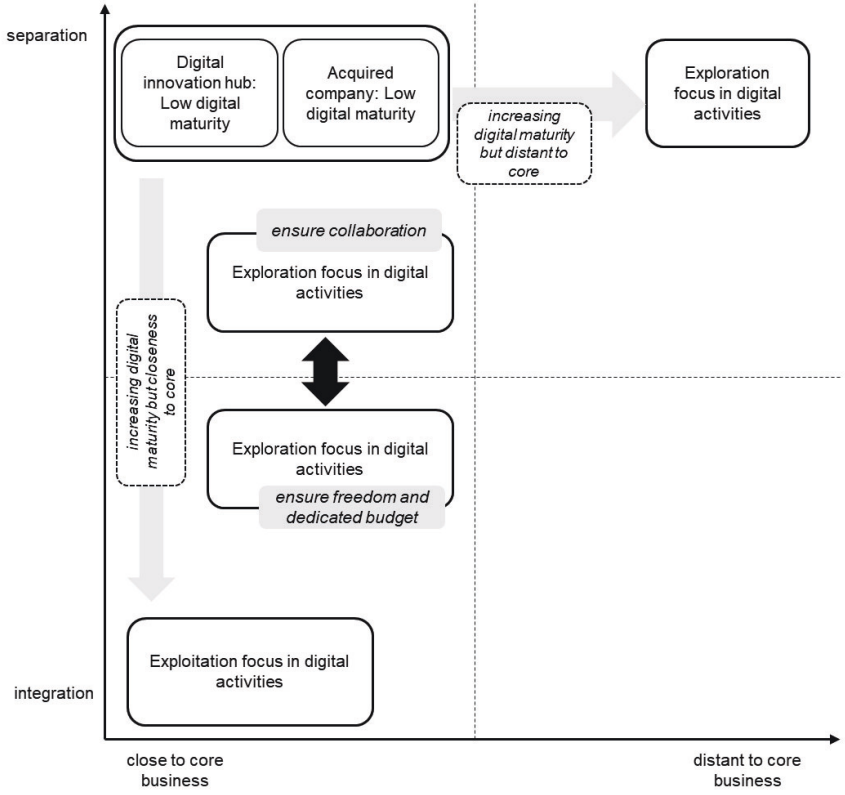

Figure 4. Decision-matrix for structural ambidexterity in digital transformation

Our interview results provide evidence of our recommendation to integrate digital exploitation activities closely related to the core business. We explain this with the need for core business knowledge such as process, product, and customer familiarity. Some authors refer in their work to the separation of digital business from the core business (Åkesson et al., 2018; Göbeler et al., 2020; Holotiuk, 2020; Kaiser & Stummer, 2020; Schiffer, 2021; Smith & Beretta, 2021; Sund et al., 2021) but also providing indicators of problems arising in this context (Göbeler et al., 2020). Based on our study results, we recommend that incumbent companies decide on separating digital and core business based on their digital maturity grade. Especially in the early stages of digital transformations, separating digital activities allows them to generate a startup culture internally. Higher flexibility, speed, and agility will enable an adaptation to the digital context. Connecting this to our guidance based on exploration/exploitation, we recommend seeing different innovation phases as trigger points for change. Moving toward integration in case of increasing digital maturity and closeness to the core business or continued separation in case of exploration focus distant to the core business.

Aside from the pure organization structure to support ambidexterity, our study addresses strategic leadership aspects that are necessary to foster ambidexterity (Alghamdi, 2018; Bell & Hofmeyr, 2021; Jansen et al., 2008; Keller & Weibler,

2015; Lin & McDonough III, 2011; Mueller et al., 2020; Probst et al., 2011). Figure 5 summarizes our recommendations on organization structures in digital transformation in a decision tree and connects it with strategic leadership aspects and a dynamic capability perspective. The baseline for organizational ambidexterity achieved through a structural separation is a cross-functional digital transformation strategy, which should be embedded in the company strategy. We identified a clear vision and strategy as crucial to guiding employees and managers. Senior leadership should be aware of the differences between exploration and exploitation, the role of those activities, and their balance in their digital transformation strategy. Using a portfolio approach to ensure balancing exploration and exploitation and then setting up organizational structures based on our recommended decision tree will foster ambidexterity in digital transformations of incumbent companies. In addition to the traditional concept of structural ambidexterity, our study includes the concept of temporal ambidexterity, which was developed in the digital context (Holotiuk & Beimborn, 2019). This could be applied in the case of separation based on digital/core business and exploration/exploitation. Nevertheless, we identified the necessity for a certain degree of consistency. Our identified leadership activities establishing clear responsibilities, collaborative decision making, candidate selection, and collaborating with IT are required to support the balance in digital transformation in incumbent companies continuously. As dynamic capabilities are often brought up in the context of ambidexterity, we incorporated related aspects based on the research of Hoessler and Carbon (2022) and Birkinshaw et al. (2016). Separation is associated with separated sensing and seizing units linked via resource-linking capability. Temporal ambidexterity adds a temporal focus-shifting capability.

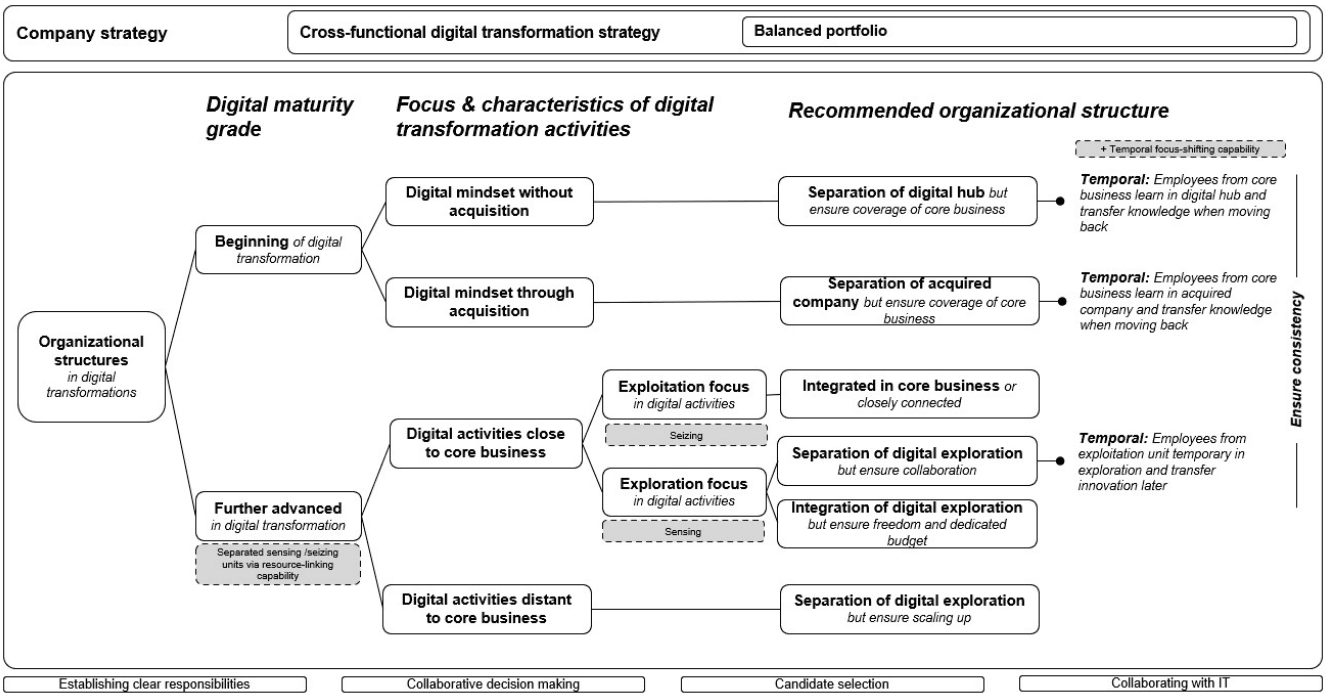

Figure 5. Structural ambidexterity in digital transformation: Decision tree embedded in a strategic framing

CONCLUSION

This study aimed to develop guidance for incumbent companies on the question of separation and integration in their digital transformations. Existing research either neglects or provides little insight into the differentiation between exploration and exploitation. Our results show the importance of understanding the differences between exploration and exploitation in digital transformation. Exploration is associated with piloting radical new things, a higher level of risk, and being more future-oriented. Exploitation is characterized by using the incumbent company's existing products or processes as a baseline. The returns are quicker and defined with a higher level of certainty. One of the major drivers for exploitation is incremental efficiency increase enabled by digital technologies. The understanding of exploration and

exploitation in digital transformation follows March (1991). Our study helps incumbent company leaders overcome the challenges posed by digital transformation using structural ambidexterity. As incumbent companies often fall behind their expectations in digital transformation, we provide with our decision tree guidance to help them evaluate which activities should be separated or integrated to capture the expected results. We also provide descriptions and examples of exploration and exploitation activities to allow practitioners to apply this in their incumbent companies. Our study enlightens incumbent companies about the crucial differences between exploration and exploitation activities in digital transformation. For instance, we clarify the distinction between piloting radical new initiatives and targeting incremental efficiency increases enabled by digital technologies. This increased transparency about different digital transformation activities helps incumbent companies avoid separation based on digital vs. non-digital business without being aware of the associated risks, such as not addressing business and customer requirements. In addition, our study helps practitioners rethink their structural set-up over time, allowing them to adapt structures as necessary based on, for example, increased digital maturity grades. As incumbent companies see organizational structures as a major challenge, and there is evidence of a positive correlation between ambidexterity and digital innovation, we provide further insights with our study results. We reveal that the closeness of digital activities to the core business and whether the activities are related to exploration or exploitation are major decision-making criteria for leaders. Our recommendation for exploration digital activities that are distant to the core business is separation. In contrast, exploitation digital activities closely connected to the core business should be integrated. Exploration digital activities close to the core business can be either separated or integrated by including both decision-making criteria.

Nevertheless, we recommend ensuring collaboration with the core organization in case of separation and generating enough freedom and a dedicated budget in case of integration. Incumbent companies with a low digital maturity grade are supported with a separation to build up knowledge and have a digital startup culture. However, we recommend integration when increasing the digital maturity grade and closeness to the core business is given. The broader company vision provides guidance to leaders and employees about the targeted future state of a company to ensure that resources are used effectively, supporting the company's goals and a unified direction of ongoing and planned activities. Aligning the digital transformation strategy with the overall company strategy based on the vision is essential that digital transformation initiatives are prioritized based on their strategic impact. As a company's vision considers the target market, ensuring digital transformation projects are market-driven, and market changes will also be addressed. Furthermore, as the overall vision is long-term focused, an alignment supports concentrating on exploration and exploitation in digital transformation rather than prioritizing short-term gains due to quicker payoffs. In addition, breaking down the digital transformation strategy into a roadmap allows differentiation into exploration and exploitation. It helps to ensure effective and efficient resource management, supporting the long-term goals of the company if this is aligned with the broader vision.

Furthermore, integrating digital transformation with the company's strategy allows employees to identify their contribution to the overall goals and can support employee motivation and commitment. Especially in cross-functional digital transformation activities, the alignment can give a common purpose and enhance the required change management process. Therefore, incorporating a cross-functional digital transformation strategy in the company strategy and developing a balanced portfolio supports fostering ambidexterity in digital transformation. We identified the necessity for leaders to consider employees' skill sets and personnel preferences to foster innovation. Primarily related to exploration, leaders need to allow freedom to explore new digital technologies and apply them to business cases. Leaders driving exploration activities supporting innovation in the digital context must create trust and freedom to explore new solutions without fear. The fast-changing character of digital technologies requires leaders to engage employees in constantly scouting new technologies and piloting ideas to address the complexities of digital disruption. In addition, we identified that leaders need to consider a balance of exploration and exploitation to avoid a lack of innovation in the case of a pure focus on exploration or a lack of results in the case of only exploration. We identified temporal ambidexterity as a possibility for collaboration between employees working in a digital hub and the core business. Especially if exploitation activities in digital transformation are separated in a digital hub, this collaboration is required to ensure process and product knowledge, ensuring effective impacts of the activities. Leaders engaging employees moving between the departments support the needed collaboration. In addition, building cross-functional teams allows companies to leverage the expected results of digital transformation. The close alignment and interaction with the IT department support digital transformation efforts as expert knowledge about existing infrastructure or new trends is incorporated. We included aspects of strategic leadership in our qualitative study. Even though we included aspects of strategic leadership in our qualitative study, we see the potential for future studies to focus more on the role of leadership. We suggest examining how leadership fosters

ambidextrous capabilities in the context of digital transformation. In addition, a study exploring the long-term effects of structural ambidexterity on the organizational performance of incumbent companies undergoing digital transformation would create additional insights and justify our results.

Our explorative research design includes a purposive sampling of 33 interview partners with work experience in digital transformations in incumbent companies or covering the research stream of digital transformation. Even though we covered various hierarchies and industries with our study participants, the count of 33 interview partners can still be seen as a weakness. Our clearly defined research process, including a detailed description of the conducted thematic analysis, and an explanation of how we achieved code saturation, helps offset this limitation.

In addition, we suggest further research to consider the digital maturity grade of the incumbent companies to cluster the findings further in that direction, as we identified this as one primary decision criterion. Combining this with how we achieved code saturation, we did not perform this check on the level of the digital maturity grade of the companies the study participants represent. This could influence our study results by achieving code saturation earlier and, therefore, missing some additional insights that are specifically relevant depending on sector experience or digital maturity grade. Therefore, we suggest that in a future study, the research sample can be clustered by sector experience, digital maturity grade, and testing for code saturation on this level. In addition, longitudinal studies with incumbent companies moving through different maturity grades could help gain further in-depth insights. The work of Del Giudice et al. (2021) provides evidence of the positive relation between ambidexterity and digital innovation. Coreynen et al. (2020) see limitations regarding digital servitization. Nevertheless, Coreynen et al. (2020) show that when reaching a medium level of exploitation, there is an exponential impact on the relation between exploration and digital servitization. Knowing this, we can see our study as a pilot for a quantitative study to investigate the correlation between digital maturity grades and our proposed organizational structure. Associated with this suggestion, future research could provide more in-depth insights into innovation phases. One interview partner provided insights on different phases in exploration, which could be seen to gain even further details on trigger points of separation/integration decisions within exploration activities. In addition, it is not part of this study to investigate different working methods and decision-making forms within different organizational units. New circumstances and the availability of new technologies require leaders to rethink and adapt existing processes. Existing research addressing the digital contexts often associates this with agile structures (Mustafa et al., 2022). Therefore, we see potential in addressing the applicability of agile work methods in digital activities related to the core business and how structures could change with increasing maturity grades. We addressed the concept of structural and temporal ambidexterity, therefore, we suggest future research to investigate the role of contextual ambidexterity in digital transformation or even combine this with this research in the form of hybrid ambidexterity.

We know that a potential analysis bias can impact our study results by having the risk of selective coding. To overcome this, one researcher did the initial transcripts coding, and the second researcher, acting as supervisor, performed an inter-coder check. In addition, we see the risk of interviewee bias leading to answers the interviewees think are expected rather than their honest opinion. Also, as we were aware of the company they work for, this could result in a potential bias toward reporting more positive aspects. To overcome this, we ensured the anonymity of the interview partners' personnel information as well as company-related information. In addition, interpersonal dynamics between the researcher and the interview partners can impact the level of detail and quality of the shared insights and, therefore, the quality of our study results. We mitigated this limitation by having semi-structured interviews and applying an interview guide. Another methodological limitation is the replicability of qualitative research. As interviews are associated with a defined context and a set of participants, replication is challenging. We address this limitation by describing our research process and clustering our participants by sector experience and hierarchy levels.

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Appendix

Table 4. Building 1st order concepts

Original Code (1st order concepts)	Count	Description of changes	Final code (1st order concepts)
Not close to core	10	Summarized	Distant to core business
Different location	1		
Explore and experiment	6	Summarized	Piloting radical new things
Piloting	4		
Research	3		
Scouting	2		
Searching new solutions	4		
Trust and freedom	15	Rephrased	Creating trust and freedom
Different processes	5	Summarized	Establishing dedicated budget and structures
Different structures	4		
Dedicated budget	4		
Innovation hubs, R&D, shares in start/ups	11	Summarized	R&D, innovation hub, shares in startups
Get ideas	1		
Built on existing in business or close	12		Built on existing in business or close
Customer relationships	3	Summarized	Having core business knowledge
Product and process know-how	5		
Understand core business	12		
Improve efficiency through digital technologies	12	Rephrased	Improving efficiency through digital technologies
M&A	6	Rephrased	Digital mentality through M&A
Startup culture	10	Rephrased	Generating startup culture
One better	7	Rephrased	Favor digital over core business
Need digital also in core business	8	Rephrased	Diminish digital activities in core business
difficult to differentiate sometimes	12	Rephrased	Difficulties in distinguishing digital and core
Integration if applications for core difficult with separation	14	Rephrased	Difficulties to integrate
needed product & process know/how missing	8	Rephrased	Missing process and product know-how
Costs	1	Eliminated	
Learn from each other	7	Rephrased	Mutual learning
Some fix people needed	6	Rephrased	Ensure consistency
Cross-functional	10	Rephrased	Digital transformation is cross-functional
Collaborating with IT	11		Collaborating with IT
Common vision and strategy	30	Summarized	Common vision and strategy
Communication of strategy	4		
Portfolio	22	Rephrased	Balancing portfolio
Clear responsibilities	11	Rephrased	Establishing clear responsibilities
Candidate selection	8		Candidate selection
Collaborative decision making	8		Collaborative decision making
Awareness	19	Rephrased	Being aware about differences
Integration e-->e	16	Rephrased	Innovation activities
Maturity grade	18	Rephrased	Digital maturity grade

Table 5. Building 2nd order themes

1st order concepts	2nd order themes
Distant to core business	Digital exploration separated
R&D, innovation hub, shares in startups	
Piloting radical new things	
Establishing dedicated budget and structures	
Creating trust and freedom	
Built on existing in business or close	Digital exploitation closely integrated
Improving efficiency through digital technologies	
Having core business knowledge	
Digital mentality through M&A	Digital business separated
Generating startup culture	
Favor digital over core business	Risks neglecting exploration and exploitation differences in digital
Diminish digital activities in core business	
Difficulties in distinguishing digital and core	
Difficulties to integrate	
Missing process and product know-how	
Mutual learning	Temporal ambidexterity
Ensure consistency	
Common vision and strategy	Strategy
Digital transformation is cross-functional	
Being aware about differences	
Balancing portfolio	
Establishing clear responsibilities	Leadership activities
Candidate selection	
Collaborative decision making	
Collaborating with IT	
Innovation activities	Impacting factors
Digital maturity grade	

Table 6. Building aggregated dimensions

1st order concepts	2nd order themes	Aggregated dimensions
Distant to core business	Digital exploration separated	Organizational separation: Exploration/ Exploitation
R&D, innovation hub, shares in startups		
Piloting radical new things		
Establishing dedicated budget and structures		
Creating trust and freedom		
Built on existing business or close	Digital exploitation closely integrated	
Improving efficiency through digital technologies		
Having core business knowledge		
Digital mentality through M&A	Digital business separated	Organizational separation: Digital/Core business
Generating startup culture		
Favor digital over core business	Risks neglecting exploration and exploitation differences in digital	
Diminish digital activities in core business		
Difficulties in distinguishing digital and core		
Difficulties to integrate		
Missing process and product know-how		
Mutual learning	Temporal ambidexterity	
Ensure consistency		

1st order concepts	2nd order themes	Aggregated dimensions
Common vision and strategy	Strategy	Strategic leadership
Digital transformation is cross-functional		
Being aware about differences		
Balancing portfolio		
Establishing clear responsibilities	Leadership activities	
Candidate selection		
Collaborative decision making		
Collaborating with IT		
Innovation activities	Impacting factors	
Digital maturity grade		

Biographical notes

Sabrina Hoessler is a PhD student at the University of Bamberg. She holds a Master's Degree International Management (M. Sc.) from the School of International Business and Entrepreneurship (Steinbeis University). Her research work is in the area of digital transformations and the implication on leadership.

Claus-Christian Carbon studied Psychology (Dipl.-Psych.), followed by Philosophy (M.A.), both at University of Trier, Germany. After receiving his PhD from the Freie Universität Berlin and his "Habilitation" at the University of Vienna, Austria, he worked at the University of Technology Delft, Netherlands and the University of Bamberg, Germany, where he currently holds a full professorship leading the Department of General Psychology and Methodology and the "Forschungsgruppe EPAEG"—a research group devoted to enhancing the knowledge, methodology and enthusiasm in the fields of cognitive ergonomics, psychological aesthetics and Gestalt (see www.experimental-psychology.com and www.epaeg.de for more details). He is the author of more than 500 publications, including more than 200 peer-reviewed international journal articles, mainly addressing perceptual topics, and has conducted more than a dozen research projects with a total budget amount of approx. 5 mill. EURO on perception and marketing issues and a renowned contributor and invited speaker at international research conferences. CCC is Editor-in-Chief of the scientific journal Art & Perception, Section Editor of Perception and i-Perception, Associate Editor of Frontiers in Psychology, Frontiers in Neuroscience, Journal of Perceptual Imaging and Advances in Cognitive Psychology and a member of the Editorial Boards of Open Psychology, Musicae Scientiae and Leadership, Education and Personality. Since 2023, CCC is an ordinary member of the European Academy of Sciences and Arts.

Author Contribution

Sabrina Hoessler: Conceptualization, Sampling, Data Collection, Methodology, Formal Analysis, Project Administration, Visualization, Writing. **Claus-Christian Carbon**: Conceptualization, Sampling, Methodology, Formal Analysis, Project Administration, Visualization, Writing, Supervision, Review & Editing.

Conflicts of interest

The authors declare no conflict of interest.

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