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Digital Transformation in Digitally Mature Organisations:

Managers' perspectives on challenges in progressing in digital maturity

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Abstract

Today's flow of technological advancements is putting pressure on organisations to maintain a digital transformation to stay competitive in their industries. According to previous research, digitally mature organisations have significantly higher profitability and revenue growth compared to lower-maturity organizations. This study aims to describe the main challenges and solutions met by managers to stay competitive in an increasingly digital world. Based on existing work on digital transformation, the research questions ask: *What are the main challenges for managers in digitally mature organisations to progress in their digital transformation?* And *how do managers suggest overcoming these challenges?* In this context, the researchers define digital transformation as the integration of value-adding digitization initiatives into all areas of a business, fundamentally changing how the business operates and delivers value to customers.

Based on a literature review, the researchers sent out a self-assessment questionnaire to managers to identify their status of digital maturity. Managers who assessed their organisation with a high level of maturity, Digital Masters, were consequently interviewed to gain further insights into their main challenges. Analysis of the responses demonstrated that the main challenges concerned the internal elements of digital transformation, focusing on leading the digital change within the organisation and changing the already established legacy systems. The results indicate that for digitally mature organisations to progress in their digital transformation, organisations need not only to focus on outward development, but also on digitally transforming their internal processes.

Keywords: *digital transformation*, *digital maturity*, *digital mastery*, *competitive advantage*, *digital capabilities*, *leadership capabilities*, *management*

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Anna Jäfvert

Charlotte Parnefjord Gustafsson

Contents

List of Figures

List of Tables

1

Introduction

This chapter provides a background for the core concepts of study, such as digital maturity and digital transformation. Additionally, it describes the reasoning behind the research gap and presents the research questions and delimitations before outlining the structure of the study.

1.1 Background

The acceleration of advanced technologies is giving rise to a society that is increasingly based on digital technologies - from the internet of things to artificial intelligence. In fact, researchers suggest that we have entered a *second machine age*, referring to the notion that technology has changed the way we work today just as much as the steam engine did in the late 19th century (Brynjolfsson & McAfee, 2014). Brynjolfsson and McAfee (2014) suggest that the quick development and spread of technology are due to what is called *Moore's Law*. Moore's law infers that technological performance will double every 18 months, while continuously decreasing in cost (Brynjolfsson & McAfee, 2014). This means that technology is quickly - exponentially, even - becoming more and more advanced while also becoming increasingly available to both businesses and individuals. It does not seem to stop anytime soon.

A consequence of Moore's law is that the turnover of technology is moving quickly and is also becoming increasingly faster. This means that investments in technology can quickly gain or lose importance, leading to implications for management. According to IBM's Global C-suite study, participating CEOs saw technological factors as the second most important external force impacting their enterprise in the upcoming three years, right below market factors such as supply and demand (IBM, 2018). In addition, half of the participating CEOs found that their business model was threatened by competitors that use technology to create more attractive value propositions (IBM, 2018). This technology development has pushed organisations to start their digital transformation journey - re-engineering their businesses and how they create value with the help of technology. However, organisations do not only need to start their journey of digital transformation but continuously adapt and progress in the ever-changing technological landscape.

Several methods have been developed to measure how well organisations have adapted to technological change and integrated digital tools. The level of adaptation is widely named the organisation's *digital maturity*. Many maturity models

have been developed by some of the world's biggest consultancy firms (e.g. PwC, McKinsey and Capgemini), and by a small number of scholars. The models are usually focused on how digital technology is used in business and strategy (Schwer, Hitz, Wyss, Wirz & Minonne, 2018), and measuring to what extent the use of digital technology is done (Remane, Hanelt, Wiesboeck & Kolbe, 2017). An awareness of the organisation's current maturity status is arguably an essential step of progressing in a journey of digital transformation.

Though digital technology is seemingly more affordable and available and receives more publicity on its importance for sustaining competitive advantage, organisations have not advanced in their digital maturity the past years (Capgemini Research Institute, 2019). This further indicates that a digital transformation does not end abruptly; instead, it should be considered a continuous transformation that might never stop (Kane, Palmer, Phillips, Kiron & Buckley, 2017). This can be considered relevant for all stages of digital maturity since 40% of surveyed executives said that "they wish they had spent more time thinking about how their organizations would continue to improve" (Jacquemont, Maor, & Reich, 2015, n.p.). This study will further explore some of the conditions of digitally mature organisations.

1.2 Research Gap

There is substantial practitioner research on how organisations can start their digital transformation journey and develop into a digitally mature organisation (e.g. Kane, Palmer, Phillips, Kiron & Buckley, 2015; McKinsey, 2018; Westerman, Bonnet & McAfee, 2014). There is also some limited scholarly research on the methodology of digital transformation (Lim, Ng & Tan, 2018; Hess, Matt, Wiesbeck & Benlian, 2016). Despite the amount of research on digital transformation, it is limited in its scope. The focus of the research have primarily consisted of comparisons of organisations in different levels of maturity (e.g. Kane, Palmer, Phillips, Kiron & Buckley, 2018; McKinsey, 2018; Capgemini Research Institute, 2019) or how to start from the very beginning (e.g. Westerman, Bonnet & McAfee, 2014; Ng, Tam & Lim, 2018). Very few scholars have researched how digitally mature organisations can progress in their digital maturity and sustain a competitive advantage.

To the researchers' knowledge, only one study has presented data that connects to the continued digital transformation of digitally mature organisations, which presented the highest-ranked barriers for continued transformation (Kane et al., 2015). However, it is not nearly exhaustive. Furthermore, Reis, Amorim, Melão and Matos (2018) have pointed out the need for additional scholarly research in the area of digital maturity and digital transformation. One scholarly study focused exclusively on the challenges of digital transformation; however, this did not discern between levels of maturity and was limited to non-profit organisations (NPOs; Nahrkhalaji, Shafiee, Shafiee & Hvam, 2018). Thus, there are gaps in scholarly research regarding the digitally mature perspective on challenges in digital transformation.

The digitally mature perspective on digital transformation should be considered an important issue for the future. As previously mentioned, due to the quickly changing digital environment, digital transformation should be considered a continuous process rather than a final goal (Andersson, Movin, Mähring, Teigland & Wennberg, 2018; MIT, 2017; Remane, Hanelt, Wiesboeck & Kolbe, 2017). Since companies are standing still in their progress in digital transformation, they need

further awareness regarding the continuation of their transformation in order to sustain their competitive advantage. Looking at the challenges that exist at the most digitally mature organisations, and how these are being overcome, will be an important element to create this awareness.

1.3 Research Purpose

The purpose of this study is to describe the challenges that managers in digitally mature organisations see for continuing their organisations' digital transformation and to describe what they see as solutions to these challenges. The purpose of this description is to provide managers, specifically in digitally mature organisations, with the knowledge to sustain and progress in their digital transformation.

1.4 Research Questions

The identified research gap and research purpose lead to the following research questions:

- What are the main challenges for managers in digitally mature organisations to progress in their digital transformation?
- How do managers suggest overcoming these challenges?

1.5 Delimitations

The study includes several delimitations, mainly reflected in the selection of participants (see Chapter 3, Method). Firstly, the research is delimited to managers. Secondly, the research only includes managers representing digitally mature organisations (see Chapter 2, Section 2.4.1). Lastly, the organisations in the research must, at the time of the study, be involved in projects connected to a digital transformation.

1.6 Outline of the Thesis

Chapter 1 - This chapter provides a general introduction to the topic of the research. The background information regarding the key elements of the study is presented along with the research gap, research purpose, research questions and delimitations of the study.

Chapter 2 - In this chapter, the theoretical frame for the research is presented. It consists of a description of the theories and terminology used for the research based on four main topics; digital transformation, digital maturity, digital mastery and competitive advantage.

Chapter 3 - This chapter describes the methodology of the research. It provides an outline for the research approach, research design as well as the methods for data

collection and analysis. The chapter contains motivations for the methods used as well as a discussion regarding the validity, reliability and ethics of the research.

Chapter 4 - In this chapter, the data collected through quantitative and qualitative research is presented. Firstly, qualified participants are determined through the results of the self-assessment questionnaire. Subsequently, the chapter presents an overview of the calculations for the average scores of the subtopics and statements of the questionnaire. Lastly, the qualitative data is presented in the form of themes, challenges and solutions.

Chapter 5 - This chapter provides a comprehensive analysis of the main findings in the research. It presents a discussion around the main topics and themes and relates back to the theoretical review of the research.

Chapter 6 - In this chapter, the research questions are answered in a summary and conclusions of the analysis. This is followed by a discussion regarding the practical implications and lastly limitations and suggestions for future research.

2

Theory

In this chapter, important terminology and theoretical concepts that were introduced in the introduction will be defined and explained further. Specifically, terminology, concepts and past research on digital transformation, digital maturity and the model of Digital Mastery will be defined and discussed.

2.1 Frame and structure of the Theory

The theoretical review is based on a mix of both academic and practitioner research. This mix of sources is due to the fact that the topics related to digital transformation have mainly been researched by practitioners and less by scholars. In this chapter, these topics are divided into sections, presented in a structure according to Figure 2.1

Figure 2.1: Structure of the theoretical review

2.2 Digital Transformation

This chapter will explain the differences between digitization, digitalization and digital transformation. Additionally, the importance of digital transformation will be discussed as well as previous research about the challenges and success factors for digital transformation.

2.2.1 Digitization, Digitalization and Digital transformation

To tackle the topic of digital transformation, first one needs to understand the concepts and levels of digital change. There are three concepts for digital change that are commonly used: digitization, digitalization, and digital transformation. Although they may seem similar, they are not entirely interchangeable.

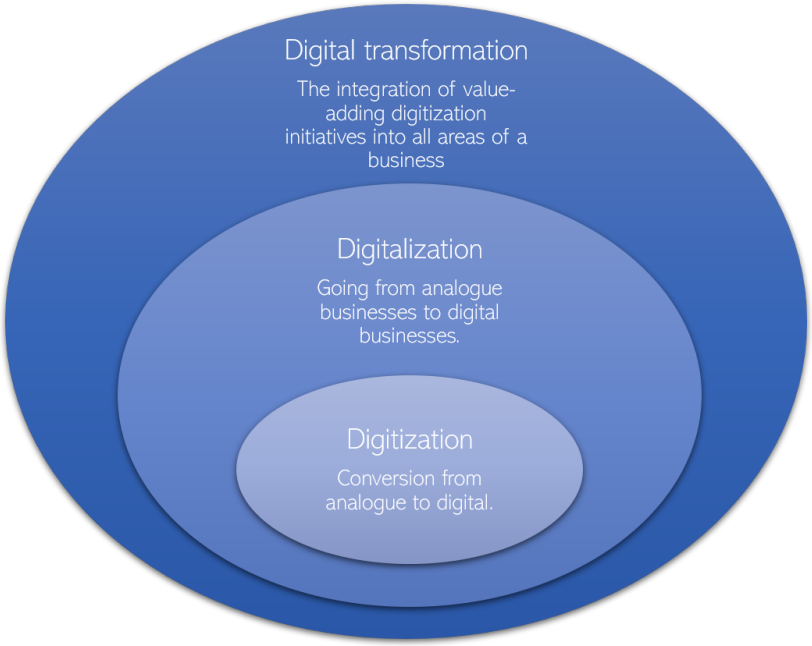

Figure 2.2: The difference between digitization, digitalization and digital transformation.

Digitization refers to turning something analogue into something digital (Gartner, 2019). For example, paper form turned into a digital form such as an email instead of a letter. "Digitization takes an analogue process and changes it to a digital form without any different-in-kind changes to the process itself" (Gartner, 2019, n.p.).

Digitalization, on the other hand, is not just about turning analogue into digital, but rather going from an analogue business into a digital business. "Digitalization is the use of digital technologies to change a business model and provide new revenue and value-producing opportunities; it is the process of moving to a digital business [...]" (Gartner, 2019, n.p.)

When it comes to digital transformation, Savić (2019) argues that "Digital transformation leverages existing knowledge to profoundly change the essence of the organization - its culture, management strategy, technological mix, and operational setup. It places the customer at the centre of all its decisions and actions." (p. 38) Others define digital transformation as "[...] a sustainable, company-level transformation via revised or newly created business operations and business models achieved through value-added digitization initiatives, ultimately resulting in improved profitability." (Schallmo & Williams, 2018, p. 2), and "digital transformation requires individuals to rethink old processes and reimagine new processes and decisions" (Schallmo & Williams, 2018, p. 7). Thus, digital transformation is not merely a list of IT projects; it involves completely rethinking how an organization uses technology to pursue business goals. In this study, digital transformation is defined as *the integration of value-adding digitization initiatives into all areas of a business, fundamentally changing how the business operates and delivers value to customers*, which is based on the definitions of Savić (2019) and Schallmo and Williams (2018).

Amongst these three different levels of digital change, digital transformation was regarded as the most relevant. This was because the researchers found it to be

the most relevant level to adapt to the increasingly digital environment, due to its extensiveness (see Figure 2.2). According to Ismail, Malone and van Geest (2015), a company that wants to avoid failure in the 21st century must also be designed for the 21st century, and not the 20th. Digital transformation should be seen as a suitable method to re-design a company for the 21st century.

2.2.2 Past research on Digital Transformation

Challenges

Past research on challenges in digital transformation has identified and ranked some of the top challenges that companies face. Nahrkhalaji, Shafiee, Shafiee and Hvam (2018) found that NPOs ranked their top challenges in digital transformation initiatives to be the *development of new capabilities and skills*, followed by *complexities of strategic and organizational challenges*, followed by *corporate culture*. Capgemini Research Institute (2019) found that the top hurdles to digital transformation were *cultural issues*, *presence of archaic IT systems and applications* and *lack of digital skills*. Kane et al. (2015) found that the top barriers for digitally mature companies consisted of *Too many priorities*, *Security concerns* and *Insufficient tech skills*. Berghaus and Back (2016) found that the *analytics and usage of big data* were the main difficulties of digitally mature companies. According to these rankings, skills, culture and technology appear to be some of the greatest challenges for companies in pursuing a successful digital transformation.

Some challenges, however, were not perceived as equally difficult. In Nharkalaji et al.'s (2018) study of NPOs, the lowest ranked challenges were *changing customer behaviour* and *market uncertainties*. Berghaus and Back (2016), on the other hand, found that *digital affinity* and *employee commitment* were some of the easiest obstacles for companies on the digital maturity scale, which they found to be opposed of past research. Thus, external factors such as customers and market appear to be more easily achievable, together with engaging employees in the use of digital technology.

Combining IT and business competences presents itself as an additional challenge. In particular, Reynolds and Yetton (2015) found that the alignment of IT and business was an especially prominent and enduring challenge. However, they also found that this kind of alignment had a strong potential of creating value, through several forms of alignment. In addition, when comparing responses from their studies in 2012 and 2018, Capgemini Research Institute (2019) found that the relationship between IT and business had not kept up with the needs of the companies. Furthermore, in their study within digital maturity, Berghaus and Back (2016) found that all data-related activities were the least achieved among the surveyed companies, arguing that there seems to be a difficulty in forming organizational practices on how to use the data. Here, the connection between IT and business failed to fulfill the needs of the companies undergoing a digital transformation. Thus, aligning IT and business to reach the common goal of a digital transformation has been found to be yet another challenge.

Digital investment is an additional challenge. Kane et al. (2017) found that a key challenge in long-term digital transformation is the funding of digital initiatives while taking care of the existing business (p. 9). However, just having money is not necessarily the solution: "throwing money at the problem isn't likely to help; some

digital initiatives generate attractive returns, others don't. So, companies must target their efforts and investments carefully." (McKinsey, 2018, p. 1). In addition, according to McKinsey (2018) the most well-performing companies invest more and broader in digital. Thus, balancing the funding

Digital transformation efforts frequently fail, which could be due to the lack of momentum, inadequate capabilities or difficulties in implementation. Research suggests that less than one-third of organisational digital transformations are successful (Jacquemont, Maor & Reich, 2015). One possible reason for this is that less than half of companies have the capabilities required to succeed in a digital transformation (Capgemini Research Institute, 2019). In addition, they also found that "digital transformation programs often fail because they lose momentum" (p. 101) and that the initial eagerness for digital transformation might be discouraged by the difficulties of implementation. As a practical example of this, Capgemini Research Institute's (2019) suggested that "[...] employees adopt[...] tools and platforms with enthusiasm at the beginning but stop[...] using them." (p. 95). The other way around, Jacquemont, Maor and Reich (2015) state that the success rate improves when organisations have an action-oriented approach and fully complete their transformations, that is, fully implementing all their digital initiatives. Thus, implementation is a possible challenge for successful digital transformation, while an essential success factor for is the ability to follow through with the implementation of digital initiatives.

Sustaining the digital transformation and its positive effects is another challenge for companies. In a survey by McKinsey (McKinsey, 2018), only 16 percent of respondents stated that their digital transformations had made them improve performance and that they are able to sustain the changes in the long run. In another study, 7 percent of respondents said that their performance improved, but that those improvements were not sustained (de la Boutetière, Montagner & Reich, 2018). Thus, based on these studies, sustaining and progressing in digital transformation could be an additional challenge.

However, all elements of digital transformation do not appear to be equally prone to failure or lack of sustainment. Capgemini Research Institute (2019) found that companies surveyed in the past have had the greatest successes with transforming their customer experience-elements, such as analytics and social media, but less with operations, IT-business relationships, engagement and governance. This might imply that the latter elements are the greater challenges and that an increased focus on these elements may infer increased success.

Success factors

One factor for success can be found in how technologies are used, as opposed to the technology itself. According to a Deloitte study (Kane et al., 2015), "[t]he strength of digital technologies — social, mobile, analytics and cloud — doesn't lie in the technologies individually. Instead, it stems from how companies integrate them to transform their businesses and how they work." (p. 4). Aligning with this statement, Hess, Matt, Benlian & Wiesboeck (2016) argue that "management regards the role of digital technologies as supporting existing products and services or as a resource to re-engineer processes" (p. 128). In addition, according to McKinsey (2018), the companies that have the highest EBIT, revenue growth and return on digital investment closely connect digital and corporate strategies, thus, focusing on making

the best use of digital and technology in their businesses. Therefore, it can be argued that technologies should be used as a value-added feature and that digital transformation is an integrative process between business goals and technological advancements.

Past research emphasizes the importance of employees and their skills as an important factor for succeeding in digital transformation. McKinsey's survey (de la Boutetière, Montagner & Reich, 2018) displayed that developing capabilities, skills and talent within the organization is an essential part of a successful digital transformation. Similarly, Kane et al. (2015) found that "digitally maturing organizations are four times more likely to provide employees with needed skills than are organizations at lower ends of the spectrum." (n.p.). Aligning with this, Capgemini Research Institute and LinkedIn (2017) found that more than half of the surveyed organisations agreed that the lack of digital talent was hindering their digital transformation. In their study, Seitz and Burosch (2018) identified that the area of *Digital Mindset*, that is, value creation based on qualified personnel, was the least matured area in the businesses surveyed, but also with the second highest potential of creating value. Finally, Capgemini Research Institute (2019) found that fewer organisations than before agreed that their employees were welcomed in participating in the transformation, despite the fact that "the employee experience is increasingly important" (p. 7), with employees who want to be engaged and participate in the digital transformation. Thus, recruiting and engaging skilled employees has been found to be a challenge, but at the same time also an important success factor for digital maturity and value creation.

Culture is yet another important aspect for success. A basis for this is that "organizations cannot truly transform themselves without transforming their culture" (Capgemini Research Institute, 2019, p. 106). Supporting this, McKinsey's research shows that culture is the main self-reported barrier to digital effectiveness (Goran, LaBerge & Srinivasan, 2017). The failure of implementing new technologies are often built around a mismatch in expectations as organizations have not changed the mindsets and processes or built cultures that fostered this change (Kane et al, 2015). As a remedy, Capgemini Research Insititute (2019) found that a positive and exciting working culture was key to both attracting and retaining talent. Thus, to succeed in their transformation, companies need to create cultures that are positive and foster change.

A final aspect of success for digital transformation is communication. Results from the Capgemini Research Institute (2019) found that one of the most pivotal success factors in digital transformation is transparency and open communication with employees. One example for effective communication was to tailor the communication to the specific groups, as well as ensuring that the message resonated with that group (Capgemini Research Institute, 2019). Another example from the same study was to use chats, video and "online collaboration tools" (p. 24) for additional ways of communicating. However, the same study also found that fewer organisations assessed digital technologies as actually improving communication. Nevertheless, effective communication should be seen as an important element to align employees for a successful digital transformation.

In conclusion, past research has identified several challenges and success factors for digital transformation. As evident from this section, challenges and success factors commonly represent two sides of the same coin. Thus, it is possible to conclude

that digital skills, employee engagement, integrating and aligning IT and business, culture, usage of data, implementation, digital investments and communication all represent challenges and success factors to some degree. These are what hinder or help the progression of digital transformation, leading to a certain level of digital maturity.

2.3 Digital maturity

In this section, several aspects of digital maturity will be discussed. Though many definitions exist, the researchers will define digital maturity according to Chanias and Hess's description: "the status of a company's digital transformation" (p.4). Since digital maturity is a central concept for this study, it needs some further elaboration and framing. Thus, the significance and different kinds of measures of digital maturity will be presented below, followed by a critical review of existing models for measuring digital maturity and an elaborate description of the model selected for use in this study.

2.3.1 Why digital maturity matters

Digital maturity is relevant for several aspects of a business. According to MIT Center for Digital Business and Capgemini Consulting (2012), the most digitally mature companies are "26% more profitable than their industry competitors" (p. 8). They also generate 9% more revenue and 12% higher market valuation ratios (MIT Center for Digital Business and Capgemini Consulting, 2012). According to research done by McKinsey, companies expect 5-10% or more in annual growth and cost efficiencies from their digital initiatives, in the next three to five years (Catlin, Scanlan & Willmott, 2015). According to a study by Deloitte, "[h]igher-maturity organizations are nearly three times more likely than lower-maturity organizations to report net profit margins and annual revenue growth that are significantly above the averages in their industry" (Gurumurthy & Schatsky, 2019). Thus, according to these insights, digital maturity is highly beneficial from a profitability perspective.

2.3.2 Different measures of digital maturity

There exist several models for measuring digital maturity. Scholars have developed digital maturity models for specific industries such as education (Balaban, Begicevic Redjep & Klacmer Calopa, 2018; Durek, Kadoic & Belgicevic Redep, 2018), healthcare (Flott, Callahan, Darzi & Mayer, 2016), manufacturing (Canetta, Barni & Montini, 2018) and telecommunications (Valdez-de-Leon, 2016), as well as for specific sizes of organisations, such as small and medium-sized enterprises (SMEs; Blatz, Bulander & Dietel, 2018). Practitioners, on the other hand, have been the forerunners in the development of digital maturity models, with models that target many types of businesses and on a global scale and that are used and updated regularly (e.g. PwC, 2019; Catlin, Scanlan & Willmott, 2015; Westerman, Bonnet & McAfee, 2014; MIT Center for Digital Business and Capgemini Consulting, 2012). To further show the set-up and diversity of these models, three of the practitioners' models will be further described below.

PwC's model for measuring digital maturity is the *Industry 4.0 Capability Maturity Model* (I4CMM; PwC, 2019). Through a self-assessment, an organisation can find out which of the four levels of digital maturity they belong to: *Digital Novice, Vertical Integrator, Horizontal Collaborator* and *Digital Champion.* These levels are linear and one-dimensional, where *Digital Champion* is the highest level. PwC believes that digital maturity is based on three main categories: Business Models, Product & Service Portfolio, Market & Customer Access and Value Chains & Processes. Depending on the scope and depth needed, these categories can be complemented by an additional set of three categories: IT Architecture, Compliance, Legal, Risk, Security & Tax and Organization & Culture. PwC does not state how their assessment was developed.

To measure digital maturity, McKinsey has developed a Digital Quotient (DQ) score (Catlin, Scanlan & Willmott, 2015), which is based on an "in-depth diagnostic survey of 150 companies around the world" (n.p.). The DQ is based upon three main categories: Digital Strategy, Capabilities and Culture, which all stem from 18 separate practices. McKinsey provides two formal levels of digital maturity, both representing the two highest groupings of DQ: Emerging leaders and Established leaders (Catlin, Scanlan & Willmott, 2015).

Capgemini measures digital maturity through levels of Digital Mastery (Westerman, Bonnet & McAfee, 2014). The model is based on a study of almost 400 companies, for a period of two years (Westerman, Bonnet & McAfee, 2014; MIT Center for Digital Business and Capgemini Consulting, 2012). Through a self-assessment, an organisation can find out which of the four levels of digital maturity they belong to: *Beginner, Fashionista, Conservative* or *Digital Master.* The model measures digital maturity in two dimensions: Leadership capabilities and Digital capabilities (see Figure 2.3). Digital capabilities include three main subtopics: Customer Experience, Operational Processes and Business Models; while Leadership capabilities include four main subtopics: Transformative Vision, Engagement, Strong Governance and Technology Leadership. Those who score highly on both dimensions are considered Digital Masters.

2.3.3 Critical review on digital maturity measures

The way digital maturity is measured is not completely unproblematic. The models that are developed by practitioners, such as PwC (2019) or McKinsey (Catlin, Scanlan & Willmott, 2015), are especially advantageous for management practice (Remane, Hanelt, Wiesboeck & Kolbe, 2017). However, Remane, Hanelt, Wiesboeck and Kolbe (2017) have also found them to have some relevant shortcomings. They found one main problem with existing practice-based models: the linear path of digital transformation. They point out that this linearity inaccurately suggests that all businesses walk the same path with the final goal of being fully digitally transformed and that "there is an ultimate state of a fully digitalized firm and that all firms should thrive for this same ultimate state" (Remane, Hanelt, Wiesboeck & Kolbe, 2017, p. 152). The researchers point out that "[t]he logic of a linear digital transformation path [...] seems to be a critical oversimplification that invites faulty thinking with the possibility of leading to wrong management decisions." (Remane, Hanelt, Wiesboeck & Kolbe, 2017, p. 144). Thus, in measuring digital maturity, the linearity of the used model should be critically reviewed.

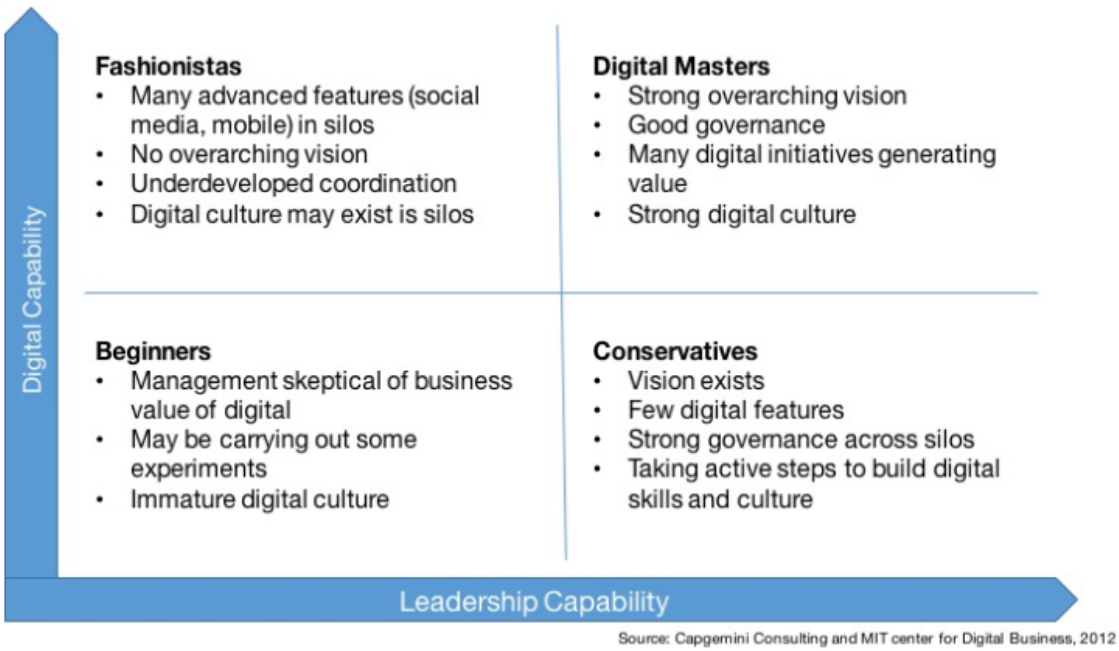

Figure 2.3: Capgemini and MIT Center for Digital Business (2012) model for digital maturity: levels of Digital Mastery

Additional scholars have criticized existing digital maturity. Schwer, Hitz, Wyss, Wirz and Minonne (2018) studied the variables of digitalization in digital maturity models and found that, of the 15 models they reviewed, none could fully assess a company's digital maturity. This, Schwer et al. (2018) argued, was because "[...] none of the models includes all layers of corporate architecture in the evaluation" (p. 145). Specifically, Schwer et al. (2018) questioned the lack of the technical elements of the digital maturity models, while the business elements were in full focus. Thus, the representation of technical elements need to be prominent in a digital maturity model.

2.4 Digital Mastery

Based on a review of existing digital maturity models and the aforementioned critical review, the researchers chose to use Capgemini's Digital Mastery model (Westerman, Bonnet & McAfee, 2014). In this chapter, the reasons for this choice will be presented. Furthermore, an in-depth description of the two dimensions of Digital Mastery, digital and leadership capabilities, will be presented in connection with theory on resources and competitive advantage.

2.4.1 Why Digital Mastery

The model of Digital mastery includes several strengths for measuring digital maturity. First, it has a strong base in practice, making it relevant for studies connected to managerial practice, such as this study. As a support, the model also has a firm basis in research, due to its development together with a distinguished university: MIT Center for Digital Business. Second, due to this co-development, there is much documentation of the theory behind the model, which enables a deeper understand-

ing and more advanced analysis of digital maturity. Third, one of the academic references (Westerman, Bonnet & McAfee, 2014) for this model is used as course literature at Lund University School of Economics and Management, which supports its reliability. Fourth, it includes a simple self-assessment test that is available and comprehensible. Fifth, the model is non-linear and two-dimensional, meaning that it avoids one of the most problematic aspects of measuring digital maturity: linearity (Remane, Hanelt, Wiesboeck & Kolbe, 2017). Sixth, the model has a very clear connection to the use of capabilities, allowing for further theoretical connections. Additionally, as no other model included the aspects above, the Digital Mastery model deemed fit for the purpose of this study.

However, there are also some backsides of this model that need to be considered. First, though the Digital Mastery model is one of only three models in Remane, Hanelt, Wiesboeck and Kolbe's (2017) review that was not published as a pure practice report, the report for the model has not been peer-reviewed. The only model that was peer-reviewed and in a language available to the researchers was Berghaus and Back (2016), but the items for measuring were not available to the researchers and therefore not a possible candidate. Second, the digital mastery model is based on an argumentative approach instead of an empirical one, where only one of the reports was deemed as empirically based: that of Deloitte (2018; Remane, Hanelt, Wiesboeck & Kolbe, 2017). However, Deloitte's model has been developed in collaboration with the telecommunications industry and, thus, was not considered appropriate for this study. Third, as the study of Schwer et al. (2018) argued, the Digital Mastery model might not cover the technological aspects fully. However, the dimension of Digital capabilities has a solid focus on technology which, under these circumstances, should be deemed as sufficient for this study.

2.4.2 Capabilities

An essential part of understanding Digital Mastery is to understand the concept of capabilities. This is because the model of Digital mastery is based on the two dimensions of capabilities: digital and leadership. In this section, the definition of capabilities and their connections to competitive advantage will be presented, together with elaborations on digital capabilities and leadership capabilities.

Capabilities have an immediate connection to resources. This study will define capabilities according to the following textbook-definition: "capabilities refer to a corporation's ability to exploit its resources" (Hunger & Wheelen, 2007, p.56). That is, for a company to develop strong capabilities, it must utilize its resources well. Thus, resources are essential for building strong capabilities, which in turn can bring further benefits for a business.

One benefit from resources and capabilities is that of sustained competitive advantage. According to Barney (1991), sustained competitive advantage must be based on firm resources that are heterogeneous and immobile. That is, they must be different from competitors' resources, and they must be hard or impossible to move. According to Barney (1991), to fulfill these prerequisites, resources need to fulfill four attributes: value, rareness, imitability and substitutability. Thus, capabilities that are built on resources that fulfill these prerequisites should be able to sustain competitive advantage.

In order to perform a successful digital transformation according to the model

of Digital Mastery, Westerman, Bonnet and McAfee (2014) suggest two essential capabilities: digital capabilities and leadership capabilities.

Digital capabilities

Digital capabilities are the *what* in digital transformation; what technological investments a company should make in order to gain competitive advantage (Westerman, Bonnet & McAfee, 2014). According to Westerman, Bonnet & McAfee, (2014), Digital capabilities consist of three main areas: Customer Experience, Operational Processes and Business Models. A company has digital capabilities when they can invest and utilize digital channels and technologies to improve the company and gain a competitive advantage for their business. Technologies are used as tools to get closer to customers, empower employees and transform internal business processes.

When it comes to sustaining competitive advantage through digital capabilities, investments in technology do not fulfill Barney's (1991) four prerequisites alone. As he states himself, "[b]ecause the machines can be purchased, any strategy that exploits just the machines themselves is likely to be imitable and thus not a source of sustained competitive advantage." (Barney, 1991, p. 220). (Since Barney wrote this in the '90s, with another level of technology development, the word *machines* could be replaced by practically any technology today). However, when a technology is integrated into a larger organisation, as in decision-making processes of management, it has the potential of sustained competitive advantage (Barney, 1991). This is because the integration between technological and human processes is complex, which makes it likely to be imperfectly imitable (Barney, 1991), as well as hard to substitute. Thus, in order to sustain competitive advantage based on technology, there is also a need for the integration of technology into human processes, as well as other aspects of the business. This is to some extent reflected in the dimension of Digital capabilities, since it focuses on making the best use of technology in the business, for example, by basing new business models on technology and using analytics to improve operational decisions.

Leadership capabilities

Leadership capabilities are the levers that turn technology into transformation; they are the *how* of digital transformation. It infers strong top-down leadership that allows for setting direction, building momentum and ensuring that the company does what it intends to do. In essence, leadership capabilities refer to how an organisation makes everyone work in the same direction and toward the same goal. According to Westerman, Bonnet and McAfee (2014), leadership capabilities are based on four main areas: Transformative Vision, Engagement, Strong Governance and Technology Leadership. They argue that senior executives must take the first step and that digital transformation should start from the top by creating a compelling vision of the future and communicate it throughout the organization (Westerman, Bonnet & McAfee, 2014).

Unlike Digital capabilities, Leadership capabilities do not include as much of the complex integration between human and technological processes that can give sustained competitive advantage (Barney, 1991). However, Leadership capabilities could still lead to sustained competitive advantage. For example, Barney (1991) argues that positive reputations can be seen as a source of competitive advantage.

This could be further amplified by including Digital capabilities, provided that having a high digital maturity and being a disruptor within an industry could lead to a positive reputation. If this is also a part of the company's history, it could be imperfectly imitable and, thus, a source of competitive advantage (Barney, 1991). The same goes for if this positive reputation is rare in the industry (Barney, 1991).

2.5 Chapter Summary

To summarize, this theoretical review has provided a basis for the research of the study, by presenting and discussing the terminology of digital transformation, past findings connected to digital transformation, the theory and use of digital maturity and, lastly, an in-depth presentation of the digital maturity model used, Digital Mastery. The purpose of this theoretical review has been to provide a basis for the further analyses and reading of this study.

3

Method

This chapter will present the research approach, research design, methods of data collection, methods of data analysis and finally the validity, reliability and ethics of the chosen methods.

3.1 Research approach

The main research approach of this study was inductive. That is, to look at specific phenomenons in order to derive more general conclusions (Sekaran & Bougie, 2016). For this study, it meant that individual data needed to be collected from managers, which could then be generalised into larger themes and conclusions. As opposed to a deductive approach, where theories can be proved or disproved, applying an inductive approach meant that any conclusions generated from the study could not be proven to be true, since there could always be one future or unknown case that disproved the theory generated from the existing cases (Sekaran & Bougie, 2016). Nevertheless, the inductive approach is seen as an essential part of the research process (Sekaran & Bougie, 2016).

In addition, the researchers took on a pragmatist approach to the research. That is, a focus on practical and applied research which helps to solve a business problem (Sekaran & Bougie, 2016). In addition, pragmatism infers that "theory is derived from practice [...] and then applied back to practice to achieve *intelligent* practice" (Sekaran & Bougie, 2016, p. 29). That is, theory is used as a tool to improve practice (Sekaran & Bougie, 2016). Thus, this was a central element for developing the research methods, as part of the research design.

3.2 Research design

The research design was defined by four main elements: research strategy, researcher interference, unit of analysis and time horizon (Sekaran & Bougie, 2016). The research strategy was set to a survey research as it allowed the researchers to collect both quantitative and qualitative data (Sekaran & Bougie, 2016), such as through questionnaires, interviews or observations, which was considered most relevant to answer the research questions. In addition, other strategies were deemed inappropriate because of time limits, methods required to use a non-compliant research approach or for not being able to answer the research questions. For example, an experiment

strategy usually includes the study of causal relationships between variables with a hypothetico-deductive approach (Sekaran & Bougie, 2016), which aligned with neither purpose nor approach of the study. The level of researcher interference, that is, how much the researchers themselves took part in the study of the phenomenon (Sekaran & Bougie, 2016), was set to be minimal since a high interference in the participants' work was not demanded to answer the research questions. The unit of analysis was set on individual managers since this was the perspective of interest in the research questions. The time horizon was set to a cross-sectional study, that is, data would only be collected during a limited period in time (Sekaran & Bougie, 2016). This was deemed to be enough to find answers to the research questions, as well as the only viable option when choosing among cross-sectional and longitudinal designs, considering the limited time for the study.

3.3 Data Collection Method

In this section, the chosen methods for collecting both primary and secondary data will be presented and discussed. First, however, an overview of the data collection process will be presented.

3.3.1 Process of data collection

The process of the data collection can be viewed in Figure 3.1. Primary and secondary data were collected simultaneously, which is deemed beneficial for the research (Sekaran & Bougie, 2016). For the primary data, the potential participants first did a self-assessment of their organisations' digital maturity, distributed in a questionnaire (see Appendix B). After an analysis of the results, only those participants who fulfilled the minimum score of digital maturity were qualified to participate in the second part of the study, aligning with the purpose of the research. These final participants were asked to take part in a semi-structured interview with questions based on the results of the questionnaires. The interviews were then analysed to draw conclusions upon the research questions. Thus, the final research design consisted of a mixed-method approach with both quantitative and qualitative measures, consisting of three main elements: a continuous literature review, a questionnaire and semi-structured interviews.

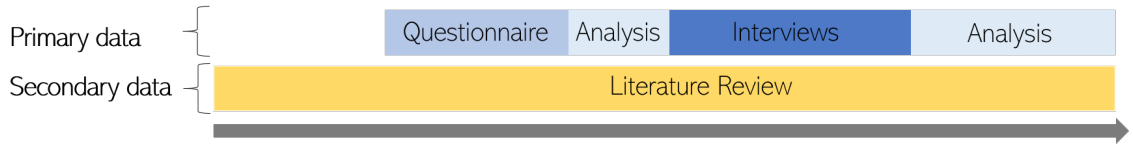

Figure 3.1: Process of data collection

The collection of secondary data started well before the collection of primary data. Thus, the collection method for the secondary data will be presented before that of the primary data.

3.3.2 Secondary data

There were several reasons for conducting a literature review. First, it helped the researchers building their study on existing knowledge (Sekaran & Bougie, 2016). Second, it prevented the researchers from trying to discover knowledge that already existed (Sekaran & Bougie, 2016). Third, it gave the researchers the ability to include relevant terminology and definitions (Sekaran & Bougie, 2016). Fourth, the literature helped to relate the findings to those of others (Sekaran & Bougie, 2016). Finally, this knowledge would be useful for the researchers in the subsequent interviews, by helping in targeting the appropriate issues (Sekaran & Bougie, 2016).

A wide variety of literature was used in the review, including textbooks, academic journals, conference proceedings, reports and selected internet sources. Textbooks were used as a starting point for the literature review, giving the researchers a base for the study as well as some definitions of common business terminology. Though textbooks are not always as up to date as journals, they succeed in covering a wide range of topics and do so more thoroughly (Sekaran & Bougie, 2016). Journals were used to find more recent information that had also been peer-reviewed. Both review and research articles were used in order to get an overview of the topics and specific research area. Reports and selected articles from companies were used to gain useful information on the research topic that was not available from other sources. As the theoretical review made clear, the number of academic journals that discuss the topic of digital transformation was very limited and, therefore, reports and articles from practitioners were some of the main sources for up-to-date information. Additionally, conference proceedings were particularly valuable and relevant as they were recently updated (Sekaran & Bougie, 2016). Finally, some selected internet sources were used for providing definitions and terminology. The mix of theory and practice in the literature supported the pragmatist approach of the study, since the integration between the two is an essential building block for pragmatism (Sekaran & Bougie, 2016).

Three criteria were used for evaluating the secondary data: timeliness, accuracy and relevance (Sekaran & Bougie, 2016). Timeliness refers to when secondary data was collected with the primary limit of 5 years (Sekaran & Bougie, 2016). In this case, this meant that the publishing year for all articles, reports and books was at earliest in 2014. However, exceptions were made for secondary data that was considered particularly relevant for the theoretical review and did not have any updated publications (e.g. Barney, 1991). In terms of accuracy, this refers to who published the data and how data was collected (Sekaran & Bougie, 2016). Thus, in searching for literature, reliable search sites such as *LUB Search*, and in some cases also *Google Scholar* was used with the criteria that *peer-review* was enabled. Other secondary data, such as reports from companies, were only used when these had a basis in research. Relevance refers to the applicability of the data for answering the research questions (Sekaran & Bougie, 2016). Secondary data that were not connected to the purpose or research questions were excluded. To find relevance in the secondary data, search terms targeted the research questions by including either of the following terms in the search for secondary data online: *digital, transformation, digitalisation, digitalization, digitisation, digitization* and *digital maturity*.

3.3.3 Primary data

Participants

A set of prerequisites were used to define the target population of the research. First, the participants were required to have a managerial position in their company. The reason being, that the study aims to describe challenges from a managerial perspective. Second, the participants had to work in either the IT or business area of their company. To get useful insights, the participants required to have a certain knowledge around the topic of digital transformation, either through an IT perspective or a strategic business perspective. Third, the participants had to be connected to projects related to digital transformation in their company. For participants to determine what challenges they face in a digital transformation, they must also be part of such transformation. Finally, the participants had to work in a company that was considered digitally mature, a Digital Master. Hence, the study focuses on the development of digitally mature organisations. However, this was only determined after the potential participants had conducted the questionnaire.

The researchers used a non-probability sampling design for recruiting participants, meaning that the gathered samples did not give all the individuals in the population equal chances of being selected. Non-probability sampling design is common in qualitative research since there is no need to make statistical assumptions (Sekaran & Bougie, 2016), which was true also for this study. Convenience sampling was used, meaning that the sample consisted of members of the population who were available to the researchers (Sekaran & Bougie, 2016). In this case, the researchers used the social media platform LinkedIn, as well as personal connections. The convenience sampling was a relevant method since it is a quick and efficient way of collecting information, which was needed due to the short time span of the study (Sekaran & Bougie, 2016). However, regarding generalizability, this method of sampling is also the least reliable sampling design.

Questionnaires

The use of questionnaires was chosen as a first method for several reasons. First, it provided a process for measuring digital maturity of the potential participants, which was one of the bases for the research purpose. Second, the use of theory in the questionnaire acted as a theoretical basis for the inductive part of the method, the interviews. This also aligned with the pragmatist approach of basing research on theory in order to improve theory. Third, the self-assessment test used in the questionnaire was developed on the basis of two years of research on global managers and organisations (Westerman, Bonnet & McAfee, 2014) and therefore, a clear example of how theory is derived from practice, aligning with the pragmatist approach (Sekaran & Bougie, 2016). Finally, the analysis of the questionnaires gave the opportunity of discerning any weaknesses of the organisations connected to digital maturity. This analysis could then be used to give the researchers a basis for developing a further focus for the interviews.

The questionnaire included three sections: one that included information about the study and ethics, one containing demographic questions and one that included the self-assessment test with the purpose of measuring digital maturity (See appendix B). The first section informed participants about the researchers and the

purpose of the study, deemed highly necessary by Sekaran and Bougie (2016). It also included information about confidentiality and the use of the collected data, which allows for "less biased answers" (Sekaran & Bougie, 2016, p. 151). The second section with demographic questions included five questions about the respondents, such as name, company and managerial position. It was put first in the questionnaire since this can increase the commitment to respond (Sekaran & Bougie, 2016). The purpose of these questions was to extract any necessary information to put the participant and its organisation into a rightful context. The third and final section included ten questions about Digital capabilities and ten questions about Leadership capabilities, as developed by Westerman, Bonnet and McAfee (2014). In the two sections on capabilities, the respondents were to indicate on a Likert-scale - from 1 to 7, where 1 represented *Strongly disagree* and 7 represented *Strongly agree* - to what extent the respondent agreed with each statement.

As an additional step before the collection of data, a pretesting of the questionnaire was done. This was done to make sure that the questionnaire could be well understood by respondents and that there were no issues with the measurement or wording (Sekaran & Bougie, 2016). A first edition of the questionnaire was distributed to two pilot respondents who gave feedback on the clarity of the statements. Following the comments from the respondents, the definitions of some terminology were added to the final section in order to avoid ambiguity.

When the content of the questionnaire was finished, it was distributed to potential participants. The questionnaire was created through Google Forms because of its user-friendliness for both researchers and respondents. Using an electronic questionnaire likely resulted in more reliable data, since participants could easily go back and forth between questions to revise their responses (Sekaran & Bougie, 2016). Subsequently, the questionnaire was sent out to the potential participants through email. The questionnaire was conducted by all potential participants no less than one week before the start of the interviews for the researchers to be able to analyse the results before the interviews.

Interviews

There were several reasons for including interviews as a second method. First, it targeted the inductive approach, with the purpose of collecting individual data from managers that could later be generalized into themes and conclusions. Second, it allowed for following the pragmatist approach, in collecting data with connection to a theory, in order to elevate the existing theory. Third, as opposed to a questionnaire or observation, the researcher could adapt questions when needed, clarify doubts and ensure understanding of the answers by rephrasing or repeating the questions (Sekaran & Bougie, 2016).

The interviews had a semi-structured approach. This meant that the researchers had a set of questions and themes to be explored, but in a relatively free format with a mix of open and targeted questions (Lantz, 2013). For this reason, an interview guide with a set of questions in Swedish was created (see Appendix D). However, the order and manner of asking the questions were not set or strict, and there was also no requirement to ask every question in the guide, depending on the interviewee's background and topics of interest. The aim of the questions was to focus on the areas of the questionnaire where the managers had scored the lowest points, since

the researchers identified this to be a possible clue in finding where the greatest challenges could be found.

How and *where* interviews were conducted depended on several factors. The preference of the researchers was to do the interviews face-to-face, in an office or other location agreed upon with the participant. However, if the participants lived or worked in a different region in Sweden and the cost of transportation exceeded the private budgets of the researchers, or the scheduling of interviews did not allow for a certain travel time, interviews were conducted through Skype or telephone. All interviews were recorded using a recording app on an iPhone 5 as well as physically noted by one of the researchers. Each interview lasted between 30 to 60 minutes.

3.4 Data analysis

In this section, the methods for analysing the collected data will be presented, both for the quantitative data from the questionnaire and for the qualitative data from the interviews.

3.4.1 Questionnaires

In total, two analyses were made of the results from the final section in the questionnaire. A first analysis of the results of the questionnaire was done by following the instructions by Westerman, Bonnet and McAfee (2014) and identifying who were self-assessed Digital Masters. The second analysis consisted of calculating the mean scores of each statement and subtopic.

To be qualified as a digitally mature organisation, a certain score was needed. The scores for the ten statements within Leadership capabilities and Digital capabilities respectively, were summarized. This lead to the categorisation of the participants' organisation into one of the four categories of Digital Mastery. Since the purpose of the study focused on digitally mature organisations, only those who reached a sufficient score to be categorized as a Digital Master were asked to be included in the subsequent interviews. To reach the level of a Digital Master, the participants needed to obtain a total score of 35 or more for the statements in each capability dimension. This averaged to be a minimum mean score of 3.5 points per statement, out of the maximum of 7 points per statement.

A second analysis of the results of the questionnaire was done by calculating the mean score of each statement and subtopics in the questionnaire. This was done through the calculating functions of Microsoft Excel. The mean scores were then used to discern which statement and subtopic had the lowest mean score, in order to find an additional focus for the subsequent interviews.

3.4.2 Interviews

For the analysis of the interviews, the researchers made sure to include two fundamental elements: getting acquainted with the data and a continuous process of sorting and resorting the data (Rennstam & Wästerfors, 2015). Firstly, before the detailed analysis of the data, all interviews were transcribed. The researchers followed agreed-upon guidelines which excluded elements such as intonations, pauses and non-words such as "uhm" and "eh". This simplified transcription was done

because of the limited time of the study and to be able to focus the efforts on the analysis of the data. The transcribed interviews were double-checked by both researchers and potential mishearings or mistakes were corrected. Thus, the researchers got well acquainted with the data before the analysis.

After the transcription, data were coded and categorized into themes. The transcribed material was coded using two main codes: challenges and solutions. The coding followed a deductive approach, guided by the research questions regarding challenges and solutions. The coding was done separately by both researchers and then integrated into one, that is, all interviews were coded by both researchers, individually, followed by a discussion and integration of the two versions of the coding. This was done in order to assure interjudge reliability (Sekaran & Bougie, 2016). Subsequently, all pieces of text coded as challenges and solutions were collected in one document respectively. Challenges were clustered and given themes, and solutions were subsequently sorted into these themes as well. Finally, the pieces of text within each theme were summarized and put into tables to create an overview (see Table 4.3 and 4.4). Within these three last steps, through transcriptions, coding and thematic clustering, the researchers used a continuous process of sorting and resorting the data which Rennstam and Wästerfors (2015) see as an important element in the analysis process.

3.5 Validity and Reliability

There are several aspects of validity and reliability to consider regarding both the self-assessment test in the questionnaire as well as for the interviews and its analysis. Firstly, the self-assessment test has not been used in scholarly research, only practitioner research. This also meant that there was no available data on its reliability and validity, for example, convergent and discriminant validity of the statements in the test. Hence, it is not certain whether the reliability and validity of the test can be assumed. Second, the self-assessment test had a relatively small number of items, in this case, 20 statements in total. According to Shaughnessy, Zeichmeister and Zeichmeister (2012), a self-report measure with many items is more reliable than one with only a few items. However, what is considered *many* and *few* is not defined by these authors. However, too many items "can cause respondents to become tired or careless about their responses" (Shaughnessy, Zeichmeister & Zeichmeister, 2012, p. 165), which would argue in favour of the relatively brief self-assessment test by Westerman, Bonnet and McAfee (2014). Third, it is uncertain if all participants interpreted the test in the same way, since many of the statements gave room for a subjective appraisal of capabilities. This risked that participants with different levels of digital maturity could have rated similar appraisal of their organisations' capabilities although this might not have been the case. Thus, some participants might have scored differently in a second test, depending on their current appraisal. Fourth, the test was developed for testing C-suite managers, meaning that an assumingly high level of knowledge of the own organisation was needed to fill in the test in a correct manner. All managers may not have had complete knowledge regarding their organisations' capabilities. However, to increase reliability it was ensured through the pilot testing that the self-assessment test had clear instructions and that some ambiguous concepts were defined under each question, explaining the different concepts in a simple and understandable way (see Appendix B).

Regarding the interviews, there are a few relevant aspects of validity and reliability to consider. First, a few biases could have been produced by the interviewer, the interviewee or the situation, as mentioned earlier in this chapter, which could have affected reliability and validity. Second, having the same interviewer and notetaker in all interviews was a measure taken to increase reliability. Third, to ensure the validity of the questions and their alignment with the research question, the interview guide was overseen by peer-reviewers. Fourth, a pilot interview was done to help adjust the interview guide and prepare the researchers for the interviews. Finally, to ensure picking up on any uncertainties, the semi-structured interviews were made to partially overlap with the questions in the self-assessment.

Furthermore, there were a few aspects to consider regarding the validity and reliability of the data analysis of the interviews. First, high interjudge reliability was the objective of the researchers, by first doing individual analyses that were subsequently integrated into one. Second, the researchers aimed for increased category reliability by making sure to sort and resort data continuously, as advocated by Rennstam & Wästerfors (2015). However, due to the time limits of the study, this analysis could have gained from even more time. Third, to increase the validity of the analysis, only themes with the most frequent support from the data were presented and further analysed in Chapter 5, Analysis. Finally, the deviant cases in the data, in other words, counterarguments for the main themes, were also included when possible. By doing this, Sekaran & Bougie (2015) believe that validity in qualitative research can be achieved.

3.6 Ethics

The ethics of the have been done according to the guidelines of Sekaran & Bougie (2016). First, all information given by participants has been treated confidentially. Second, no personal information has been solicited, aside from name and educational and professional background, which were considered as sensitive information. Third, the researchers never posed any questions or statements that could have violated the self-esteem or self-respect of the participants. Fourth, no participant was forced to participate and informed consent was included in both questionnaires and interviews. All participants were informed in both the questionnaire and the interview that they were able to cancel their participation. Finally, all reported data was made sure to not be misrepresenting or distorting.

3.7 Chapter Summary

For the pursuit of answering the research questions, the study used an inductive and pragmatist research approach. The research design consisted of a mixed-method approach with both qualitative and quantitative measures. The study contained three main elements: a continuous literature review, a questionnaire and semi-structured interviews. The questionnaire acted as a qualifying step where only participants who scored highly enough to be considered digitally mature, Digital Masters, were included in the study. The qualified participants were asked to partake in an interview. The interviews were semi-structured and used an interview guide to cover all topics of interest. These topics were derived from the set of statements in the

questionnaire and the literature review, as well as an analysis of the results of the questionnaire, in order to identify the greatest challenges of the organisations connected to the participating managers. The analysis of the interviews followed the guidelines for qualitative analysis, including data reduction and coding. In addition, elements of validity, reliability and ethics were discussed.

4

Data

In this chapter, the quantitative and qualitative data of the study is presented. The levels of digital maturity for the participants' organisations are identified and an analysis of the scores is made to discern which areas of digital transformation are the weakest. The qualitative results from the interviews of the qualified managers are then presented in relation to this analysis.

4.1 Quantitative data: Questionnaire

The results from the questionnaires were compiled (See Appendix C) to determine whether or not the participants were qualified for an interview. Figure 4.1 displays the scores of each participant that completed the questionnaire.

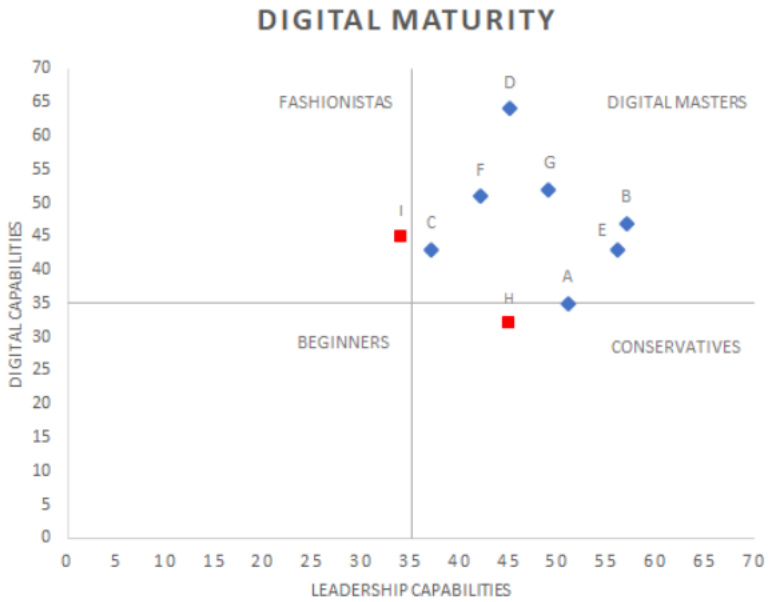

Figure 4.1: Digital maturity levels of potential participants' organisations. The graph displays all participants that conducted the self-assessment test of their organisations' digital maturity. The qualified participants are marked in blue and are within the boundaries of Digital Masters. Unqualified participants are marked in red.

Figure 4.1 displays that seven out of nine participants qualified as Digital Masters. Participant H and I were assessed as a Conservative and a Fashionista, respectively. Therefore, the results for participants H and I were not included in the subsequent analysis, thus are marked red in Figure 4.1.

After the results from the questionnaires were assessed and the qualified participants were determined, further analysis of the detailed scores of the Digital masters were made. Among the Digital Masters, the average total score out of 70 for Leadership capabilities was 48.1 and the average total score for Digital Capabilities was 47.9. To discern any possible weak areas within the capabilities, an average score for each statement and each subtopic was created. It should be noted that, because the results were only gathered from the Digital Masters, most subtopics were generally highly scored. Therefore, the main point of interest was not the score in relation to the maximum of 7, but instead of the relative deviation between the scores of the different subtopics.

Table 4.1: Mean results from the self-assessment questionnaire regarding the managers' perceived digital capabilities in digitally mature organisations. Each of the statements were rated between 1-7 where 1 represents Strongly disagree and 7 represents Strongly agree.

Digital Capabilities		**Average** (Max. 7)	**Average per subtopic** (Max. 7)
Customer experience	We are using digital technologies (such as analytics, social media, mobile and embedded devices) to understand our customers better.	4,43	4,82
	We use digital channels (such as online, social media, mobile) to market our products and services.	6,00	
	We sell our products or services through digital channels.	4,00	
	We use digital channels to provide customer service.	4,86	
Operational processes (automation)	Technology is allowing us to link customer-facing and operational processes in new ways.	4,86	4,43
	Our core processes are automated.	3,29	
	We have an integrated view of key operational and customer information.	4,86	
	We use analytics to make better operational decisions.	4,71	
Business models	We use digital technologies to increase the performance or added-value of our existing products or services.	5,43	5,43
	We have launched new business models based on digital technologies.	5,43	

Table 4.2: Mean results from the self-assessment questionnaire regarding the managers' perceived leadership capabilities in digitally mature organisations. Each of the statements were rated between 1-7 where 1 represents Strongly disagree and 7 represents Strongly agree.

Leadership Capabilities		Average (Max. 7)	Average per subtopic (Max. 7)
Transformative vision	Senior executives have a transformative view of the digital future of our company.	5,571	5,07
	Senior executives and middle managers share a common vision of digital transformation.	4,57	
Engagement	There are possibilities for everyone in the company to take part in the conversation around digital transformation.	5,571	5,29
	The company is promoting the necessary culture changes for digital transformation.	5.00	
Strong governance	The company is investing in the necessary digital skills.	5,43	5.00
	Digital initiatives are coordinated across silos such as functions and regions.	5.00	
	Roles and responsibilities for governing digital initiatives are clearly defined.	4,57	
Technology leadership (It & business)	Digital initiatives are assessed through a common set of key performance indicators.	4,14	4,14
	IT and business leaders work together as partners.	4,43	
	The IT unit's performance meets the needs of the company.	3,86	

Through this analysis, one can identify a few particularly high and particularly low scored subtopics. From the mean scores within each subtopic, the lowest scored subtopic was Technology Leadership with an average score of 4.14. Within this subtopic, the lowest scored statement was *The IT unit's performance meets the needs of the company.* Furthermore, the next-to-lowest ranked subtopic was Operational processes with an average score of 4.41.Within this subtopic, the lowest scored statement was *Our core processes are automated*, which is also the lowest average scored statement of the questionnaire. On the opposite side of the spectrum, the highest average scored subtopic was Business models, with an average score of 5.43. Additionally, the highest scored statement in the whole questionnaire was under the subtopic of Customer experience; *We use digital channels (such as online, social media, mobile) to market our products and services*, with an average score of 6.0.

4.2 Qualitative data: Interviews

After the first analysis of the questionnaire, the interviews were conducted. Interviews were, as previously mentioned, only conducted with the managers who had fulfilled the requirement of working in an organisation that was self-assessed as digitally mature. One main focus of the interviews related to the subtopic of Technology Leadership, as this was the lowest scored subtopic according to the analysis of the questionnaires. However, additional questions were asked following the interview guide (See Appendix D) based on the results from the questionnaires and the literature review. After the interviews were transcribed, a thematic analysis was conducted according to section 3.4.2. The analysed interviews showed trends of a divide between external and internal digital transformation. This divide is explained

further in chapter 5, Analysis. The results of the thematic analysis were compiled in Table 4.3 and Table 4.4.

Table 4.3: Internal elements of digital transformation, thematic analysis of data from interviews.

Internal elements of digital transformation		
Theme	**Challenges**	**Solutions**
Human relations *(6 out of 7)*	• Job roles are changing, people are afraid of losing their jobs • Difficulties in attracting competences • Employees are unwilling to change • Difficulties in making sure employees understand why changes are needed • Making people go in the same direction	• Offer more stimulating tasks • Educating: upskilling and reskilling • Re-evaluate & prepare people for changes • Storytelling, selling the idea, explaining why change is needed • Follow through with the changes • Meeting people where they are, let people be involved in the development • Communicate through many channels
Collaboration between IT and Business *(7 out of 7)*	• IT and Business as two separate entities • Lack of knowledge/understanding • Lack of *direct* contact	• Integration of IT and Business through collaboration & relationship building • Improved communication through education or mediators • Trusting each entity to do their job
Systems and processes *(6 out of 7)*	• Clean up old legacy: Unable to incorporate current technology into old systems • Time consuming to change systems • Standardized platforms are not always enough	• Receive external IT support • Prototyping of systems and testing them beforehand • Adapt to customer and business needs • Switching out and decreasing the number of collaboration platforms • Go from outsourcing to insourcing of [IT] development
Investment decisions *(5 out of 7)*	• High costs of development • Difficult to get funding • Making investment decisions	• Always include profitability into decision making on digital investments • Find efficiencies: using technology to improve marginal and find new revenues • Ask "how" and "why" when investing

Table 4.4: External elements of digital transformation, thematic analysis of data from interviews.

External elements of digital transformation		
Theme	**Challenges**	**Solutions**
Stakeholders *(5 out of 7)*	• Fast and continuously changing customer and market needs	• Take one step at a time • Communicate through many channels to all stakeholders • Customers should be in focus • Realize some changes are not possible
Compliance *(1 out of 7)*	• Costly and extensive • Limiting possible ideas/solutions • GDPR	• Complying with the law
Global challenges *(2 out of 7)*	• Different markets and conditions in different countries • Language barriers • Finding common ways of working in decentralised or global organisations • Too narrow-minded perspectives within the organisation, inward-looking instead of outward-looking can prevent innovation	• Look at global trends, micro and the macro trends around the world
Competition *(4 out of 7)*	• Threats from other businesses, big or small can be dangerous in the long run • Competition from start-ups	• 'Ours to lose': act or lose your position • Develop fast to be market leaders, or be followers and copy products fast

4.3 Chapter Summary

In this chapter, the results from the questionnaires and interviews were presented. The results showed that seven out of nine managers were qualified to partake in the interviews, since their organisations were assessed as Digital Masters. Participants whose organisations were not assessed as Digital Masters were not included in the subsequent analysis nor interviews. Furthermore, the analysis of the questionnaires displayed that the lowest scored subtopics was Technology Leadership, under the dimension of Leadership capabilities. This subtopic was further explored in the interviews. From the analysis of the interviews, eight themes were found and identified and their challenges and solutions were presented. The themes were also divided into two sections: Internal elements of digital transformation: consisting of Human relations, The collaboration between IT and Business, Systems and processes and Investment decisions and External elements of digital transformation: consisting of Stakeholders, Compliance, Global challenges and Competition. These themes are further analysed and the main themes are identified in chapter 5, Analysis.

5

Analysis

In this chapter, the results from the questionnaires and interviews will be analysed and discussed. First, a general analysis of the themes will be presented, followed by an in-depth analysis of the main challenges and their solutions.

5.1 Internal and external elements of digital transformation

The underlying structure of the analysis is based on one of the main themes derived from the collected data, the separation of *internal* and *external elements of digital transformation*. This separation is founded on what the participants mentioned as more or less challenging in their digital transformation. Specifically, many of the participants described how the greater challenge in their digital transformation was about transforming tools and processes internally for the organisation and its employees (C, D, E & G). On the other hand, transforming products and processes connected to the final customer were generally viewed as more achievable and less challenging (B, C, D, E & G). These insights were named *internal* and *external elements of digital transformation*.

Thus, internal and external elements of digital transformation need further definition. The researchers defined the *external elements* as all outbound-related digital projects concerning the customers or market. In other words, digital transformation directly related to the products or services going out from the organisation. On the other hand, the researchers defined the *internal elements* as aspects concerning the internal processes or employees and how the organisation works in order to produce the products or services. In a simpler way, external elements can be thought of as the *what*, as in what the company sells, and the internal elements as the *how*, as in how the company produces the products or services sold.

The division between internal and external can also be found in past research. Highly ranked challenges, or particularly low maturity, within digital transformation have been found to be *development of new capabilities and skills, complexities of strategic and organizational challenges, corporate culture* (Nahrkhalaji et al., 2018), *too many priorities, security concerns, insufficient tech skills* (Kane et al., 2015), *alignment of business and IT* (Reynolds & Yetton, 2015), *Digital Mindset* (Seitz & Burosch, 2018), *analytics and usage of big data* (Berghaus & Back, 2016), *cultural issues, presence of archaic IT systems and applications* and *lack of digital skills*, most

of which can be categorized as internal elements of digital transformation, according to the researchers' definition. The lowest ranked challenges, on the other hand, have been found to be *changing customer behaviour, market uncertainties* (Nahrkhalaji et al., 2018), *digital affinity and employee commitment* (Berghaus & Back, 2016). Here, *changing customer behaviour and market uncertainties* would be categorized as external elements, while *digital affinity* and *employee commitment* would be categorized as internal elements. Thus, the lower level of challenge in external elements is not as clear as the higher level of challenge in internal elements. However, the reliability of Berghaus and Back's (2016) study will be critically discussed in chapter 5.3.2. Though the low level of challenge for the external elements is not as validated as the high level of challenge of internal elements in past research, there is a possible divide.

Reasons for the ease of external elements

The strong focus on customers and profitability might be one reason for why the external elements are more highly developed and considered less of a challenge by the participants. This possible explanation was first found in the results from of the questionnaire, where the highest scored statement originated from the subtopic of Customer experience; "We use digital channels (such as online, social media, mobile) to market our products and services", with an average score of 6.0 (out of 7.0). Thus, indicating that this was a main focus and achievement among the participants in their digital transformation. The progress in customer experience was also found by Capgemini Research Institute (2019). The results from the questionnaire were further supported by participant D: "[...] it starts with a knowledge of the meeting with the customer [...] all companies live on solving some kind of problem or add some value for a customer." Participant G also emphasized the customer focus, explaining that their organisation had developed their digital channels towards customers significantly more than their own internal processes: "we digitized very much towards our customers, and then it is the external systems, we have done the website, we have done this whole data store, and we have worked very much with our customer applications, but we still have the same business system at the bottom". Participant G argued that a reason for the external elements to be easier to transform was since it is easier to control customers as they are not as complex as internal business systems. Another factor driving this digital focus on customers could be the argument of participant G, that there is an expectation among customers to be able to connect online with brands and have an increased accessibility, as a result of them seeing digital as the norm. The increased expectations could be one reason for the trends of organisations to focus more on the external elements of digital transformation compared to the internal elements of digital transformation. Again, this could also be connected to past research, stating that *changing customer behaviour* and *market uncertainties* are the lowest ranked challenges in digital transformation (Nahrkhalaji et al., 2018). Thus, there are many reasons why companies focus on the customer and the external elements of digital transformation and, accordingly, the internal elements of digital transformation become neglected and challenging.

Internal elements as the main challenge

Contrasting with the ease of the external elements of digital transformation, several participants explicitly pointed out that their main challenges instead related to the internal elements of digital transformation. Participants E, C and G argued that the internal changes cause more resistance, while the external changes are welcomed by most: "Especially customer solutions [...] is always well received, because everyone sees the need of doing something. There we have no direct obstacles. But you can say that everything that involves work processes and things like that affect people in varying degrees." (E). Similarly, participant C stated: "The support from employees depends on what kind of implementation it is: if you're implementing new processes within administration and control [of data, hours or efficiency], it's negative, no matter if the company can show the need for the data to improve or show to investors." Finally, participant G argued that: "We have digitized the agreements, we have actually made the whole transition that you need to do in order to meet customer expectations. It's really the easy part." This also aligns well with the findings of Capgemini Research Institute (2019), arguing that companies have been progressing in customer experience, but are still falling behind in areas such as operations, engagement and governance. In conclusion, several of the participants found the internal elements of digital transformation to include the main challenges.

The division between internal and external, and their levels of challenge, is an important feature for answering the research question. Since the research questions focus on the *main* challenges and solutions, only the challenges that are mentioned by the most participants and/or with the greatest depth and emphasis will be presented as answers to the research questions. Thus, this integral analysis provides motivation for focusing on the internal elements of digital transformation, since these were appraised as more challenging.

Within the elements of internal digital transformation, four distinct themes of challenges were found, displayed in Figure 5.1. These themes consist of *Collaboration between IT and Business*, *Human relations*, *Systems and processes* and *Investment decisions*. These four themes of challenges were the result of the previous data reduction and data analysis, which focused on answering the research questions to the best ability and, thus, the four themes of challenges do not exhaustively cover every challenge mentioned by the participants. In the following sections, these challenges and their proposed solutions will be explained in further depth, along with discussions on their connections to past research and theory.

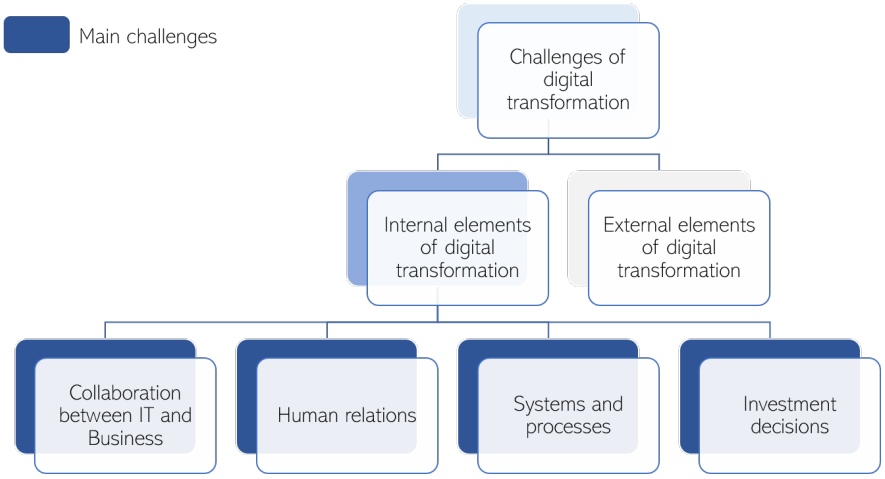

Figure 5.1: Main challenges to progress in digital maturity

5.2 Collaboration between IT and Business

According to the analysis of the questionnaire, the results showed that the lowest scored subtopic for the participants going through a digital transformation was the Technology Leadership within Leadership capabilities (see chapter 4, Table 4.2). The following paragraphs will focus on the participants' perceived challenges regarding the partnership between IT and Business and specifically, how IT and business departments are more or less integrated, and on the level of understanding and communication between the two departments. Due to the participants' different organisational structures, where IT and business are either integrated (B) or separated (A,C,D,E,F,G), different needs for communicating and understanding between the two exist.

Challenges

Some of the participants found that they, or their employees, had a hard time keeping up with the increasingly advanced IT knowledge. Participant C noted that the high expertise of IT was difficult for the business employees to keep up with. Similar to this, participant G argued that the development teams in their company had a tendency to move along too quickly, while other employees struggled to keep up with implementing the development teams' work into their daily tasks and roles. Despite weekly meetings, the people in participant G's project group had still not been able to take in the necessary knowledge and changes that came with the digital transformation. The imbalance between IT and business was also found by Capgemini Research Institute (2019), who detected that the relationships between IT and business had not kept up sufficient pace to satisfy the organisation's needs.

For some participants, the differences and separation between the IT and business departments was especially clear and could pose some challenges. Participant A stated that IT and business are two completely different languages that need constant translation. In addition, participant E found that it was a significant challenge to move away from the mindset that "business is business and technology is technology". Participant D noted that this separation of business of IT was something particularly characteristic of companies with history, unlike start-ups where these

separations do not exist. This disconnect was also detected by Capgemini Research Institute (2019), noting that a shared understanding and view of common issues had substantially decreased between 2012 and 2018. The challenge of aligning IT and business was also noted by Reynolds and Yetton (2016).

Solutions

The participants suggested to solve the challenge of disconnect and imbalance by creating contact and communication in several ways. At participant G and E's company, they used 'translators' to enable communication between IT and business. That is, employees who can translate between management and the coders. Participant G argued that this was a necessity for their organisation, while E saw this system as redundant and outdated, aiming for an organisational structure with more integration of all kinds of roles and skills. Following this attitude, E's company had started to integrate a mixture of roles in the new, product-led teams: "What we are really trying to do is to create an as efficient interface as possible, where we premiere some kind of direct contact rather than middlemen" (E). Without these translators, participant A suggested that it was important to have openness and understanding in this contact and argued that direct communication was a key element in this understanding. Similar to E, participant C worked hard on making conversations happen between roles, mixing people with different competences in their teams, particularly in relation to IT and business. Participant C described the importance of not allowing people "to run off and do their own thing", but instead always encouraging dialogues between these people: "You need to create transparency between these two parts, otherwise you don't understand each other." Similarly, participant F's solution was to create a small team with a mixture of roles, in order to come up with new ideas and innovations. The need for strong communication was also found in Capgemini Research Institute's (2019) study. Hence, several participants believed that by creating spaces for people of different expertise to meet, one can minimize the knowledge gap and create an increased understanding between IT and business employees.

Furthermore, the participants proposed a number of key competences for bringing IT and business closer together. Participant B suggested that participants require two main skills for integration: understanding the business and putting on a coaching and didactic role to demonstrate the potential the change can do. However, B also noted that this requires hard work, endurance and discipline as well as the ability to link new processes to the existing processes in the company. Participant E stated that to handle the meeting between business and IT, managers need the capability of explaining how the technology can bring the company forward and why the method used today is better than the method used yesterday. Participant C further argued that you need competences from both sides: business needs to understand how to ask the right questions to IT, and "IT needs to understand and accept that we are a profit-making company". "The competence is about understanding each other" (C). Thus, some of the key competences for bringing business and IT together consist of understanding and being able to explain and motivate decisions.

Finally, the participants also stated that the communication and collaboration could be improved by increased trust among the groups. Both participant G and participant C stated that trusting their IT-colleagues, as well as suppliers, was

an important key for them to work in harmony with IT. Having worked several years with digital projects, participant G felt confident in understanding the most fundamental concepts, but still, being able to trust those around that knew more and worked more directly with IT was something participant G was adamant about pointing out in the interview. Participant C stated that when IT is getting advanced and business is not stringing along, "you need to trust in and make sure you have the right competence [in the company]".

Discussion

As argued by Kane et al. (2015), the strengths of digital technologies aren't in the technologies themselves, but rather in how these are integrated into transforming their business and how they work. This integration and complexity are also what can build and sustain a competitive advantage for companies (Barney, 1991). Thus, it can be seen as essential to make the collaboration between IT and business to work well, as this is a possibility to sustain a competitive advantage. For example, there is nothing unusual about having an IT department if you are a big company and, thus, the only way to make the IT resources valuable, rare, imperfectly imitable and non-substitutable (Barney, 1991) is to connect them with other resources of the company, such as business, to create strong capabilities with potential of sustained competitive advantage. This could also align with Reynolds and Yetton's (2015) arguments, who found that the alignment of IT and business has several areas of potential for value creation.

In addition, it is possible that this constant push for creating communication, or the use of translators between, is something that hinders the further development of their organisation's digital maturity. Several participants found themselves as a kind of mediator between business and IT, either translating or actively creating projects or other contact surfaces for them to meet, which could be seen as taking away resources from other value-creating activities available to them in their roles as managers. Only participant B seemed to have a role that was not directly mediating between the two, making B available for other types of managerial duties. Seeing that most participants actively strived to create a partnership and collaboration of some kind, it is reasonable to think that a setup like B's would be more advantageous for all. In addition, it seems instinctive to think that working more integrated, such as participant B describes, would create more contact surfaces between the different roles, and, thus, give rise to more digital innovations that could propel the organisation into higher levels of digital maturity. In addition, this would counteract the disconnect and imbalance in pace, as detected by Capgemini Research Institute (2019).

The collaboration between IT and business has a clear connection to Leadership Capabilities, since it was the main focus deriving from the analysis of the questionnaire. Thus, working on overcoming the knowledge gaps and separations between IT and business would be a concrete way to increase a company's level of digital maturity. This would, according to the definition of digital maturity, also aid in progressing in digital transformation.

5.3 Human relations

When interviewing on the topic of employees, many participants found this area to be particularly challenging. This could be connected to the subtopic of Engagement and Strong governance within Leadership capabilities. Within this theme, two subthemes were detected: *Attracting and retaining employees* and *Employee resistance to change*.

5.3.1 Attracting and retaining employees

As a result of new technological abilities in companies, there is room for automation and efficiencies that lead to the loss and obsoletion of certain tasks, as well as the creation of new roles. This allows for further competition between companies, leading to the challenges of attracting and retaining employees.

Challenges

Several participants mentioned the challenges of attracting and retaining competent employees. Participant F described how in their traditional industry, the company especially struggled with recruiting and retaining people with the right competences: "In the past, it was said that if you were to become a [...] machine operator, then it required 5 years before you were even sufficiently trained, and today people do not stay more than five years. It has driven us very much, [...] both in training for our employees, but also to create much smarter solutions in the actual production, then, to facilitate and stimulate the younger individual.". Participant D added to this by suggesting that (young) people have become more interested in whether the tasks are stimulating or interesting, rather than the title of their job. In addition, participant D stated that there is an increased interest in personal and professional development in the workplace. Participant G proposed a different perspective, arguing that sometimes it does not work to change people if the constellation remains the same: "It is perhaps a sad truth that you may not be able to go with the same 40 people to a whole new way of working." If the same group of people have worked in a certain way for years and suddenly need to start working in a different way it imposes problems. Thus, attracting new people in the organisation arguably is a vital part of the digital transformation. Past research also found the lack of digital skills and talent to be one of the main challenges of digital transformation (Capgemini Research Institute, 2019; Capgemini Research Institute and LinkedIn, 2017; Nharkhalaji et al., 2018; Kane et al., 2015; Seitz & Burosch, 2018), but also highly valuable (de la Boutetiére, Montagner & Reich, 2018; Seitz & Burosch, 2018; Kane et al., 2015). Hence, the perceived challenge was for companies to find ways to become more attractive to potential employees, especially the younger or newly graduated people.

Solutions

To increase the ability to attract and retain employees, several of the participants talked about how to make both tasks and roles more inviting. Both participant E and participant F suggested that their organisations need to find and offer more modern and stimulating tasks in order to attract new employees, but also added that they must also be able to offer these tasks much faster than before. Participant D

suggested that companies need to use new technologies to automate the monotonous, administrative and repetitive tasks. When it comes to the retaining of employees, participant B talked about how their company is investing in 'enabling capabilities', that is, the skills and competencies of the company's employees. Participant E advocated the need for the company to constantly rebuild and re-evaluate what these competences are or should be, depending on the market and what needs the company is required to fulfil. Another solution, implemented by participant F in their company, was to introduce digital training to make it possible to learn machine service outside the loud factory environment, in order to increase the attractiveness of the positions. As a part of this, participant F's company has been introducing technologies such as Virtual Reality (VR) into the training and Artificial Intelligence (AI) into the production. Thus, the participants solutions consist of using different kinds of training, both analogue and digital, for initial and continuous training, as well as digital technologies for automating routine tasks.

Discussion

According to several studies (de la Boutetière, Montagner & Reich, 2018; Seitz & Burosch, 2018; Kane et al., 2015), the skills of employees are some of the most important resources of companies, especially in a digital transformation. Thus, it can be considered even more important to actively work toward attracting employees with the right skills, as well as constantly build and develop those skills of existing employees, since these have a great potential of value creation (Seitz & Burosch, 2018). Therefore, the challenge of the participants in attracting employees should be seen as a rightful one, that is, it is a challenge worth the fight.

Having the right competence and digital skills connects to the subtopic of Strong governance within Leadership capabilities. In particular, this corresponds to the statement *The company is investing in the necessary digital skills*, which had the highest average score within the subtopic. Apart from past research on the importance of digital skills, improving within this area would lead to increased digital maturity and, thus, progress in digital transformation.

5.3.2 Employee resistance to change

In a digital transformation, some changes need to be made, though they are not always welcome. In particular, the participants found that challenges arose when making changes to the internal processes. This will be elaborated on below.

Challenges

Several of the participants suggested that, although it is often easy to make employees excited about a digital transformation and digitizing customer-facing products and processes, changing the internal processes can be challenging. Participant G stated that: "Everyone has been so enthusiastic to make this trip. But when it comes down to it, how fun is it really?". While employees may be positive at first, when they realize they are affected themselves they can still create resistance. Participant G added to this by stating that the challenge was about changing the internal processes and getting people to walk in the same direction. Similarly, participant B argued that it is very easy to buy new technologies and digital solutions,

but you have to work more with people's behaviour and culture. This corresponds with the results of Capgemini Research Institute (2019), finding that the employees' initial eagerness for digital transformation might get clouded by the difficulties of implementation. Hence, the challenge lies in implementing the digital changes with the employees.

The reason for this resistance were believed to have certain causes. In particular, several participants found that the changes in administrative tasks and roles caused resistance from employees (B, C, D, E & G). In addition, participant D noted that a job that was once perfect for one person may change, leading to dissatisfaction, while participant G made the observation that employees who have worked for a long time in the industry tend to 'guard' their analogue tasks, in fear of losing their job. Participant D agreed with G, stating that some are afraid of losing their jobs in conjunction with the changes of a digital transformation. Thus, resistance may be caused by low satisfaction with new tasks, unwillingness to change routines or fear of losing a job.

Solutions

To meet this resistance, most of the employees brought up different aspects of explaining and motivating the internal or administrative changes to the employees. Participant E stated that leading a digital change requires clear communication and explaining the reasons behind the change; why technology is good and advantageous and why the new methods are needed. Participant F noted that to get employees on board with the digital transformation, managers need to make employees realize the value that digital changes bring. Participant B advocated the need for them to 'sell in' the new digital technologies to employees through storytelling. Participant G stated that they could encourage employees by giving feedback on what the effects the changes have as well as what the new behaviour constitutes. Similarly, participant F specifically noted that doing changes step by step allowed them to show off "success stories", making employees see how the changes benefited the productivity, the quality or the work environment, and, thus, creating a greater interest in the change. This aligns with the results of Capgemini Reasearch Institute (2019), finding that transparency is an important factor for success in digital transformation. Thus, the participants found explaining, motivating and 'selling in' the digital change as a prominent solution to meet employee resistance.

However, motivating and explaining *why* was not enough according to one participant. Participant C experienced that when implementing new processes within administration or control (for example, by measuring time or efficiency and collecting data from employees), the response was always negative, no matter if the manager or the company can show the need for the data to improve its business or present to investors. However, participant C also stated that if certain changes need to be done, the leader needs to be fully committed to the change and follow through with it until the end. This aligns with what Jacquemont, Maor and Reich (2015) found to be a success factor: fully implementing digital initiatives. Thus, a first step is to thoroughly motivate changes, then, if that does not work, managers must make sure to follow through with the decisions they make.

The participants also proposed solutions connected to engaging employees in the digital transformation journey. Participants E, F and G suggested that they can create this understanding by letting the employees work with and invite them to be

a part of the journey and by giving people time to explore the new opportunities. Particularly, participant F said: "Let people, not just participants, of course, but also operators, be involved in driving the development." This inclusive attitude also aligns with the relatively high score of 5,571 (out of 7) of the statement *There are possibilities for everyone in the company to take part in the conversation around digital transformation* (see Table 4) in the questionnaire. This suggested solution aligns with the results from Capgemini Research Institute (2019), finding that the employee experience is becoming increasingly important. Thus, an additional way to create understanding for digital change is to involve the employees, not just explain what is happening.

Discussion

The resistance of employees aligns with some of the past research. As Schallmo and Williams (2018) stated, the digital transformation requires people to rethink their old processes and reimagine new processes and decisions, which may not be a simple thing to do. The resistance could also be due to the existing corporate culture, which Nharkhalaji et al. (2018) found to be one of the top challenges for NPOs and McKinsey reported to be the main self-reported barrier to digital effectiveness (Goran, LaBerge & Srinivasan, 2017). Some cultures might be convinced by good motivations and explaining "why" (as for e.g. participant A and B), while some might reject any and all changes (as for participant C). Both participant C and G had difficulties in making changes, which G explained to be because of the high academic level of the employees in the company, which was also true for the employees at C's company. An additional cause could be due to what Kane et al. (2015) found, arguing that the failure of implementing new technologies usually is caused by the mismatch in expectations due to the organisations not changing their mindsets and processes nor build cultures that foster the digital transformation. Thus, resistance might be connected to culture, the individuals in it or a mismatch in expectations between the company and its employees.

Contradictory to the findings in this study, Berghaus and Back (2016) found that employee commitment and digital affinity were some of the easiest obstacles to tackle in a digital transformation. According to the findings, Berghaus and Back's (2016) study might be correct at the early stages of a transformation, as described by participant G. That is, the employees are excited about keeping up with digital trends in the beginning, but when it starts affecting them and their routines directly, they are no longer as cheerful. This could align with Capgemini Research Institute's (2019) suggestion that "[...] employees adopt[...] tools and platforms with enthusiasm at the beginning but stop[...] using them." (p. 95). Alternatively, it could also align with that the participants found that employees were more excited about transforming the customer-focused parts of the company where they could get instant feedback from customer, for example, by digitizing forms or overall improving the customer experience through digital, rather than their own processes and routines.

Engaging employees can be connected to the subtopic of Engagement within Leadership capabilities. In particular, engagement can be connected to the statement *There are possibilities for everyone in the company to take part in the conversation around digital transformation*, which had the highest average score within Leadership capabilities. Thus, this area might not be able to improve very much

more for some. Nevertheless, as employee experience is becoming more important (Capgemini Research Institute, 2019), it should stay in focus for companies who want to keep progressing in their digital transformation.

5.4 Systems and processes

As the concept of digital transformation implies, it most often involves some sort of development or purchase of new technology, which connects to Digital Capabilities. Several of the participants had found some challenges in this area of their transformation, aligning with the low scores in the results of the questionnaire. The most prominent theme was the challenge of handling old business systems, so called *legacy systems*.

Challenges

One main challenge concerning the technology of the digital transformation is how to handle legacy systems. Needless to say, mature organisations have a history and already-established systems that need to be considered. Thus, the problems of legacy systems, and not having as advanced technology as they would have liked, was apparent to participant E, stating that: "in our current set up , we're not really in the cloud when it comes to our solutions, it's still very much hardware and wires and things. That leads to that the actual technical deployment takes its time"(E). That is, E found that the legacy systems they had was hindering them from being as quick footed as they would like. Participant G added even further challenges with the legacy systems, explaining that older systems are usually incompatible with newer technologies, making it impossible to stay ahead, or even up to date, on current technology. "It is difficult to be quick in such an organization, and then the start-ups become huge competitors" (G). Thus, again, the legacy systems affect the quickness of organisational action, which in turn welcomes competition from other companies who are not burdened by legacy systems. Adding to this, E also mentioned that their current "underlying landscape" was hindering them from getting access to data and setting up the product-led teams that they need to become a digital organisation. Past research has also found legacy systems, or specifically, *archaic IT systems and applications*, to be one of the top hurdles to digital transformation (Capgemini Research Institute, 2019). Based on the participants' statements, having legacy systems creates challenges for several aspects of the business: quickness of action, staying current in technological developments, the competition from start-ups, access to data and creation of product-led teams.

Legacy systems aren't just a challenge in themselves, they are also a challenge to dispose of. Participant E noted that "[...] we still invest a lot in just cleaning up old legacy - that's really where we put most of our money" (E) while G noted that "to replace [the old system], it is so terribly difficult. Then 1100 people will need to go in and start from scratch" (G). Participant G noted that this was difficult for two main reasons: first, that they would need to re-think the whole basis of the company's IT process and second, because it would infer extensive change management processes to lead employees in working in a completely new system. Thus, the challenge in disposing of legacy systems includes the high costs and the need to manage change

processes for employees. This, of course, leads back to the challenges of *Human relations* in chapter 5.3.

Solutions

The main solution to legacy systems seems simple: disposing of them. However, the participants had different perspectives of what that would take. Participant G elaborated on this: "[an old business system] will never be able to incorporate the technology we have today [...], so it is better to switch to a new business system. Even though it costs, and it is incredibly painful, still, you have to do that. And it is the key, perhaps, that one needs to start from the beginning, with some things as well". Despite this statement, participant G's company had no imminent plans on implementing a new business system. As opposed to participant G, participant E did not mention implementation of new systems as a challenge. E noted that "restructuring the underlying landscape [...]is pretty basic in a technology point of view, it's not very complex in implementation point of view." Participant E also elaborated further: "we want to change [the long time for technical deployment] by being much more cloud-based and being able to deploy much faster." (E). In addition, participant E's organisation is preparing for developing their own, centralized, system. Thus, replacing the legacy systems with new ones seems to be necessary, at least at some point, though it is considered more or less painful.

Discussion

Some elements of the challenges of legacy systems could have a possible connection to past research. As previously mentioned, Berghaus and Black (2016) found that the analytics and usage of big data were the main difficulties of digitally mature companies. This connects to participant E's statement on how the legacy systems were hindering his company from accessing and utilizing data. Though Berghaus and Black (2016) connected this to the difficulty in forming organizational practices, based on E's statement, the low achievement of data-related activities could also be connected to the limitations of legacy systems.

Legacy systems are not explicitly touched upon in the Digital Mastery model, however, they would naturally connect to Digital capabilities. In addition, if legacy systems are hindering the implementation of new technology, it should be particularly relevant to nearly all aspects of Digital capabilities, since these are based on performance-improving technologies. Thus, looking over the efficiency and compatibility of legacy systems should be a priority of companies if they want to progress in their digital transformation.

5.5 Investment decisions

Most participants stated, in one way or the other, their need for financial resources to be able to progress in their digital transformation. In particular, deciding what digital investments the financial resources should be used for was found the be a challenge that targeted digital transformation specifically, and is closely connected to Digital capabilities.

Challenges

Two participants (B and C) found that the decisions regarding digital investments were especially challenging. Participant C found that a challenge is to know whether an investment is good, in terms of whether it will pay off in the long run. Thus, C found it hard to know if one is making a good decision. B noted a similar challenge; getting value from the investment throughout its implementation, not just at the end. This challenge is more or less unique to digital transformation, since the rapidness of technological development, imposed by Moore's law (Brynjolfsson & McAfee, 2014), creates further uncertainty on the long-term return on investment (ROI).

Solutions

The participants suggested a few solutions, or rather, ways of thinking, regarding digital investment decisions. Participant C's solution was to be very critical towards new investments, constantly asking "why". C also made sure to create business cases for every potential investment. The motivation for this was that the company needs to show profitability, just like all companies do. Participant D noted that it was common for business leaders to think that investments in technology were one-time investments, however, D believed that "[...]one should prepare to have a sustainable high level of investment in the digital area.". Similarly, participant B's company had a common saying: "It is ours to lose". That is, if they don't act, and invest, they will lose their position. Though there is a need for reasonable decisions regarding investments, it is also important to continuously act and invest.

Discussion

Participant B's statement on the importance of acting in order to not lose their position shows a consciousness of the need for technology in order to sustain their competitive advantage. The role of technology in sustaining competitive advantage should reasonably differ depending on the industry and competition, though it should not be able to sustain competitive advantage by itself (Barney, 1991). However, it is interesting to note that C's company is a heavily research-based company where a large portion of their budget is dedicated to research on innovations, which might be the reason that C is careful with approving additional digital investments.

Investment decisions are most certainly connected to Digital capabilities, since this concern digital investment. Making the right investment decisions should, thus, be considered key to increasing a company's Digital capabilities. Thus, finding efficient and effective ways of making long-term profitable investment decisions is essential to increase digital maturity and progress in a digital transformation.

5.6 Chapter summary

In this chapter, an in-depth presentation of the data analysis has been presented. A general theme regarding the division between internal and external elements of digital transformation was found, where the main challenges lay in the internal elements. This might be due to the heavy focus on fulfilling the expectations of customers and, thus, sustaining competitive advantage, leading to the fulfillment of

the external elements of digital transformation. Within the internal elements, three central themes of challenges were found; *Collaboration between IT and Business*, *Human relations*, *Systems and processes* and *Investment decisions*. The themes were presented with challenges and solutions, as well as a small discussion connecting back to the past research and theory. In addition, the themes were connected to either Digital or Leadership capabilities.

6

Conclusion

This chapter presents the conclusions and summarises the findings from the research in order to answer the research questions. Additionally, this chapter presents the practical implications of the research, the limitations and suggestions for further research within the topic.

6.1 Conclusions

The flow of technological advancements is putting pressure on organisations to keep up with a digital transformation to match the new expectations on the market. Previous research shows many benefits of being a digitally mature organisation such as significantly higher profitability, cost efficiencies and revenue growth. Although most organisations are realizing the value of using digital to gain competitive advantage, many organisations have not advanced in their digital maturity the past years. While already established or even digitally mature organisations have resources to digitally transform their organisations, they may be put at risk by start-ups or companies that are more flexible to utilize the new technologies more efficiently. Without developing and fostering the right capabilities to handle the changes, organisations may lose their competitive advantage. Hence, for organisations to stay competitive they are required to lead a continuous digital transformation - one that may never stop. This study aimed to identify the main challenges and solutions as perceived by managers in digitally mature organisations to stay competitive in an increasingly digital world. Based on existing work on digital transformation, this thesis aimed to answer the research questions:

- What are the main challenges for managers in digitally mature organisations to progress in their digital transformation?
- How do managers suggest overcoming these challenges?

Based on a literature review, the researchers conducted a mixed-approach method including a questionnaire and interviews for the participating managers. The self-assessment questionnaire was sent to managers to identify their status of digital maturity. Managers who were assessed as a high level of maturity, Digital Masters, were consequently interviewed to gain further insights into their main challenges and proposed solutions. The researchers used an inductive approach during the semi-structured interviews to gain further knowledge and insights into the managers' thoughts around their progress in digital transformation.

The research found two elements within digital transformation that imposed various degrees of difficulty for the managers; the internal and external elements of digital transformation. While the external elements focused on the outbound-related digital projects and customers, the internal elements focused on the internal processes and employees. The researchers' analysis of the responses demonstrated that the main challenge concerned the internal elements of digital transformation. Within this, the researchers found four themes of challenges for managers: *Collaboration between IT and Business*, *Human relations*, *Systems and processes* and *Investment Decisions*, presented in more detail below.

The four themes of main challenges all included more specific challenges. Within *Collaboration between IT and Business*, the knowledge gap and separation between IT and business employees posed the greatest challenges. These were solved by creating contact surfaces for meetings between the two, using a number of key competences, such as explaining and motivating, as well as trusting in each other. These challenges were connected to Leadership capabilities. Within *Human relations*, attracting and retaining employees and employees' resistance to change posed the main challenges. These were solved by making tasks and roles more attractive by additional employee training and introducing automation of particularly monotonous and time-consuming tasks, as well as motivating the reasons for the changes, follow through on any initiated digital projects and involve and engage employees in the transformation. These challenges were connected to Leadership capabilities. Within *Systems and processes*, the main challenge was the legacy systems that hindered quickness of action and technological developments, as well as the challenge of disposing of the legacy systems. The proposed solution for this was to dispose of the legacy systems by any means, though this had not been implemented completely by the participants. These challenges were connected to Digital capabilities. Finally, within *Investment decisions*, the main challenge consisted of the difficulty of making the right investment decisions that would give return on investment both short- and long-term. The solution to this was to both question new investments and to plan to invest continuously in digital technologies, in order to not lose the market position. These challenges were connected to Digital capabilities. Through the connection of these challenges and solutions to Digital and Leadership capabilities, it should be possible to progress in the organisations' digital maturity according to the Digital Mastery model.

6.2 Practical implications

The purpose of this study was to describe the challenges that managers in digitally mature organisations see for continuing their organisations' digital transformation and to describe what they see as solutions to these challenges. To this end, four main challenges were identified and described from the perspectives of the participating managers, providing insights for managers in digitally mature organisations for in their continued development. Furthermore, the research has presented suggestions for practical solutions that practitioners can utilize to progress in their digital maturity. Finally, this research has contributed to providing further academic research into the progression of digital transformation for digitally mature organisations. Hence, the purpose of the study has been fulfilled.

6.3 Limitations and future research

There are a few limitations of this study that should be considered, variations of these dimensions could all be a basis for valuable further research. First, one limitation of the study was the limited sample and the convenience sampling design. To increase the generalizability of the study and to validate the data collected, additional studies would be needed, preferably with larger samples and randomized sampling of managers. Furthermore, another limitation is the sampled managers' positions that could have affected the results. As Hanelt, Kolbe, Remane and Wiesboeck (2017) found, "CEOs tend to assess the digital readiness more positively than other survey participants" (p.154). Thus, to study a sample from various levels of managers at one organisation could be of interest to see how the managers' position vary the outcome of the results. In addition, by interviewing more managers from the same organisation it could have provided an even more accurate depiction of the organisations' maturity. Hence, this study's area of research would gain from using different kinds of samples or by using a higher number of participants.

Second, the mixed method had both advantages and disadvantages. To its advantage, it had the opportunity to apply both qualitative and quantitative measures (Sekaran & Bougie, 2016). The different measures allowed for finding answers to the research problem with different types of data (Sekaran & Bougie, 2016), such as in the use of the data from the self-assessment questionnaires to give focus for the interviews. To its disadvantage, the mixed-methods approach made the research design more complicated and required more clarity in the presentation (Sekaran & Bougie, 2016). However, the researchers assessed the advantages to be able to add more value than the disadvantages could retract. Nevertheless, it would be valuable to conduct further research with another method, such as observations, to gain more in-depth insights in the topic.

Third, the model used for digital maturity was another limitation of the study. The chosen digital maturity model was non-academic and not empirically grounded (Hanelt, Kolbe, Remane, & Wiesboeck, 2017). Therefore, using a different model for digital maturity could have affected the data collected and results for digitally mature organisations. Several models of digital maturity could have been used to further validate the digital maturity of the organisations. Therefore, it would be of interest to research how the use of a different model or theoretical framework for digital maturity would affect the results. While this study focuses on the Digital Masters, it would be of interest to focus on one of the other three groups in the framework; Conservatives, Fashionistas or Beginners. By focusing on another group of digital maturity, the differences in needs for progress among the groups could be explored. Hence, further research would be needed in looking into different models for digital maturity as well as the specific different levels of digital maturity to gain insights on how their challenges affect their progress in digital transformation.

Fourth, the intelligibility and interpretation of questionnaire questions could have affected the results. Due to potential misunderstandings of the questions, some potential participants may have placed themselves lower or higher than what they would have if they would have completely understood the statements. Meaning that, some participants may not have been Digital Masters, although they self-assessed themselves in this category. Although the researchers used pilot respondents for the questionnaire and added extra explanations, some misunderstandings may still have

occurred. Thus, conducting the self-assessment through the form of an interview could be a potential variation for future research.

Fifth, the semi-structured interviews imposed some limitations to the study. As the interviews were held with a semi-structured approach, the interview questions only acted as guidelines during the interviews. Therefore, all questions were not asked for all the interviews and, as well as some new follow-up questions were added as seemed appropriate. Due to the slight variations between the questions in the interviews, the interviews could not be exactly compared to one another. There are also potential biases as questions could have been formulated in favour of certain arguments, e.g. asking if the manager had encountered a certain challenge. To mitigate this limitation, the researchers could have conducted structured interviews, however, then the value from an inductive approach would have been lost.

Sixth, the extensive use of reports and articles from practitioners and non-academic publications limits the reliability of the research that this study was based on. However, due to the limited scholarly research on the topic of digital transformation, this was part of the best available knowledge known to the researchers. Nevertheless, the data used from this type of research was selected with particular care, in order to find the most reliable data.

Finally, the time constraint of 10 weeks for the study imposed large limitations for the methods used and quality of analysis. If more time was allowed, methods such as observations could have been used to gain further in-depth insights from the managers. Additionally, future research with a longer time frame could allow for a larger data sample to be collected.

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Appendix A

Participants

Appendix A briefly presents information about the participating managers. Participants have been given a letter for referencing instead of their real names due to anonymity (See Table A.1). Their roles in the companies have been classified as either Middle Manager or Top Manager (See Table A.1). To further keep their anonymity, the managers' companies are presented by industry, rather than by the name. In the analysis of the study, only the qualified participants have been included, i.e. managers who classified themselves as working in digitally mature organisations according to the questionnaire (Bonnet, McAfee and Westerman, 2014). Participant H and I were disqualified as they were not fulfilling the requirements of working in a digitally mature organisation (see Appendix C).

Table A.1: Participants: reference name, management level and the industry of each of the participating managers' organisations.

Participant	**Management level**	**Industry**
A	Middle Manager	Consultancy
B	Top Manager	Security
C	Top Manager	Naval technology
D	Top Manager	Furniture
E	Top Manager	Furniture
F	Top Manager	Packaging
G	Top Manager	Healthcare
H	Junior	Healthcare
I	Middle Manager	Furniture

Appendix B

Self-assessment questionnaire

Appendix B presents the full self-assessment questionnaire which was sent to all potential participants to determine their organisations' digital maturity as well as to collect further information. The questionnaire included three sections. Firstly, the questionnaire introduced the topic and presented the ethics of the questionnaire. Secondly, the questionnaire collected information about the participants that were used for background info and putting them into a context (See Appendix A). The last section focused on the self-assessment of Digital capabilities and Leadership capabilities.

B.1 Ethics and introduction to the study

Digital transformation: Digital and leadership capabilities

In this questionnaire, you will answer 20 statements on the digital and leadership capabilities of your organization. The concept of digital and leadership capabilities is taken from the book "Leading Digital" by Bonnet, McAfee and Westerman. The purpose of this questionnaire is for us to get an understanding of to what extent your organization has transformed into digital. It will also act as the basis of our scheduled interview.

Any information derived from this questionnaire will only be used by the researchers, Anna and Charlotte, and for research purposes only. Any results from this questionnaire that are used in the final thesis will not be connected to you or your particular organization. All individual responses will be deleted when the thesis has been handed in.

If you have any additional requests for the handling of the information you give in this questionnaire or any further questions, please contact either of the researchers.

The questionnaire takes no more than 5-10 minutes to fill out, and you can cancel your participation at any time by closing the browser.

Thank you for participating!

B.2 Information about the participant

1. **First and last name:**
2. **The name of my company:**
3. **My job title:**
4. **My position in the company:**
   (a) Top-level management / Managing Director /Senior Executive / or equivalent
   (b) Middle manager
   (c) Other:
5. **My main area of responsibility concerns:** *The managers could rate themselves between 1 and 7, where 1 represented purely IT focused responsibilities and 7 represented purely business focused responsibilities*

B.3 Self-assessment for digital maturity

Digital capabilities
Please answer these statements for the organization you are currently working for, and, when applicable, in the position you currently possess in that organization. Answer each question, using a scale from 1 to 7, where 1=strongly disagree; 4=neutral; and 7=strongly agree. If you do not understand a question, or if a term is unclear, please let us know in the comment section at the end of this section.

1. We are using digital technologies (such as analytics, social media, mobile, and embedded devices) to understand our customers better. [Analytics = "The systematic computational analysis of data or statistics." ; Mobile = "Relating to mobile phones, handheld computers, and similar technology." ; Embedded device = "a highly specialized device meant for one or very few specific purposes and is usually embedded or included within another object or as part of a larger system." e.g. a heart rate monitor in a watch]
2. We use digital channels (such as online, social media, and mobile) to market our products and services.
3. We sell our products and services through digital channels. [Digital channels = e.g. online, social media, and mobile]
4. We use digital channels to provide customer service. [Digital channels= e.g. online, social media, and mobile]
5. Technology is allowing us to link customer-facing and operational processes in new ways.
6. Our core processes are automated. [Automated = "Operated by largely automatic equipment."]

7. We have an integrated view of key operational and customer information. [Integrated view= "close and seamless coordination between several departments, groups, organizations, systems"]

8. We use analytics to make better operational decisions.

9. We use digital technologies to increase the performance or added-value of our existing products and services.

10. We have launched new business models based on digital technologies.

Leadership capabilities

Please answer these statements for the organization you are currently working for, and, when applicable, in the position you currently possess in that organization. Answer each question, using a scale from 1 to 7, where 1=strongly disagree; 4=neutral; and 7=strongly agree. If you do not understand a question, or if a term is unclear, please let us know in the comment section at the end of this section.

1. Senior executives have a transformative vision of the digital future of our company. [Transformative = "Causing a marked change in someone or something." ; Vision = "A mental image of what the future will or could be like."]

2. Senior executives and middle managers share a common vision of digital transformation.

3. There are possibilities for everyone in the company to take part in the conversation around digital transformation.

4. The company is promoting the necessary culture changes for digital transformation.

5. The company is investing in the necessary digital skills.

6. Digital initiatives are coordinated across silos such as functions or regions. [Silo = an individual business function which is divided into subgroups and has its own strategies and works parallel with other organizations."]

7. Roles and responsibilities for governing digital initiatives are clearly defined.

8. Digital initiatives are assessed through a common set of key performance indicators.

9. IT and business leaders work together as partners.

10. The IT unit's performance meets the needs of the company.

Appendix C

Questionnaire Results

The following tables display the collected results from the questionnaire. Participants A-G were qualified as self-assessed Digital Masters, whereas Participants H and I were disqualified according to their summarised points. Participants H and I were subsequently not used in the analysis of this research.

Table C.1: Self-assessment questionnaire results for Digital capabilities. Each of the statements were rated between 1-7 where 1 represents strongly disagree and 7 represents strongly agree.

Digital Capabilities		A	B	C	D	E	F	G	H	I
Customer experience	1. We are using digital technologies (such as analytics, social media, mobile, and embedded devices) to understand our customers better. [Analytics = "The systematic computational analysis of data or statistics." ; Mobile = "Relating to mobile phones, handheld computers, and similar technology." ; Embedded device = "a highly specialized device meant for one or very few specific purposes and is usually embedded or included within another object or as part of a larger system." e.g. a heart rate monitor in a watch]	5	5	2	7	3	4	5	2	5
	2. We use digital channels (such as online, social media, and mobile) to market our products and services.	5	6	7	7	6	6	5	2	6
	3. We sell our products and services through digital channels. [Digital channels = e.g. online, social media, and mobile]	1	2	5	7	7	4	2	2	5
	4. We use digital channels to provide customer service. [Digital channels= e.g. online, social media, and mobile]	1	5	3	7	7	7	4	4	4
Operational processes	5. Technology is allowing us to link customer-facing and operational processes in new ways.	4	5	3	7	4	6	5	5	5
	6. Our core processes are automated. [Automated = "Operated by largely automatic equipment."]	2	4	2	5	2	3	5	3	2
	7. We have an integrated view of key operational and customer information. [Integrated view= "close and seamless coordination between several departments, groups, organizations, systems"]	5	3	5	6	3	5	7	1	4
	8. We use analytics to make better operational decisions.	6	4	3	6	2	5	7	5	3
Business models	9. We use digital technologies to increase the performance or added-value of our existing products and services.	4	6	6	6	3	6	7	5	4
	10. We have launched new business models based on digital technologies.	2	7	7	6	6	5	5	3	7

Table C.2: Self-assessment questionnaire results for Leadership capabilities. Each of the statements were rated between 1-7 where 1 represents strongly disagree and 7 represents strongly agree.

Leadership Capabilities		A	B	C	D	E	F	G	H	I
Transformative vision	1. Senior executives have a transformative vision of the digital future of our company. [Transformative = "Causing a marked change in someone or something." ; Vision = "A mental image of what the future will or could be like."]	5	7	5	4	7	6	5	7	5
	2. Senior executives and middle managers share a common vision of digital transformation.	5	6	4	4	4	5	4	6	3
Engagement	3. There are possibilities for everyone in the company to take part in the conversation around digital transformation.	6	6	7	4	6	5	5	7	4
	4. The company is promoting the necessary culture changes for digital transformation.	6	6	4	4	5	6	4	5	3
Strong governance	5. The company is investing in the necessary digital skills.	7	6	4	5	7	4	5	3	3
	6. Digital initiatives are coordinated across silos such as functions or regions. [Silo = an individual business function which is divided into subgroups and has its own strategies and works parallel with other organizations."]	5	5	2	5	7	6	5	4	3
	7. Roles and responsibilities for governing digital initiatives are clearly defined.	3	5	3	5	7	4	5	5	3
Technology Leadership (It and business)	8. Digital initiatives are assessed through a common set of key performance indicators.	4	5	1	5	4	4	6	5	3
	9. IT and business leaders work together as partners.	5	6	4	5	4	1	6	2	3
	10. The IT unit's performance meets the needs of the company.	5	5	3	4	5	1	4	1	4

Appendix D

Interview questions

The interviews were based on the following guidelines of questions. However, all questions were not asked for all of the interviews nor were they necessarily asked in the same order as stated in the guideline. The interviews were conducted in Swedish, thus this section is written in Swedish.

1. Bakgrund:
   (a) Kan du berätta mer om din bakgrund: utbildning, tidigare jobb, vad har lett dig till var du är idag?
2. Kan du berätta lite mer om din nuvarande position?
   (a) Vad är din roll och vilka konkreta uppgifter har du?
   (b) Hur arbetar du med digitalisering? På vilket sätt?
      i. Vilka nuvarande projekt jobbar du i som innebär någon typ av digitalisering?
      ii. Vad är/har varit dina främsta utmaningar med det/de projektet/n?
      iii. Har du överkommit några av dessa utmaningar, i så fall, hur?
3. Personlig syn på Business vs IT: varför placerade du dig själv som x (1-7) på vår skala mellan IT och business? (self-assessment test)
   (a) Vad har du för typ av ansvar för att föra samman teknologi och business?
      i. Vad är din personliga roll i mötet mellan Business och IT?
      ii. Hur jobbar du för att samarbetet mellan IT och Business ska bli så bra som möjligt?
   (b) Vilka färdigheter och kompetenser använder du vid mötet (i denna roll) mellan Business och IT?
   (c) Vad är dina utmaningar med detta/i denna roll?
   (d) Hur arbetar du för att överkomma dessa utmaningar?
4. Företagets syn på Business vs IT: I vilken utsträckning arbetar Business och IT managers tillsammans?
   (a) På vilka sätt träffas dessa två delar och hur arbetar dem tillsammans: i vilken kontext och vilka miljöer? Hur kommunicerar dem?

(b) Vilka utmaningar har din organisation haft i att kombinera IT och business mål och färdigheter (för att förändra organisationen digitalt)?

(c) Har ni överkommit vissa av dessa utmaningarna och i så fall hur?

5. Har ni en digitaliseringsstrategi i ert företag?

   (a) I så fall, hur kommunicerar ni ut denna digitaliseringsstrategi till resten av organisationen?

   (b) Hur väl implementeras denna strategi i praktiken?

6. Berätta lite mer om er organisations digitala förmågor, med andra ord investeringar i digitala förbättringar.

   (a) Vilka ser du har varit de mest framträdande investeringarna i teknologi som främjar digitalisering?

   (b) I dina projekt, vilka digitala teknologier använder ni er av?

   (c) Vilka digitala teknologier skulle du vilja att ni investerar i framtiden?

   (d) Hur stärker ert företag era digital innovations-förmågor?

      i. Developing the digital capabilities of existing employees; collaboration with contractors and consultants; cooperation with other organizations (e.g. partnership and other forms of cooperation); recruiting employees with relevant knowledge in the field of digitization; recruiting leaders (managers) with relevant knowledge in the field of digitization; mergers & acquisitions?

   (e) Vilka hinder/utmaningar finns det i er organisation som motverkar att ni utvecklar och implementerar ny teknologi?

7. Berätta lite mer om era ledarskapsförmågor: vad är er vision om ert företags digitala framtid?

   (a) Var kommer digitala initiativ från?

   (b) Vem deltar i dessa initiativ?

   (c) Stöttar anställda/kollegor de förändringar som ni implementerar relaterat till digital transformation?

      i. Finns det någon skillnad mellan olika grupper?

   (d) Hur uppmuntrar du anställda att ha en positiv syn på de förändringar som orsakas av digital transformation?

   (e) Hur samordnar du initiativ mellan olika avdelningar och funktioner?

8. Hur tror du att digitalisering kommer påverka din bransch i framtiden?

   (a) Hur tror du att roller i Business och IT kommer att utvecklas i framtiden? (t ex Kommer de att integreras helt eller fortfarande vara separerade)

   (b) Hur digitalt kan ditt företag bli, tror du?

9. Anna, har du något att tillägga?

10. Har du några frågor till oss?