Santtu Karppinen

DIGITAL TRANSFORMATION OF SMES: DRIVERS, CHALLENGES, AND STRATEGIES

ABSTRACT

Karppinen, Santtu
Digital transformation of SMEs: drivers, challenges, and strategies
Jyväskylä: University of Jyväskylä, 2024, 30 p.
Information Systems, bachelor's thesis
Supervisor: Riekkinen, Janne

Digital transformation has become an important research topic in many fields during the recent years. The COVID-19 pandemic can be seen as one of the reasons why this transformation process came to the attention of many organizations and researchers. Digital transformation is a process which offers unprecedented scale, scope, and speed for organizations. During this process organizations transform their business models and processes through new digital technologies. These new digital technologies enable organizations to raise their competitiveness by increasing their performance and lowering input costs. However, digital transformation is a time-consuming process that can also present difficult challenges that organizations have to overcome. This thesis was conducted as a literature review, and the source material consists of 32 peer-reviewed articles. The purpose of this thesis is to examine the ever-increasing growth of digital transformation and give a definition for the process. In addition, the process of digital transformation is further reviewed from the viewpoint of small and medium-sized enterprises (SMEs), by reviewing their digital transformation drivers, challenges, and strategies. The conclusions show that SMEs have different types of challenges in different phases of the transformation process. These challenges include developing a proper strategy before the transformation, cyber security challenges during the transformation, and the difficulty of using new digital technologies after the transformation. In addition, SMEs have additional challenges due to their lack of resources and digital knowledge. This thesis also shows that there are general strategies for the process of digital transformation, but strategies regarding SMEs specifically are in sparse.

Keywords: Digital transformation, digitalization, SMEs, digital transformation challenges, digital transformation strategies

TIIVISTELMÄ

Digitaalinen transformaatio on noussut viime vuosien aikana tärkeäksi tutkimuskohteeksi monilla aloilla. Etenkin COVID-19 pandemian seurauksena kyseinen prosessi nousi organisaatioiden ja tutkijoiden tietoisuuteen. Digitaalinen transformaatio on prosessi, joka tarjoaa monia tärkeitä hyötyjä organisaatioille. Tämän prosessin aikana organisaatiot muuttavat heidän liiketoimintamallejaan sekä prosessejaan uusien digitaalisten teknologioiden avulla. Näiden teknologioiden avulla organisaatiot pyrkivät kasvattavaan kilpailukykyään nopeuttamalla ja modernisoimalla toimintojansa. Organisaatioiden digitaalinen transformaatio on monimutkainen prosessi ja siihen sisältyy paljon erilaisia haasteita. Näiden haasteiden seurauksena suurin osa digitaalisista transformaatioista epäonnistuu. Tämä kandidaatin tutkielma toteutettiin kirjallisuuskatsauksena ja tutkielman aineistona käytettiin 32 vertaisarvioitua tutkimusartikkelia. Tutkielman tarkoituksena on selventää digitaalisen transformaation määritelmää sekä pyrkiä erottamaan se samankaltaisista termeistä kuten digitoinnista ja digitalisaatiosta. Tämän lisäksi tutkielmassa tarkastellaan tarkemmin pienten ja keskikokoisten yrityksien (pk-yrityksien) digitaaliseen transformaatioon johtavia tekijöitä sekä prosessiin liittyviä haasteita ja strategioita. Tutkielma osoitti pk-yrityksien digitaalisen transformaation haasteiden tapahtuvan eri prosessin vaiheissa kuten esimerkiksi ennen transformaatiota sen suunnittelussa, transformaation aikana kyberturvallisuuden kanssa sekä transformaation jälkeen uusien teknologioiden käyttämisen kanssa. Tämän lisäksi pk-yrityksien ongelmia lisäävät heidän resurssien vähäisyys sekä digitaalisten tietojen ja taitojen puute. Näiden syiden seurauksena pk-yritykset saattavat joutua tukeutumaan kolmansien osapuolten tukeen. Tutkielmassa kävi ilmi, että kirjallisuudessa on esitetty erilaisia strategioita digitaalisen transformaation liittyen yleisellä tasolla, mutta pk-yritysten näkökulmasta strategioita on tutkittu vielä varsin vähäisesti.

Avainsanat: digitaalinen transformaatio, pk-yritykset, digitalisaatio, digitaalisen transformaation haasteet, digitaalisen transformaation strategiat

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1   INTRODUCTION

Digital transformation research is becoming increasingly more popular every year. The process of digital transformation offers unprecedented scale, scope, and speed for organizations to transform their business models and processes (Mandviwalla & Flanagan, 2021). In addition to transforming existing business models and processes, the use of new digital technologies can create new business models and processes for organizations (Plekhanov et al., 2023). Defining this transformation process can be difficult, as there is currently no clear definition for digital transformation (Schallmo et al., 2017). However, Parviainen et al. (2022) defines digital transformation as changes in an organization through adoption of digital technologies that affect ways of working, roles, and business offerings.

Digital transformation has enabled SMEs to improve their market intelligence, and it has given them access to global markets and knowledge networks at a relatively low cost (Ulas, 2019). Digital transformation also raises the competitiveness of SMEs in both global and local markets, through the ability to improve and innovate both the products and services, and their production processes (Ulas, 2019).

In addition to the changes digital transformation has brought to SMEs, it has shown different types of challenges during different phases of the transformation process. The transition towards digital technologies during digital transformation challenges with its corresponding organizational changes and the increasing complexity of the new digital systems (Omrani et al., 2022). These challenges can be especially seen present in SMEs, because having the need to develop and implement digital capabilities into fast-changing, cross-company processes, and structures, is an enormous challenge (Goerzig & Bauernhansl, 2018). In addition to challenges in developing and implementing digital capabilities, SMEs are very limited in their resources, and their employees most likely do not have the required capabilities and skills regarding the new business solutions and processes (Goerzig & Bauernhansl, 2018).

In order to successfully go through the process of digital transformation, SMEs have to develop a strategy. This digital strategy for digital transformation is a crucial part of its success (Correani et al., 2020). Enterprises might encounter

operational difficulties and lose their scope if the strategy for digital transformation is approached passively (Matt et al., 2015). With this in mind, developing a proper strategy for digital transformation is a requirement, and it is further emphasized by the estimated digital transformation failure rate of 66%-84% (Correani et al., 2020).

This thesis was conducted in the form of a literature review, so that we can emphasize the importance of digital transformation and its challenges. The topic of digital transformation has been researched in a broadly manner, so that the referenced literature is comprehensive. This thesis aims to answer the following research questions:

1) What kind of challenges are present in the digital transformation process in SMEs?
2) What kind of tools can SMEs use for the process of digital transformation?

This thesis reviews digital transformation and its effects on SMEs, and what kind of challenges can be present during the different stages of this transformation process. With this foundation it is possible to review different strategies for SMEs, in order to clarify and refine the process of digital transformation.

This thesis has referenced scientific literature from the following databases: JYKDOK, Google Scholar and Scopus. While gathering the referenced literature, the following search terms were used in the process: "Digital Transformation", "Digitalization, Digitization and Digital Transformation", "Digital Transformation in SMEs", "Digital Transformation history", "Digital Transformation challenges", "Digital Transformation strategies", "SME digitalization", and "DT in SMEs". This thesis also referenced a document of the European Union for the purpose of defining SMEs.

2   DIGITAL TRANSFORMATION AND SMES

This chapter presents an overview of digital transformation through its history and definition. In addition, digitization and digitalization will be reviewed, and their connection to digital transformation will be examined. Lastly, digital transformation will be reviewed from the viewpoint of SMEs.

2.1   History of Digital Transformation

The first research regarding digital transformation can be found in the 1980s and early 1990s (Plekhanov et al., 2023). At first, researchers were interested in the effects of adopting information technology in organizational hierarchies and structures, with the addition of innovation and performance (Plekhanov et al., 2023). Schallmo et al. (2017) argue that the ideas of digital products and services were well-understood in the 1990s, which can be seen in the mass media advertising campaigns through digital channels at that time. Computer technology commoditization and the rise of the internet can also be seen as facilitators for IT-enabled business transformation in the 1990s (Plekhanov et al., 2023). These can be seen as the first steps towards digital transformation since computer technology and the internet are still critical factors in digital transformation. Moreover, drastic changes regarding businesses, social media platforms, and e-commerce would arrive in the 2000s (Schallmo et al., 2017).

Digital transformation was pushed further in the 2000s, through the rise of social media platforms, digital payment options, and smart devices. Businesses realized that they could digitally communicate with their customers on an individual basis through digital media and smart devices (Schallmo et al., 2017). In addition, new opportunities for businesses would arrive through the rise of online commerce and digital payment options such as PayPal (Schallmo et al., 2017). A bigger leap regarding digital transformations would come later due to a global crisis, COVID-19 (Plekhanov et al., 2023).

The COVID-19 pandemic further upsurged the awareness of organizations of their need to accelerate digital transformation (Hanelt et al., 2021). The pandemic can be seen as one of the reasons why digital transformation discussion

was revived (Plekhanov et al., 2023). However, the pandemic is not the sole reason why digital transformation gained relevancy. Furthermore, Vial (2019) argues that digital transformation has become an important phenomenon in strategic information systems research in the last recent years, before the pandemic started. In addition, digital transformation can be viewed as an interdisciplinary research field, that has contributions from IT, strategic management, organization science, and others to date (Plekhanov et al., 2023).

2.2 Defining Digital Transformation

The definition for digital transformation can be difficult to propose, as it is a broad process that has significant effects on different parts of organizations and their ways of functioning. Digital transformation can be defined as a process that triggers significant changes to its properties through different combinations of connectivity, communication, computing, information, and technologies, with an aim to improve an entity (Vial, 2019; Gong et al., 2020; Mandviwalla & Flanagan, 2021; Palade & Møller, 2023). Moreover, digital transformation is primarily identified with organizations, and terms such as "digital technologies" are often used in describing changes in organizations (Vial, 2019). Ulas (2019) describes digital transformation as a period, during which entities, universities, public and employees are transformed. In addition, digital transformation forms new business models and practices (Ulas, 2019). These definitions suggest that in a digital transformation, an entity goes through a transformation period in which they adopt new business models and practices through means such as new digital technologies. These new digital technologies could include things such as big data, analytics, the cloud, and social media platforms, and they are used in order to provide goods and services for organizations (AlNuaimi et al., 2022).

The change of business models is a common occurrence in digital transformation discussions. Verhoef et al. (2021) argue that digital transformation changes the way organizations use digital technologies, and that they are used in developing new digital business models, which can be used to create and allot more value for the organization. In addition, these technologies can blur market boundaries and change the way agent roles work, for example customers becoming co-producers (Verhoef et al., 2021). Hess et al. (2016) point out that digital technologies that come with digital transformation change organization's business models in a way that results in the change of products, organizational structure, or automation of processes. In addition, Schallmo et al. (2017) argue that digital transformation of organization's business models can relate to an individual element of a business model, or an entire business model. This further proves that digital transformation has huge effects on organizations and the way they function, through the way it drastically affects the business models of organizations.

The process of digital transformation does not happen in a short period of time. Digital transformation should be seen as a continuous change process,

which can happen in episodic bursts (Hanelt et al. 2021). This change process inside organizations can be seen as a gradual and strategic integration of the digital technologies, orientation, and capabilities (Rupeika-Apoga et al., 2022). This suggests that organizations should have a strategy in place to control the process of digital transformation. Furthermore, this strategy is subject to change since the whole process of digital transformation can be difficult to predict.

Digital transformation changes can be examined through different levels of an organization. According to Parviainen et al. (2022), these levels include process level, organization level, business domain level, and society level. Moreover, process level adopts new digital tools and streamlines processes, organization level offers new services and old services in new ways, business domain level changes ecosystems through roles and value chains, and society level changes structures of society (Parviainen et al., 2022). All of these levels have different changes according to the nature of the digital transformation. In addition, digital transformation is a continuous adaptation in a company (Parviainen et al., 2022). This further suggests that the changes happening during the transformation have effects on all levels of an organization, but at different times.

As stated before, digital transformation is a continuous process in which significant changes happen in every part of an organization. This process is fuelled by digital technologies, which can be used for creating new digital business models, or for enhancing existing business models. In addition, digital transformation should provide an ability to monitor these digital business models and their results, while also facilitating the organizations with the ability to understand them and their results (O'Leary, 2023).

2.3 Digitization, Digitalization, and Digital Transformation

Different definitions for digital transformation, and the terms digitization and digitalization being often used interchangeable (Schallmo et al., 2017), can cause problems for understanding these terms and their use. The terms digitization, digitalization and digital transformation all have distinct meanings (Bloomberg, 2018), but they have similar effects inside organizations, thought these effects are arguably different in their intensity and length. For this purpose, it is important to define digitization and digitalization so that we can examine their connection to digital transformation.

Digitization as a process can be described as a transformation process in which information is transformed from a physical format into a digital variant (Rupeika-Apoga et al., 2022). Saarikko et al. (2020) argue that digitization can be thought of as a fundamental precondition for things such as smartphones or artificial intelligence. In addition, digitization could be looked at as a component for digital transformation (Saarikko et al., 2020), which suggests that digitization could be a fundamental precondition for digital transformation. However, digitization as a component for something bigger such as digital transformation does

not mean that it is an easy process to go through. Moreover, Saarikko et al. (2020) point out that digitization is a complicated process that might require expertise from an outsourced small group of experts.

Digitalization can be described as a sociotechnical process in which digitized products or systems are leveraged in order to develop new procedures, business models or commercial offerings within an organization (Saarikko et al., 2020). Whereas digital transformation refers to a companywide change where new digital business models are made, digitalization can be looked at as a process that alters existing business processes like communication or distribution by using new digital technologies (Palade & Møller, 2023). This suggests that digitalization might not fully change business models or processes, but it aims to increase the efficiency of existing models and processes.

According to O'Leary (2023), digital transformation, digitization, and digitalization can be viewed as a hierarchy, where a lower level needs to be completed in order to be able to move to the next level. Moreover, digitization is generally a requirement for both digitalization and digital transformation, and digitalization is a requirement for digital transformation (O'Leary, 2023). In addition, Rupeika-Apoga et al. (2022) argue that digital transformation begins with digitization, and companies that are willing to start a digital journey cannot do so if they do not start the process of digitization first. However, the path where digitization leads to digitalization, which then leads to digital transformation might not be optimal. Realizing the need for digital transformation after digitalization could delay or obstruct the process of digital transformation as a whole (Verhoef et al., 2021). This suggests that digitalization and digital transformation are bigger processes than digitization, and it could be more beneficial for organizations to go through digitalization and digital transformation at the same time, or as a one big transformation of the organization. However, digital transformation is a broad change process, and it poses multiple challenges for smaller organizations, which could lead them to choose the path of digitalization before realizing digital transformation.

2.4   Digital Transformation in SMEs

SMEs are defined as enterprises that employ fewer than 250 persons and that have less than EUR 50 million annual turnover, and/or an annual balance sheet that does not exceed over EUR 43 million. (European Commission, 2020; Palade & Møller, 2023). SMEs are also the biggest group of all enterprises, representing 99% of enterprises in the European Union (Palade & Møller, 2023). SMEs differ from larger enterprises by having a smaller financial budget and less operational resources (Amaral & Peças, 2021; Palade & Møller, 2023). Using this definition, it is possible to examine digital transformation from the viewpoint of most SMEs. However, digital transformation could differ in many ways between enterprises that are on the opposite ends of the SME definition scale. In addition, SMEs in general are known to have a limited number of resources regarding time and

money (Stich et al., 2020), but also a limited amount of human capital (Ates & Bititci, 2011). This can be seen as a challenge for SMEs, since digital transformations are often seen as time-consuming, costly, and risky (Pelletier & Cloutier, 2019). Lastly, digital transformation of SMEs gives them access to many new technologies, which can be seen affecting the three pillars of the transformation: adopting e-commerce platforms, big data, and digital marketing (Ulas, 2019; Peruchi et al., 2022; Malodia et al., 2023).

Digital transformation in SMEs gives them access to new digital technologies. Skare et al. (2023) argue that these technologies are used in order to produce digital products and services. In addition, these technologies improve the business performance of SMEs and expands their consumer base (Skare et al., 2023). This effect is caused by digital transformation's ability that gives SMEs access to real-time information, which then enables them to respond to rapidly developing markets and supply chains (Skare et al., 2023). Implementing these technologies can be difficult, especially for SMEs. These enterprises often have a lack of necessary knowledge regarding new digital technologies, and it could be difficult for them to align their existing information with these new technologies (Palade & Møller, 2023).

Organizational flexibility can be seen as a requirement and a benefit for SMEs in general, regarding digital transformation. Gong et al. (2020) points out that flexibilities can be divided into different forms, which can be seen when enabling adaptations through the required flexibilities, such as organizational flexibility and infrastructure flexibility. The term flexibility can be explained as the ability to effectively respond to changes in an environment (Gong et al., 2020). This flexibility is important, because digital transformation is a continuous process with a lot of variables that may change during different phases of the transformation.

Digital transformation is a difficult process for SMEs and many of them are still unprepared for adopting new digital technologies (Omrani et al., 2022). Furthermore, many SMEs lack the required knowledge to operate these technologies, which is further emphasized by Telukdarie et al. (2023), who argue that many SMEs do not have the required expertise to extract the full potential of these technologies. To be able to use the full potential of digital transformation, SME leaders might have to develop a variety of different skills and adopt a new style of leadership (Franco et al., 2021). These aforementioned digital transformation drivers and challenges will be further reviewed in the following chapter.

3 SME DIGITAL TRANSFORMATION DRIVERS AND CHALLENGES

This chapter reviews digital transformation drivers from the perspective of SMEs. These drivers will provide a better understanding of why SMEs decide to go through the process of digital transformation. Although SMEs have a lot to gain from digital transformation, there are many challenges that they might face during different phases of digital transformation. These phases and their challenges will also be reviewed in this chapter, so that we understand why SMEs might struggle with the process of digital transformation.

3.1 Digital Transformation Drivers

The benefits of digital transformation are a big part of the reason why SMEs decide to transform their organization. The benefits that SMEs gain from the transformation process are connected to improvements in business results, and increased productivity and output by the workforce (Skare et al., 2023). Improvements regarding business results can be gained through more efficient work-production and lowered input costs (Skare et al., 2023). In addition, Vial (2019) argues that digital transformation has effects in many different aspects of organizational performance, for example financial performance, firm growth, and competitive advantage. Skare et al. (2023) also point out that digital transformation facilitates SMEs with new financial management and payment forms. With digital transformation comes new digital technologies, that provide SMEs with many assets. These new technologies help SMEs to create more digital products and services, which can positively affect their customer base (Skare et al., 2023). In addition, new digital technologies enable managers to build a shared understanding of the organization, and adapt to changing environments (Skare et al., 2023). All of these different factors suggest that digital transformation has many

benefits for SMEs, but they might not be the sole reason for a digital transformation.

The different reasons why SMEs go through the process of digital transformation may be due to different internal or external factors. Omrani et al. (2022) argue that the adoption of digital technology is evidently driven by internal factors. Furthermore, the decision to adopt new digital technologies depends on different contexts, including technological and organizational contexts, which contain, for example existing IT infrastructure and employee skills (Omrani et al., 2022). Lastly, the external environment is shown to have a lesser impact on the adoption of digital technology (Omrani et al., 2022). However, internal factors may not be as important as external factors. Change in SMEs is often motivated by the customers, which are thought of as external factors (Ates & Bititci, 2011). Furthermore, Verhoef et al. (2021) argue that there are three major external drivers for digital transformation, which include new digital technologies, drastic changes in the competition due to the new technologies, and changes regarding consumer behaviour. Omrani et al. (2022) also point out that certain type of technology adoption could be caused by external pressure, such as data security concerns or the development of new business models that disrupt the competition. These findings could suggest that there are both internal and external factors that affect digital transformation of SMEs. However, internal factors could be more important in organizations that have skilled employees with prior experience regarding digital technologies and IT infrastructures.

Consumer behaviour changes are a major part of the external drivers for digital transformation of SMEs. Verhoef et al. (2021) point out that these changes are present especially in the rise of e-commerce, where consumers seem to be shifting towards using online stores. In addition, consumers have changed in a way which has made them more active, connected, and informed (Verhoef et al., 2021). This could suggest that consumers are informed about new digital technologies that they can use to be more efficient. Moreover, Verhoef et al. (2021) argue that new digital technologies may change consumer behaviour in a way that allows these new technologies to become the new norm and have the ability to challenge traditional business rules. This could be seen as a major external driver for digital transformation, because being able to deliver the consumer's preferred way of doing business greatly affects organization's competitiveness.

3.2 Challenges in Different Phases of Digital Transformation

Digital transformation is a huge process for every organization, and it can be very difficult especially for smaller organizations. SMEs have many things to gain from the transformation process, but it brings many challenges that organizations have to overcome during different phases of the process. Moreover, in these different phases there are challenges such as planning the digital transformation process, managing security of the organization, and having the required skills

inside the organization to use the digital technologies that arrive with the process. These challenges are further emphasized by Ulas (2019), who argues that SMEs have many different obstacles within digital transformation. Furthermore, these obstacles can be present due to different factors, such as budget deficiencies, high investment and operational costs, and the incapability to understand new technologies (Ulas, 2019). In addition, data security and privacy are also possible obstacles (Ulas, 2019), since digital transformation without security concerns could open the organization for different types of difficult data breaches (Hanelt et al., 2020; Stewart, 2023).

The challenges that are present with digital transformation are possibly a result of the increasing complexity of the organizations' operating environment (Vial, 2019). In addition, Goerzig & Bauernhansl (2018) argue that the high complexity of the different approaches and the inaccessibility for quickly developing new solutions can be seen as some of the main challenges. The complexity can be especially seen in new digital technologies, that have better capabilities regarding information, computing, communication, and connectivity (Vial, 2019). These factors suggest that digital transformation brings more complexity to SMEs. Furthermore, Pelletier & Cloutier (2019) argue that the increased use of IT brings several challenges to SMEs, such as the requirement for different skills for managing the newly implemented IT, and the realization of the growing complexity within the ecosystem in which an organization operates. Lastly, Correani et al. (2020) argue that the change management aspect that affects the employees and the customers of the organization is one of the many reasons why digital transformation projects fail.

The aforementioned aspects suggest that there are multiple different factors that make digital transformation in SMEs difficult. These challenges will be reviewed further in the following sub-sub-sections. In addition, they will be examined in different phases of the transformation process, so that we can easily understand when the challenges tend to be present.

3.2.1 Before Digital Transformation

Before starting the process of digital transformation, organizations have a mandatory task, which is the development and implementation of a digital strategy Stewart, 2019). This suggests that having a strategy is a crucial part of the success of digital transformation. Furthermore, being able to ensure the consistency between formulating a strategy and implementing it, can be seen as a major challenge in transformations (Correani et al., 2020). This is further emphasized by Goerzig & Bauernhansl (2018), who argue that there is a demand for deep integration of these digital strategies. Furthermore, as digital transformation entails changes such as changing structures of organizations and fundamentally altering business processes (Goerzig & Bauernhansl, 2018), the organizations have to be aware of the changes that they prefer, before the process begins.

AlNuaimi et al. (2022) argue that organizations that plan to go through the process of digital transformation, have to implement more agile processes and

management practices into their traditional processes, management, and structure. This agility can help organizations react faster to different changes that happen during the transformation process. As stated before, digital transformation is a continuous change process (Hanelt et al., 2021), and organizations cannot anticipate everything before the process begins.

Planning a strategy for digital transformation is difficult of SMEs. Rupeika-Apoga et al. (2022) argue that many companies that have interest in this process lack the knowledge of how to build their IT organizations. In addition, it is difficult to develop the required talents and tools inside the organization for maintaining and managing these new processes and services (Rupeika-Apoga et al., 2022). These factors suggest that organizations might know what they want from digital transformation at the start, but these preferences can change when organizations get more knowledge. It is also important to note that many of the critical resources that are required for transformation, are not available to organizations internally (Rupeika-Apoga et al., 2022). Furthermore, if organizations are willing to develop this knowledge internally, it should be stated that it might take them years to do so (Rupeika-Apoga et al., 2022).

These aforementioned factors suggest that planning the process of digital transformation is a critical requirement, but SMEs often lack the required knowledge. This can be seen as a significant obstacle in the digital transformation of SMEs, since the process will be difficult when there is a shortage of human resources that meet the required criteria with their abilities and knowledge (Nguyen et al., 2015; Skare et al., 2023). In addition, this knowledge might not be available internally, and developing this knowledge can take multiple years.

3.2.2   During Digital Transformation

The process of digital transformation could be started when the aforementioned digital strategy is in place. The first challenge during this phase of transformation is implementing the digital strategy. This is due to the difficulties of ensuring that the strategy and the implementation are consistent throughout the whole process (Correani et al., 2020). To be able to ensure this consistency, SMEs might have to make new professional roles inside the organization, such as a manager for the transformation process (Correani et al., 2020). Furthermore, these employees are required to have specific capabilities regarding digital technologies, so that the opportunities they bring can be fully utilized (Correani et al., 2020). These factors suggest that SMEs might have to utilize external knowledge while driving digital transformation further, since having the required knowledge inside a smaller organization can be in sparse.

While implementing new digital technologies, the challenge of cybersecurity is always present. Ebert & Duarte (2018) argue that when the complexity and scale of systems increase, professional methods and tools are required for ensuring elements, such as cybersecurity, dependability, functionality, robustness, and usability. As new digital technologies make better networks within organizations, the higher the exposure rate for all kinds of attacks will be (Ebert & Duarte, 2018). This is further emphasized by Stewart (2023), who argues that the lack of

knowledge regarding key factors of digital transformation security, have led to corporate information security risks. Furthermore, a cybersecurity strategy should be a part of digital transformation, and within this strategy the organization should build a security culture (Stewart, 2023). In addition to cybersecurity, usability is an important factor to have in mind, since having an insufficient usability might lead to critical failures, hazards, and operational difficulties (Ebert & Duarte, 2018).

Being able to drive a secure digital transformation is a requirement for gaining the trust of consumers and investors (Stewart, 2023). It is also important to note that this phase of digital transformation can be a long process. The process is prone to change, which could challenge the SMEs even further. However, these changes are difficult to predict, which suggests that it is specific to an organization and the changes might have more difficulties for some and less for others.

3.2.3 After Digital Transformation

After SMEs have implemented new digital technologies through digital transformation, they have to have employees that have the required skills to operate these technologies. Individual digital skills support the growth of SMEs, but the lack of financial resources challenges SMEs' capabilities to develop these skills within the organization (Scuotto et al., 2021). This pushes SMEs towards the skilled labour of the labour market (Skare et al., 2023). That being a difficulty for SMEs, suggests that the number of skilled workers are in sparse in both SMEs and in the labour market. This is further emphasized by Skare et al. (2023), who argue that European SMEs are already facing the difficulties regarding the lack of skilled labour in the market. Furthermore, digital transformation makes this issue worse in the short run by widening the gap between the supply and SMEs' demand of skilled labour (Skare et al., 2023).

Digital literacy is a term that involves many features that affect efficient digital technology usage and knowledge. This term can be defined as a set of abilities, attitudes, awareness, knowledge, skills, and strategies that are required for using digital media and ICT to do many different things, for example communicate, manage information, perform tasks, and solve problems. (Jiao et al., 2021; Malodia et al., 2023). Furthermore, strengthening this individual digital literacy was found to be essential for digital transformation of SMEs in a study of over two million European SMEs (Scuotto et al., 2021; Malodia et al., 2023). Individuals with a lack of digital literacy show higher resistance to the process of digital transformation (Malodia et al., 2023). These aspects suggest that higher digital literacy supports the digital transformation process, while a lack of digital literacy can hinder this change process.

SMEs might also face different kinds of difficulties regarding their new digital technologies. Malodia et al. (2023) argue that SMEs often use third-party digital platforms, due to their lack of resources. Furthermore, these third-party digital platforms have more requirements, such as top management belief and investments in developing organizational capabilities (Malodia et al., 2023). This suggests that these third-party online platforms might not be the most ideal

solution for SMEs, but the lack of resources limits their options. This is further emphasized by Telukdarie et al. (2023), who argue that SMEs' profitability can be affected due to higher fees, since SMEs do not have the power to bargain for lower fees. In addition, digital transformation should give SMEs access to customer data. However, this might not be the case with the third-party online platforms, since they could limit the direct access of SMEs to this data, further affecting their capabilities (Telukdarie et al., 2023).

These aforementioned points suggest that after digital transformation there are many challenges to consider. Being able to find skilled labour can be difficult and developing the skill within SMEs takes time and resources. In addition, the lack of digital literacy can enable change resistance within the organizations, which can be seen as a challenge on its own. Lastly, the third-party digital platforms need to be closely examined, so that SMEs are able to gain the full benefits of digital transformation.

4 DIGITAL TRANSFORMATION STRATEGIES FOR SMES

This chapter proposes different strategies and tools for the digital transformation of SMEs. These strategies and tools include a framework, a roadmap, and enterprise architecture. However, not every strategy can be applied to every SME, since the process of digital transformation can be broad, and it might differ greatly between different enterprises.

4.1 Creating a Strategy

As stated before in the previous section, a digital strategy for digital transformation is a crucial part of its success (Correani et al., 2020). In addition, it is important to ensure that the strategy and the implementation are consistent throughout (Correani et al., 2020). Matt et al. (2015) point out that enterprises might encounter operational difficulties and lose their scope if the strategy for digital transformation is approached passively. Furthermore, enterprises need a person with sufficient experience in digital transformation projects to ensure that the strategy is carried out in the right way and responsibly (Matt et al., 2015). This is further emphasized by Hess et al. (2016), who point out that managers often lack knowledge of all possible options and elements that are required to consider with digital transformation. This could lead to managers choosing unfavourable options for their organizations, which can lead to unintended consequences (Hess et al., 2016). However, Matt et al. (2015) argue that it is important to note that the strategies of digital transformation should be continuously reassessed, and the progress of the process should be evaluated. Furthermore, these things are necessary so that the organizations can change their actions if the process does not meet the current expectations (Matt et al., 2015). This further suggests that digital transformation is a continuous process that is subject to change, and that organizational agility is important, so that their course of action can be easily changed if required.

The strategies for digital transformation of SMEs can consist of multiple different aspects. These aspects include necessary decisions regarding financials, structure, technology, and value creation (Matt et al., 2015; Goerzig & Bauernhansl, 2018). In addition, substantial changes in the organization's business model can be required, so that organizations can take full advantage of digital transformation (Correani et al., 2020). Furthermore, business model has a role in this transformation process in different aspects such as in the adaptation of the architecture of the firm's value proposition, market segments, value chain, and value appropriation to approaching emergencies (Correani et al., 2020). Business models are important since they can provide descriptions of an enterprise's strategy, which can be helpful in an event that presents disruptive changes within the organization, such as digital transformation (Correani et al., 2020).

Leadership and communication are important aspects of carrying out digital transformation in SMEs. According to AlNuaimi et al. (2022), digital transformational leadership positively affects the transformation process significantly, due to the results of their research. In addition, communication is important, and it is tied together with good leadership. This is further emphasized by Mugge et al. (2020), who argue that leaders have to communicate about the transformation changes frequently and powerfully once the vision for the transformation process is assembled. If the process is not communicated properly, it might lead to more difficult challenges such as change resistance.

These strategies are crucial for the success of digital transformation in SMEs, and SMEs should be expecting different types of changes during the implementation of these strategies. Organization-wide changes that affect elements such as business models, should be communicated within the organization, so that everyone is prepared for the upcoming events, and the chances are lowered for difficult challenges like change resistance. The following sub-sections will examine different tools for digital transformation, such as a framework, a roadmap, and enterprise architecture. These tools aim to give a better understanding of how digital transformation should be planned, so that the transformation process can be successful. However, these tools might not be specifically made for SMEs, but they can still be useful in different ways.

4.2 Digital Transformation Framework

Hanelt et al., (2021) propose a multi-dimensional framework for digital transformation, that provides a tool to analyse digital transformation for scholars and practitioners. This framework consists of three different categories, which are contextual conditions, mechanisms, and outcomes (Hanelt et al., 2021).
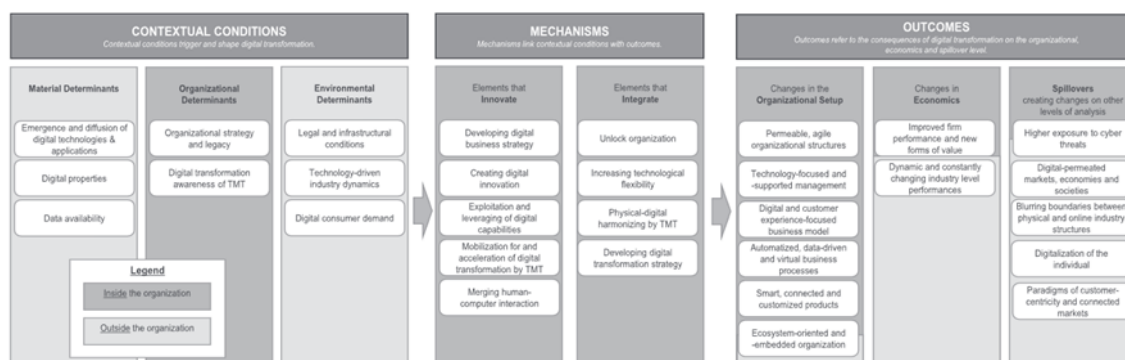
FIGURE 1   Multi-dimensional framework (Hanelt et al., 2021, p. 7).

The contextual conditions as the first part of this framework, showcase different types of determinants for digital transformation. According to Hanelt et al. (2021), these determinants can be divided into material, organizational, and environmental determinants, and they trigger and shape the process of digital transformation. These include the drivers of digital transformation that were discussed in the previous section. Digital technologies and digital consumer demand are some of the important factors that trigger and shape the digital transformation process (Hanelt et al., 2021). Furthermore, SMACIT technologies and the routine use of digital technologies by consumers shape digital transformation (Hanelt et al., 2021). The term SMACIT technology alludes to social, mobile, analytics, cloud, and Internet of Things technologies (Hanelt et al., 2021). As stated before, these aforementioned determinants can be seen as some of the drivers of digital transformation in SMEs.

The mechanisms in this framework have been divided into innovation and integration. Hanelt et al. (2021) argue that innovation describes the elements that are new to the organization through digital transformation, such as application of resources, processes, and capabilities. Integration on the other hand describes how these new things can be aligned with the existing capabilities, processes, and resources (Hanelt et al., 2021). The most important factor in this section of the framework is developing a digital transformation strategy. This strategy includes key factors such as integrating the entire coordination, and implementation of digital transformation in the firm (Hanelt et al., 2021). This further suggests that SMEs have to integrate the new digital technologies that come with digital transformation, so that they can be efficiently used within the enterprise.

In the outcomes section there are different consequences that organizations face after digital transformation. These outcomes have effects on the enterprise, its environment, and the economics (Hanelt et al., 2021). Some of the previously discussed factors can be found in this section, such as digital business model, improved performance, and higher exposure to cyber security threats. Digitalization of the individual is also mentioned in this section, and it relates to customers or workers that have increased access to things such as information (Hanelt et al., 2021).

This framework provides a better understanding of how many different aspects digital transformation affects within an organization. There are many

different factors that can trigger and shape the transformation process, and things that enterprises have to innovate and integrate. The outcomes section also provides valuable information regarding the positive effects of digital transformation, but also some of the challenges that it presents.

4.3 Digital Transformation Roadmap

Schallmo et al. (2017) propose a roadmap for digital transformation of business models that could be useful for SMEs. This roadmap has five different phases that are digital reality, digital ambition, digital potential, digital fit, and digital implementation (Schallmo et al., 2017). These phases aim to give a better understanding of the different steps that organizations go through during digital transformation.
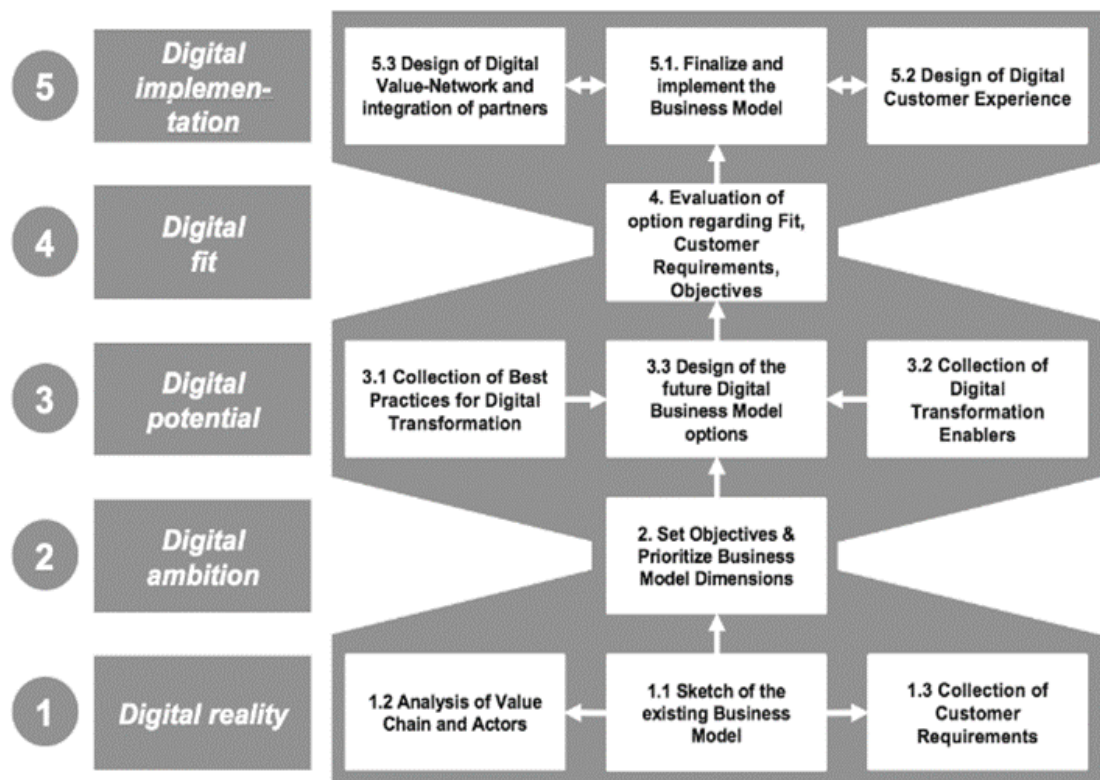

FIGURE 2   Digital transformation roadmap (Schallmo et al., 2017, p. 8).

1. Digital reality phase contains tasks such as sketching the existing business model, a survey of customer requirements, and making a value-added analysis to the related stakeholders (Schallmo et al., 2017). These tasks are done so that organizations gain a better understanding of the current state in different areas of the organization (Schallmo et al., 2017). This phase further suggests that SMEs should

know their current state before starting the digital transformation process.

2. Digital ambition phase is based on the earlier digital reality phase, and the goal of this phase is to consider different objectives for the transformation of the business model and its elements (Schallmo et al., 2017). In addition, objectives such as finances, quality, space, and time are examined (Schallmo et al., 2017), which suggests that this phase is especially important for SMEs that have limited financial resources and time.

3. Digital potential phase is the starting point of designing the future digital business model and establishing the best practices and enablers for digital transformation (Schallmo et al., 2017). This could be seen as one of the critical success factors for SMEs, since being able to design a working digital business model is a requirement for the success of digital transformation.

4. Digital fit phase examines the different options that were designed to the digital business model (Schallmo et al., 2017). In addition, their digital fit with the existing business model is evaluated, so that organizations can ensure that business objectives and customer requirements are accomplished (Schallmo et al., 2017). This phase suggests that the new digital business model is not completely new for the enterprise, but it builds upon the earlier business model.

5. Digital implementation as the last phase of the roadmap, finalises and implements the new digital business model (Schallmo et al., 2017). This phase also contains the implementation of the new digital customer experience with the digital value-creation network (Schallmo et al., 2017). One thing to note is that this implementation phase should be monitored closely, so that the strategy and the implementation are consistent throughout (Correani et al., 2020).

This roadmap should give SMEs a better understanding of how the digital transformation of business models could be done. It includes important factors such as figuring out the current state of your business, what the new digital business model should be, and what are the different options in the transformation process. However, making a strict roadmap for digital transformation that could be applied to every SME might be impossible, since the transformation process is so broad and different between organizations.

4.4 Enterprise Architecture

Enterprise Architecture (EA) could be a useful tool for digital transformation in SMEs. Gong et al. (2020) argue that EA provides a prominent overview of the enterprise and its IT systems. In addition, EA can examine the interrelationships of these systems (Gong et al., 2020). Providing this view and the ability to see

how different systems are connected together can be a very valuable tool for digital transformation. EA can also be seen capturing different interactions within the enterprise by examining different interactions between things such as applications, business, data, and infrastructure (Gong et al., 2020). In addition, EA is able to address the need for digital transformation by providing a strategic context, in response to a constantly changing business environment, through evolution and the reach of digital capability (Gong et al., 2020). These benefits of EA suggest that it could be a useful tool for digital transformation in general, but it might not be the most effective for SMEs.

The problem with EA from the perspective of SMEs, might be that it is too complex for them to use effectively. Goerzig & Bauernhansl (2018) argue that the main difficulty with EA for SMEs is that it is too complex and deeply rooted in IT. In addition, SMEs lack the understanding of EA frameworks such as TOGAF, which provides enterprises the aforementioned complete view of the enterprise (Goerzig & Bauernhansl, 2018). These frameworks are complex and difficult to handle, which means that using them effectively requires extensive training (Goerzig & Bauernhansl, 2018). Lastly, another drawback regarding EA could be that it presents an extensive and inflexible way of planning, which can be a difficulty when performing a digital transformation, since the transformation process is subject to change and requires flexibility (Goerzig & Bauerhansl, 2018). These factors suggest that EA is not the optimal solution for digital transformation of SMEs, because it requires extensive knowledge, and it might not be flexible enough for digital transformation.

There are many advantages and disadvantages in EA regarding digital transformation of SMEs. As stated before, the process of digital transformation might already require external knowledge and skills, which suggests that EA could be applicable with external expertise. However, if EA is not flexible enough for the possible changes that could happen during the process, it is not a good tool for SMEs to use. This would challenge one of the benefits that SMEs have, which is their organizational flexibility.

5   DISCUSSION AND CONCLUSION

This chapter explains the limitations and conclusions of this thesis. These conclusions consist of the definition of digital transformation, and its challenges and possible strategies from the viewpoint of SMEs. In addition, potential future research ideas are presented based on these factors.

5.1   Discussion

This thesis is limited to an overview of the process of digital transformation, since the possible technologies that are involved in this transformation process were not examined. Researching these technologies and their effects on organizations could be important since they are constantly developing, and implementing them could become easier for SMEs in the future. Plekhanov et al. (2023) note that there is also a lack of understanding of how the advancements in technologies contribute to the redesign of organizations and changes in the nature of enterprises.

The focus of this thesis was on the digital transformation of SMEs, and its challenges and strategies. However, some of the proposed strategies were not specifically made for SMEs, but they could still give a better understanding of how the process of digital transformation should be approached. Digital transformation can be a long and difficult process, which further suggests that SMEs might struggle to go through it. It is important to figure out how SMEs could successfully transform their organization digitally, since SMEs represent 99% of the enterprises in Europe (Palade & Møller, 2023).

Future research regarding this topic could further examine the different types of technologies that SMEs enable through digital transformation. In addition, it would be important to examine how these technologies affect different parts of the SMEs. Possible strategies for the digital transformation of SMEs could also be researched. This is due to the high failure rate of this process, and the lack of research regarding the strategies that are specifically made for the digital transformation of SMEs. However, it should be noted that a strict framework or a

roadmap might not be possible due to the unpredictable nature of digital transformation process.

5.2 Conclusion

Digital transformation is swiftly increasing in popularity, and it is important for SMEs to realize their need for this transformation. The aim of this thesis was to give an overview of digital transformation from the viewpoint of SMEs. This overview was done by defining digital transformation and examining how it affects them. A clear definition for digital transformation can be difficult to propose, as it is a broad process that changes many different areas of organizations. However, a potential definition could be that it is a process that triggers significant changes to its properties through different combinations of connectivity, communication, computing, information, and technologies, with an aim to improve an entity (Vial, 2019; Gong et al., 2020; Mandviwalla & Flanagan, 2021; Palade & Møller, 2023). From the viewpoint of SMEs, digital transformation gives them access to new technologies, that affect their business performance and customer base (Skare et al., 2023). These changes are important since they greatly improve the competitiveness of SMEs. In addition to the definition and the effects, the drivers, challenges, and proposed strategies for the digital transformation process of SMEs were reviewed.

This thesis examined the challenges that SMEs face during digital transformation in different phases. These phases were before, during, and after digital transformation. The challenges that were identified are difficulty of developing a strategy and a lack of knowledge in the first phase, adapting to changes in the process and cyber security threats in the second phase, and the lack of digital literacy and third-party platform concerns in the last phase. In addition, SMEs have general challenges when compared to larger enterprises, such as the lack of operational resources and financial budget (Amaral & Peças, 2021; Palade & Møller, 2023).

Some proposed strategies and tools were also reviewed for a better understanding of what the process of digital transformation contains. These included a framework, a roadmap, and enterprise architecture. The framework and the roadmap showcased different phases that exist within the transformation process, while also explaining different elements that exist in these phases. Enterprise architecture on the other hand is a tool that contains frameworks of its own, and it could be used for digital transformation. However, it might be too complex for smaller organizations such as SMEs to use without external expertise.

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