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Digital Transformation and Organizational Impact

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Digital Transformation and Organizational Impact

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EXECUTIVE SUMMARY

Digital transformation is a multilevel process that aims to improve organization efficiency through changes caused by digital technologies. To expand our understanding of this strategy, the dissertation accepts that digital transformation is a process that needs to be segmented into six stages based on dynamic capabilities theory. These stages encompass triggers, strategic orientations, evaluative elements, digital technology investments, implementation initiatives, and potential positive outcomes. Furthermore, the dissertation delineates the contextual factors like organization, top management, employees, middle managers, and strategy execution speed that influence digital transformation.

Utilizing the proposed research framework that encompasses different theoretical perspectives, the dissertation answers general theoretical questions regarding digital transformation stages and factors that influence each stage. In other words, it aims to map a successful digital transformation process and list the most influential factors. The findings of the first research stage provide a stable foundation to pursue a more specific research objective and in combination with the proposed literature to further investigate the way organizations enable employee engagement. Employees are a key stakeholder in the digital transformation process that has gained researchers' attention over the last few years. Regardless of their position, they determine the successful implementation of the transformation strategy as they need to accept and utilize the adopted digital technology. Therefore, the second research stage examines ways to align organizations current situation with the planned digitally transformed future. By assessing existing resources like human resources, technological infrastructure, and processes, organizations list strengths and weaknesses. This way they formulate an implementation plan that enables employee engagement and eliminates or reduces employee resistance.

Employing a qualitative research approach, the dissertation examines the digital transformation processes across ten organizations; eight organizations in the first research stage and two organizations in the second research stage. A case study qualitative approach is considered the most appropriate as it aligns with dissertation objectives to understand an evolving phenomenon and lets the researcher follow an inductive approach to generate conclusions after interpreting the data. Furthermore, the qualitative approach is a popular and common methodology used in digital transformation literature. In the first stage, eight exporting organizations, encompassing diverse industries, notably labor-intensive sectors, are investigated to seek an initial validation of the research framework. On the contrary, the second stage examines two worth to examine organizations that represent unique cases. It is a focused exploration of the implementation stage, particularly emphasizing strategies to foster employee engagement. By leveraging existing infrastructures and digital capabilities, organizations can align current and future states, potentially alleviating resistance.

The synthesis of findings from these two research stages concludes in the development of a digital transformation framework facilitating employee participation and guiding aligned transitions. The research underlines the importance of the "assessing the existing resources" stage to collect valuable insights that will assist organizations to invest in the appropriate digital technologies and improve the implementation plan. As it was noticed, organizations assess existing resources like processes, digital capabilities, and technology infrastructure but tend to focus on resources that are significant for their business model. Additionally, the research provides insights into contextual factors and their impact on digital transformation's different stages. Managerial factors are regarded as a highly influential contextual factor that holistically impacts the digital transformation process. On the contrary, specific organization

factors enable digital transformation, formulate digital transformation strategy, shape the assessment process, impose digital technology investments, and affect implementation plans and outcomes. A significant contextual factor is employees that facilitate the success of digital transformation. Their engagement or involvement in different stages of this process blunt change resistance. However, the analysis marked that their engagement is according to their digital capabilities level and top management perception. Therefore, in some cases, middle managers are more likely to be involved.

Keywords: digital transformation; organizational impact; employees; existing resources assessment; contextual factors

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Contents

1. INTRODUCTION	1
1.1 Research motivation.....	1
1.2 Research objective and questions.....	2
1.3 Thesis Outline	3
2. BACKGROUND	5
2.1 Digital Transformation.....	5
2.2 Stages of a digital transformation process.....	7
2.3 Factors that affect digital transformation process.....	32
2.4 The role of digital technologies in digital transformation	43
2.5 Emerging research avenues.....	44
3. A RESEARCH FRAMEWORK FOR THE DIGITAL TRANSFORMATION PROCESS	47
3.1 Theoretical background of the research framework.....	47
3.2 Sensing Capabilities: Identifying triggering factors and formulating a Digital Transformation Strategy.....	48
3.3 Seizing Capabilities: Assessing digital readiness level and adopting digital technologies	53
3.4 Transforming capabilities: Implementation initiatives.....	56
3.5 Measuring digital transformation outcomes.....	63
3.6 Contextual factors	64
3.7 Research framework overview	69
4. RESEARCH METHODOLOGY	74
4.1 Research approach	74
4.2 Research questions.....	76
4.3 Research design.....	79
5. VALIDATING THE DIGITAL TRANSFORMATION STAGES	89
5.1 Case Study Design.....	89
5.2 Multiple Case Study Findings.....	94
5.3 Concluding remarks.....	108
6. INFLUENCE OF EMPLOYEE FACTOR IN THE ALIGNMENT PROCESS	111
6.1 Case study design	111
6.2 Case study findings	116
6.3 Concluding remarks.....	132
7. RESEARCH CONTRIBUTION AND CONCLUSIONS	141

7.1	Research overview.....	141
7.2	Research contribution	142
7.3	Research limitations and Future research.....	146
	REFERENCES.....	148
	APPENDIX A - 1st Research stage interview questions.....	165
	APPENDIX B – 2nd Research stage interview questions.....	167

Content for Figures

Figure 1: Internal and external triggering factors.....	49
Figure 2: Elements incorporated in the assessing existing resources stage.....	55
Figure 3: Proposed research framework.....	73
Figure 4: A qualitative research approach. The research approach presentation was adopted by (Creswell, 2014).....	75
Figure 5: Overview of the proposed research framework.....	77
Figure 6: Research Approach.....	77
Figure 7: Digital transformation stages that will be examined in this research stage.....	89
Figure 8: Research process.....	112
Figure 9: Proposed actions during the assessment stage.....	139

Content for Tables

Table 1: Proposed framework for digital transformation.....	9
Table 2: A broad categorization of non-financial outcomes of digital transformation.....	31
Table 3: Digital transformation strategy formulation options.....	51
Table 4: Overview of the implementation initiatives and the proposed options.....	58
Table 5: Overview of the factors influencing the 5 main stages of digital transformation research framework.....	65
Table 6: Case studies tactics that have been selected to enhance the quality of the research design. Adopted by (Yin, 2009).....	81
Table 7: Selection criteria that must be met by the participating organizations for the first stage of the research.....	82
Table 8: Selection criteria that must be met by the participating organizations for the second stage of the research.....	83
Table 9: Proposed research protocol.....	88
Table 10: Sample demographics.....	91
Table 11: Data structure of the digital transformation stages.....	93
Table 12: Data structure of the contextual factors.....	94
Table 13: How contextual factors influence digital transformation process.....	105
Table 14: Sample information.....	113
Table 15: Provisional coding data structure.....	115
Table 16: Additional codes created during the coding process.....	116
Table 17: Assessment process followed by QWERT.....	133
Table 18: Overview of QWERT implementation initiatives.....	134
Table 19: ZXCVB assessment process.....	136
Table 20: Key information about organizations digital transformation projects.....	138

1. INTRODUCTION

1.1 Research motivation

Digital technology advancements decreased the price-performance rate and improved global connectivity, reshaping Information Technology (IT) strategy and placing IT at the center of the organization's strategy (Bharadwaj, El Sawy, Pavlou, & Venkatraman, 2013). Digital technologies and other elements like practices, strategies, and behaviors facilitate or promote innovation and entrepreneurship (Nambisan, Wright, & Feldman, 2019). If these elements are combined, they cause digital innovations that digitally disrupt and destabilize organizations competitive position and value-creating actors. Even though digital innovation is created by one or multiple organizations, it systemically affects value creation and value capture as it is adopted and produced by the wider ecosystem (Skog, Wimelius, & Sandberg, 2018).

These changes are repositioning IT at the center of organization's strategy, changing industry structures, and value creation, enhancing organizations ordinary capabilities and performance, and dynamic capabilities (Drnevich & Croson, 2013). Putting IT strategy in the center means that digital innovations will be developed as organizations combine internal resources and technologies. The combined effect of several digital innovations brings to surface actors, structures, practices, values, and beliefs that change, trigger, replace, or complement existing rules inside an organization, ecosystem, or industry. These institutional changes caused by digital innovations are called digital transformation (Hinings, Gegenhuber, & Greenwood, 2018). However, the adoption of IT systems or IS technologies needs to be aligned with business strategy because of the multilevel influence on organization (D. Q. Chen, Mocker, Preston, & Teubner, 2010). Therefore, IT strategy cannot be perceived as a subordinate or functional strategy but as an essential strategy that must be aligned with business strategy (Bharadwaj et al., 2013).

The fusion of IT strategy and business strategy is called digital (business) strategy, and describes an organizational strategy that tries to leverage digital resources in an effort to create new value (Bharadwaj et al., 2013). It is directly related to manager's change perception (Mithas, Tafti, & Mitchell, 2013), is influenced by external factors defined by industry and competition (Mithas et al., 2013), and industry's business model elements like key resources (Woodard, Ramasubbu, Tschang, & Sambamurthy, 2013). Digital strategy may become detached, part of corporate strategy, or identical to corporate strategy (Bharadwaj et al., 2013; Schallmo, Williams, & Lohse, 2019). This level of connection prescribes how rapid organizations will start a digital transformation journey as digital strategy is the necessary step that enables the digital transformation of the existing business model or the creation of a digitally focus business model (Proksch, Rosin, Stubner, & Pinkwart, 2021; Schallmo et al., 2019). Nevertheless, digital transformation is beyond a simple technology adoption as it is connected to organization strategic orientation (Santos & Martinho, 2020), and applies as well to cities, and governments (Van Veldhoven & Vanthienen, 2021).

Among the first that introduce digital transformation in the academic community is George Westerman who described the different types of digital transformation strategies (Westerman, Calm ejane, Bonnet, Ferraris, & McAfee, 2011), and showcased the importance of digital transformation presenting case studies from diverse industries (Westerman, Tannou, Bonnet, Ferraris, & McAfee, 2012). The objective of this early work and of the following produced work was to not only showcase and convince top management about the digital transformation benefits but also the necessity of following this new

strategic orientation. The prime literature around digital transformation was mainly focused on breaking down the digital transformation process, defining stages, and listing the advantages of digital transformation. Following this period, academic work started focusing on directly or indirectly influenced stakeholders such as customers, competitors, employees (Van Veldhoven & Vanthienen, 2021), how organization principles, beliefs, and culture shift digital transformation journey, and its externalities like the creation of an ecosystem.

Employees are considered a key digital transformation enabler because a successful implementation is closely connected to employee acceptance and their willingness to adopt new digital technologies. Only in this way, the organization implements a digital transformation strategy and achieves the desired outcomes. Employees directly or indirectly influence every stage of the digital transformation. Their direct influence is clear from the beginning by proposing changes that may simplify everyday activities or elevate existing products, or when they are requested to adopt, utilize the selected digital technologies to facilitate implementation. On the other hand, employee digital capabilities level, personal characteristics, demographics, work style, and work environment indirectly influence management decisions about technology investments and implementation initiatives.

Consequently, this Ph.D. dissertation is motivated by the need to understand digital transformation and examine how specific stakeholders like employees influence the success of a digital transformation strategy. The pandemic underlined the significance of digital transformation not only for organizations that want to be innovative but also for well-established incumbent organizations that need to tame the digital technologies wave to remain competitive. The aim of this research is to further enhance digital transformation understanding and propose specific steps to break down digital transformation processes and initiatives that will boost employee engagement, participation, and acceptance.

1.2 Research objective and questions

Despite the light that has been shed on digital transformation still many organizations struggle to successfully digitally transform; providing further research opportunities to explore aspects that enable and define digital transformation success (Chanias, Myers, & Hess, 2019). Therefore, trying to figure out how organizations disseminate digital transformation efforts or how they gain employee acceptance is valuable and necessary (Hinings et al., 2018). To meet research objectives a 6-stage research framework was created that describes different stages of this process starting from identifying triggers to listing the positive outcomes of this process. This framework combines previous knowledge but also sheds light on aspects like assessing existing resources, processes, and technological infrastructure that the researcher believes may facilitate implementation and employee participation.

To holistically investigate the digital transformation process the proposed research framework tries to encompass multiple theoretical perspectives (Hanelt, Bohnsack, Marz, & Antunes Marante, 2021; Jedynak, Czakon, Kuźniarska, & Mania, 2021; Steiber, Alänge, Ghosh, & Goncalves, 2021), and combine different theoretical views by incorporating various, diverse aspects of digital transformation (Jedynak et al., 2021). Furthermore, the theoretical foundation of this research framework, dynamic capabilities theory, underlines some aspects that have not been thoroughly examined by digital transformation literature. A starting point of this research is to answer more general theoretical questions regarding digital transformation stages and factors that influence each stage. This first stage will set the foundations for the second stage of the research and will pinpoint stages and factors that need further examination. To this end, the research questions of dissertation's first research stage are:

Which stages may enable a successful digital transformation?

- Which are the main stages of the digital transformation process?
- Which are the factors that influence each stage of this process?

The second research question focuses on the assessment and implementation stage of the research framework as we try to understand and analyze how organizations align existing resources (human resources, technological infrastructure), and processes with the following stages of digital technology investments and implementation. To follow this research path was recommended by (Cichosz, Wallenburg, & Knemeyer, 2020) who urges researchers to explore how existing organizations influence the implementation plan and the outcomes of digital transformation. Furthermore, being a well-established organization means that employees are familiar with specific processes and have a certain digital capabilities level. Hence, employees are worthy to examine contextual factors that would shed light on aspects like the role of employees, a contextual factor, in formulating the implementation plan (Hanelt et al., 2021). In addition, the first stage of the research concludes that employees are a factor that is highly considered by top management because digital disruptions mainly affect employee satisfaction and commitment. Therefore, the research questions of this stage are:

How can organizations leverage employee engagement by aligning existing processes with digital transformation strategy?

- Are any implementation enablers that facilitate employee participation?

1.3 Thesis Outline

This Ph.D. dissertation is comprised of 7 chapters presenting the theoretical background of this work, the methodological approach, and research outcomes. More specifically, chapter **INTRODUCTION** presents the motives of this research, and summarizes the research objectives and the research questions that this dissertation tries to tackle.

Chapter **BACKGROUND** deals with the theoretical foundations of this approach by presenting a literature review. Initially, this chapter discusses the “digital transformation” term and underlines significant aspects of digital transformation process. Then tries to define the digital transformation stages by combining different theoretical perspectives. Each proposed stage is analyzed in detail to facilitate reader understanding. Furthermore, the chapter lists the factors that were indicated by the literature that influence digital transformation and sheds light on the digital technologies role in digital transformation. Finally, it presents the research gaps that originated from the examined literature.

Chapter **A RESEARCH FRAMEWORK FOR THE DIGITAL TRANSFORMATION PROCESS** presents the theoretical foundation of the proposed digital transformation research framework. The theoretical foundation of the research model is the dynamic capabilities theory. Dynamic capabilities theory enables organizations to implement and align their actions to achieve a successful digital transformation. More

specifically, it presents the digital transformation stages according to sensing, seizing, and transforming dynamic capabilities. The chapter concludes by listing the contextual factors that we believe may have the biggest impact on digital transformation process.

Chapter **RESEARCH METHODOLOGY** discusses the methodological approach that supports this dissertation. Starting by explaining why a qualitative research approach was chosen and how aligned it is with the research objectives. Following, we discuss the research questions of each stage and their connection with the research gaps identified in a previous chapter. In both stages, a multiple case study approach was applied. However, in the first stage, our sample consists of 8 incumbent organizations, and in the second stage as we narrow the scope of the research we focus on 2 organizations. Finally, the chapter ends by discussing the proposed research design and sheds light on data collection, data analysis, and interview procedure.

Chapter **VALIDATING THE DIGITAL TRANSFORMATION STAGES** presents the case study findings of the first research stage. It breaks down each digital transformation stage and presents participants points of view and best practices. Furthermore, it lists the factors such as management, organization, employees, and financial resources that have a great influence on digital transformation. Closing this chapter some initial concluding remarks are presented.

Chapter **INFLUENCE OF EMPLOYEE FACTOR IN THE ALIGNMENT PROCESS** presents the assessment process of existing resources, the way organizations invest in new technologies, and the implementation of digital transformation. These stages will be examined under the prism of employee influence and the middle manager's role. The case study finding section describes separately the digital transformation process of the 2 examined organizations. The last subsection presents case-level conclusions and cross-case conclusions.

Finally, Chapter **RESEARCH CONTRIBUTION AND CONCLUSIONS** presents the final remarks of this Ph.D. dissertation. A general overview of the research is presented to summarize the research framework, and validate the research objectives. In addition, it presents the dissertation's theoretical and practical implications. The chapter ends by presenting research limitations and potential future research opportunities.

2. BACKGROUND

Digital Transformation (DT) represents a comprehensive reimagining of organizational processes, strategies, and structures through the integration of digital technologies. This chapter tries to blueprint the digital transformation process by synthesizing existing research and presenting a holistic review by naming various stages of this transformative process. In addition, it lists various factors regarding management, organization, employees, time, financial parameters, and scale that affect each stage of the digital transformation process. This literature review was performed before the fieldwork as we want the examined research framework to incorporate previously examined frameworks both on theoretical and practical levels.

To this end, it reviews more than 150 papers that were sourced from a crafted database which includes papers that were examined throughout this PhD research and the results of various searches in the Web of Science database. Initially, this database included more than 1275 papers published from 2010 until March 2023. However, the aim is to conduct a high-quality review, therefore various quality criteria were set about journal rank, journal subject, and subcategories according to SCIMAGO ranking. This means that papers published in Q1 and Q2 “Business, Management & Accounting” journals were only included. It focuses only on journals that were listed in subcategories related to business¹. In addition, some additional criteria related to the type of paper, unit of analysis, and scope were set. During the review, it was noticed that the SCIMAGO list does not rank the MIS Quarterly Executive journal. In the researcher’s view, the MIS Quarterly Executive journal must be added as it is a practice-oriented journal and includes articles that combine the academic and practical aspects of DT. A similar exception has been made by (Chawla & Goyal, 2021; Schneider & Kokshagina, 2021) who have underlined the importance of including MIS Quarterly Executive in their research, too. Unfortunately, access to MIT and HBR articles was not attained so articles for these magazines have not been added. The review was based on more than 150 papers.

The structure of this chapter begins by reviewing various digital transformation definitions that help readers better identify key elements of this phenomenon. Following this section, the digital transformation key stages are presented (Section 2.2). This subsection presents in detail the proposed 5 stages that have been identified from the review. Section 2.3 lists the factors (management, organization, employees, middle managers, scale, and execution speed) that affect the identified stages. Finally, light is shed on digital technologies as they are a key component of digital transformation (Section 2.4), and future research avenues are noted down.

2.1 Digital Transformation

Digital technology advancements have reshaped IT strategy (Bharadwaj et al., 2013), repositioning IT at the center of an organization's strategy (Drnevich & Croson, 2013). This has affected industry structures, value creation processes, and enhanced performance (Drnevich & Croson, 2013). IT/Information System (IS) strategy is an organizational perspective on the investment in the deployment, use, and management of IT (D. Q. Chen et al., 2010). The fusion between IT and business strategy is called digital (business)

¹ Subcategories like “Business and international management”, or “Management information system”, or “Management of technology innovation”, or “Organizational behavior and human resources management”, or “Strategy and management”.

strategy, which may create three types of connections between digital strategy and corporate strategy (Bharadwaj et al., 2013; Schallmo et al., 2019). As digital strategy becomes part of corporate strategy, or identical (Bharadwaj et al., 2013; Schallmo et al., 2019) enables digital transformation efforts.

Hence, digital strategy is a precondition for organizations that try to digitally transform the existing business model or try to develop a new one (Proksch et al., 2021; Schallmo et al., 2019). Digital transformation exceeds the adoption of digital technologies in processes; it affects strategy orientation (Santos & Martinho, 2020). However, the level of alignment between IT strategy and digital transformation strategy is moderated by the complexity and dynamics of the environment or by the digital maturity of the industry (Sia, Weill, & Zhang, 2021). So, it is considered a more comprehensive, cross-functional strategy that requires resources reconfiguration and a holistic and integrated approach as many key stakeholders are affected (Hess, Benlian, Matt, & Wiesböck, 2016; Sia, Soh, & Weill, 2016; Vial, 2019). The digital transformation phenomenon encompasses three axes technology, business, and society, and applies not only to organizations and directly or indirectly involved stakeholders like customers, competitors, and employees, but also to cities, and governments (Van Veldhoven & Vanthienen, 2021).

When researchers try to define or describe digital transformation, they shed light on various aspects by describing it as a business change process (Gong & Ribiere, 2021; Park, Pavlou, & Saraf, 2020; Parviainen, Tihinen, Kääriäinen, & Teppola, 2017; Peter, Kraft, & Lindeque, 2020; Shahi & Sinha, 2021) or as a non-organization-centric process that can be applied to society or industry (Vial, 2019). However, the focal point is the sociocultural process then the role of digital technologies is decreased and DT is focused on organizational culture and ideas (Saarikko, Westergren, & Blomquist, 2020). Therefore, digital transformation might cause changes in processes like streamlining and automating, disrupt businesses offering new services, advance existing processes, and transform roles, or value. Finally, it might reform social structures like the type of work, and decision-making process (Parviainen et al., 2017).

Yet a common point of these definitions is that digital technologies enable digital transformation (Gong & Ribiere, 2021; Park et al., 2020; Parviainen et al., 2017; Peter et al., 2020; Shahi & Sinha, 2021; Vial, 2019), and play the most important role in this process. The term digital technologies include IT solutions, internet or ICT solutions, integrative solutions like applications and software, BRAICQ² (Van Veldhoven & Vanthienen, 2021), and SMACIT³ (Sebastian et al., 2017). Digital technologies disrupt internal (operations, knowledge extracted from data), and external environment (customers and competition) (Vial, 2019), and compel organizations to make minor changes or transform key elements like functions, processes, resources, and capabilities and even the value creation (Gong & Ribiere, 2021; Shahi & Sinha, 2021; Van Veldhoven & Vanthienen, 2021). Consequently, digital transformation is understood as the result of combining process engineering or digital business development with new technologies (Peter et al., 2020); setting IT aspects like IT spending, IT training, and IT usage (Park et al., 2020) a key parameter of the digital transformation equation.

Market and industry disruptions are inevitable during a digital transformation process because many reconfigurations and changes occur when an organization's vision and strategy, structure, processes, capabilities, and culture are disrupted (Gurbaxani & Dunkle, 2019). Hence, a business model adaptation,

² The acronym stands for Blockchain (and smart contracts), Robotics (including 3D printing), Artificial Intelligence (AI), and Cognitive and Quantum computing.

³ Acronym to describe the key technologies of today's digital businesses: social, mobile, analytics, cloud, and Internet of Things.

workforce skill development, redesigning the value proposition, and implementation plans need to be included and mentioned in digital transformation (Santos & Martinho, 2020). Furthermore, researchers should not overlook the effect of human factors and especially the founder or/and the manager, so founders' digital IT capabilities, digital culture, and perspectives' on new ventures as they determine the digitalization level (Proksch et al., 2021). As a consequence, a standalone digital transformation strategy is mandatory, especially in early DT stages (Hess et al., 2016).

Finally, the role of internal and external stakeholders should not be disdained when researchers define or examine digital transformation. This disruption affects the way stakeholders connect (Van Veldhoven & Vanthienen, 2021) and receive the value proposition (Gong & Ribiere, 2021) from the organization. During digital transformation process, external stakeholders are becoming an important parameter of the organization, as the organization must narrow its operations and collaborate or outsource processes to other organizations that specialize in specific activities. Consequently, organizations' boundaries are blurred, the dynamic relationships with customers change and become part of an ecosystem (Menz et al., 2021). In addition, organization dependence on stakeholders rises so they try to build relationships based on trust, engagement, and empowerment (Candelo, Casalegno, & Civera, 2021) as they become an important part of organizations environment and an enabler for a successful digital transformation.

2.2 Stages of a digital transformation process

The digital transformation definition proposed by (Vial, 2019) describes digital transformation as a process that utilizes technologies to improve an organization. More specifically, the paper defines digital transformation as “a process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies”. We adopt this definition because it fits dissertation purposes and is in line with researchers view of digital transformation. Considering digital transformation, a process means that some key stages must be defined. To define these stages we relied on the 3-stage IS strategy process formulation model proposed by (Henfridsson & Lind, 2014) following the consideration that digital business strategy and IS/IT strategy is a precondition for digital transformation. The Henfridsson & Lind, (2014) model proposes a decision process that is considered a good fit for the first stages of digital transformation process. However, their decision model does not include an implementation and an outcome stage that we believe are essential for a holistic digital transformation process. To better ground the digital transformation stages, advance our understanding, and support key stages a digital transformation literature was utilized (Table 1).

A starting point for Henfridsson and Linkd's process model is management's ability to sense a triggering event that is forcing or will force the organization to react and develop a strategy initiation (Henfridsson & Lind, 2014). The “Triggering Event” stage lists all the triggering factors from organization's internal (Hanelt et al., 2021; Martinez, 2019; Vial, 2019) and/or external environment (Hanelt et al., 2021; Martinez, 2019; Schallmo, Williams, & Boardman, 2017; Schallmo et al., 2019; Vial, 2019). These triggers force organizations to start a digital transformation process. Hence, organization's ability to acknowledge this need is a prerequisite (Björkdahl, 2020; Chanas et al., 2019; Guenzi & Habel, 2020; Hanelt et al., 2021; Parviainen et al., 2017). The triggering event prescribes the strategy formulation process for (Henfridsson & Lind, 2014) leading to the second stage “Strategy Formulation”. The aim of this stage is for organizations to define what they want to achieve (Guenzi & Habel, 2020; Parviainen et al., 2017), formulate multiple scenarios (Björkdahl, 2020; Chanas et al., 2019; Schallmo et al., 2019), and choose the one that fits better

(Björkdahl, 2020; Chanas et al., 2019; Guenzi & Habel, 2020; Schallmo et al., 2019; Zoltners, Sinha, Sahay, Shastri, & Lorimer, 2021). By selecting the best scenario, organizations have clearly defined the organizational aspects that are affected by this process (Martinez, 2019).

According to Henfridsson & Lind, (2014), strategy formulation consists of multiple strategy initiations that are reformulated by various intervening factors from different organizational sub-communities. Through this process, the final IS strategy is formulated. A similar process is conducted in digital transformation and is called the “Mediating Stage”. This stage summarizes factors that might affect the digital transformation strategy formulation and implementation, so organizations may redesign the initial transformation strategy. The chosen digital transformation strategy and this stage are influenced by factors like time, finances, scale of the process, space, and quality (Schallmo et al., 2017). Organization is a living entity meaning that sub-communities related to organization may intervene and influence directly or indirectly the strategy initiation. Obviously, directly affected sub-communities have a greater influence on strategy formulation as they steer management towards the correct technology-mediated practices. Furthermore, the interactions between the two sub-communities shape an emergent IS option that could fit into sub-communities existing learnings, and possibly eliminate adoption obstacles (Henfridsson & Lind, 2014). Even though in the digital transformation literature there are no direct references to the influence that subcommunities have on the process we notice a similar process by assessing existing infrastructures, processes, and digital skills (Martinez, 2019; Parviainen et al., 2017; Schallmo et al., 2019). This assessment helps organizations adopt new digital technologies (Martinez, 2019), and align existing and new business models (Schallmo et al., 2017; Zoltners et al., 2021).

The last two stages are not included in the IS strategy process model, but are necessary for an integrated digital transformation process and are supported by the relevant literature (Björkdahl, 2020; Guenzi & Habel, 2020; Hanelt et al., 2021; Martinez, 2019; Parviainen et al., 2017; Schallmo et al., 2017, 2019; Vial, 2019). Therefore, a stage called “Implementation process and practices” is added that describes initiatives organizations may follow to achieve a successful DT. Organizations choose and design the practices that they believe will enable digital transformation (Björkdahl, 2020; Chanas et al., 2019; Guenzi & Habel, 2020; Parviainen et al., 2017; Vial, 2019; Zoltners et al., 2021). In addition, they establish monitoring mechanisms to oversee the implementation process (Chanas et al., 2019; Guenzi & Habel, 2020; Martinez, 2019; Parviainen et al., 2017). The last stage in this process is outcomes. This dissertation will focus only on possible positive outcomes so this stage lists the financial (economical) and non-financial (organizational) outcomes of digital transformation (Hanelt et al., 2021; Vial, 2019).

Stages of DT	Description	Parameters to be considered	References
Triggering Events	<i>Factors that trigger a DT process</i>	Understanding the importance or the need for DT	(Björkdahl, 2020), (Parviainen et al., 2017), (Guenzi & Habel, 2020), (Hanelt et al., 2021) (Chanas et al., 2019)
		External organizational environment	(Martinez, 2019), (Schallmo et al., 2017), (Schallmo et al., 2019), (Hanelt et al., 2021) (Vial, 2019)
		Internal organizational environment	(Martinez, 2019), (Hanelt et al., 2021) (Vial, 2019)

Stages of DT	Description	Parameters to be considered	References
Strategy Formulation	<i>Define transformation objectives, formulate various scenarios, and opt for the best</i>	Goals organizations want to achieve	(Guenzi & Habel, 2020), (Parviainen et al., 2017)
		Formulating multiple digital transformation strategy scenarios	(Schallmo et al., 2019), (Björkdahl, 2020) (Chanias et al., 2019)
		Choose the most appropriate scenario	(Schallmo et al., 2019), (Björkdahl, 2020), (Guenzi & Habel, 2020), (Zoltners et al., 2021) (Chanias et al., 2019)
		Define affected organizational aspects	(Martinez, 2019)
Mediating Factors	<i>Factors that might affect strategy implementation</i>	Gap future and existing situation or evaluation of the digital maturity level	(Parviainen et al., 2017) (Schallmo et al., 2019) (Martinez, 2019)
		Adoption of the required digital technologies	(Martinez, 2019)
		Alignment of the new and old business model Designing initiatives to support selected strategy	(Schallmo et al., 2017) (Zoltners et al., 2021)
Implementation process and practices	<i>Practices that enable digital transformation</i>	Choosing and designing practices that will enable digital transformation implementation	(Parviainen et al., 2017), (Björkdahl, 2020), (Björkdahl, 2020), (Guenzi & Habel, 2020), (Zoltners et al., 2021) (Chanias et al., 2019) (Vial, 2019)
		Formulating a monitoring process to overview implementation	(Parviainen et al., 2017), (Martinez, 2019), (Guenzi & Habel, 2020) (Chanias et al., 2019)
Outcomes	<i>Measuring the positive effect of digital transformation</i>	Organizational, and economic digital transformation outcomes	(Hanelt et al., 2021) (Vial, 2019)

Table 1: Proposed framework for digital transformation.

2.2.1 Triggering events

Organizations and the Top Management Team (TMT) must be aware of the opportunities presented by digital transformation, as well as the value and potential outcomes that could result from it (Björkdahl, 2020; Hanelt et al., 2021). At this stage, the ability to scan the surroundings is necessary, so it is regarded as a fundamental adaptive capacity (Liu, Yang, & Liu, 2021). More particular, it assists managers in locating and evaluating opportunities in the technological sector as well as opportunities in the digital economic environment (Colli, Stingl, & Waehrens, 2022; Liu et al., 2021). These opportunities offer priceless information that is used as input for later phases (Liu et al., 2021). Nevertheless, country's legal and infrastructural conditions are a parameter that alters organizations' digital transformation plans and limits their scanning abilities (Hanelt et al., 2021).

External changes force organizations to redefine and be innovative with their business model (Acciarini, Borelli, Capo, Cappa, & Sarrocco, 2021). Utilizing tools like PESTEL analysis or customer and competition analysis assists organizations analyze the external macro-environment and micro-environment for identifying opportunities and threats (Schallmo et al., 2019). These triggers could be new industry directions (Acciarini et al., 2021), a new business model (Åkesson, Sørensen, & Eriksson, 2018; Cozzolino, Verona, & Rothaermel, 2018; Sia et al., 2016; Steiber et al., 2021), new technological advancements or specific characteristics (Åkesson et al., 2018; Cozzolino et al., 2018; Hanelt et al., 2021; Hess et al., 2016; Sia et al., 2016). Furthermore, customers are an important trigger of the external environment; closely monitoring customers' needs and requirements helps organizations design an encompassing digital transformation strategy (Setia, Venkatesh, & Joglekar, 2013), and signifies new strategic directions (Hanelt et al., 2021; Martinez, 2019; Schallmo et al., 2017, 2019; Sia et al., 2016; Vial, 2019). Customer concerns could be more significant if they are combined with societal concerns. This combination triggered the changes in the automotive industry as sustainability concerns kicked off the transition to a more sustainable business model and the introduction of new innovative products (Acciarini et al., 2021). Finally, part of organizations external environment is stakeholders whose perspectives and needs could stir digital transformation direction (Schallmo et al., 2017).

External environment triggers are considered quite significant for an organization's competitive position and performance growth, yet triggers coming from their internal environment should not be neglected. As mentioned above, Top Management scanning capabilities are an enabler for digital transformation projects as they decide about organizations' strategic directions and have the power to mobilize resources. Hence, a change in the TM composition like a new CEO could change organization's strategic direction (Sia et al., 2016). Except for management decisions, employees may be change agents by proposing a new digital initiative or being part of a digital innovation development process (Åkesson et al., 2018; Steiber et al., 2021). Digital initiatives or digital innovation projects impact managers' abilities to sense and shape opportunities, too. Being involved in a digital project or initiative influences participants mindset as they are in a continual process of solving problems, scanning for opportunities on short- or long-term horizons, and articulating opportunities beyond immediate concerns (Colli et al., 2022). More digital transformation opportunities may be identified by analyzing business data (Vial, 2019), and marking business issues that require instant responses (Hess et al., 2016; Sia et al., 2016). Monitoring (non-) financial performance indicators is another data type that should be considered. Changes in economic indicators or financial pressure on core business activities may trigger a domino of changes (Hess et al., 2016; Steiber et al., 2021). The DBS case study reveals the importance of analyzing data, as the low performance of the wealth management department forced the organization to adopt new digital technologies to offer services similar to those of their competitors (Sia et al., 2016). This case study showcases that scanning the internal and external, or macro and micro-environment, is essential to responding to digitalization challenges by formulating a strategic act, especially in highly disruptive industries (Åkesson et al., 2018). In addition, it underlines that the internal and external environment cannot be strictly separated because input from the external environment may be necessary to provide solutions to potential problems, support further innovations, and develop innovations based on learning and insights (Colli et al., 2022).

In general, triggers could modify not only the strategy formulation process (Martinez, 2019) but also the implementation initiatives that will be utilized (Cozzolino et al., 2018). Identifying an external trigger with great influence on the core business model or that is capable of creating a new value proposition, such as

a technological disruption, forces incumbent organizations to digitally transform their business model faster. This obligation influences implementation initiatives as they will choose to create alliances or acquire an organization to speed up the adaptation process (Cozzolino et al., 2018) instead of developing in-house the necessary resources and capabilities. As triggers are the starting point of the digital transformation process and affect the evolution of the entire process they should be evaluated and classified (Setia et al., 2013). To become organizational information, data should be cleaned, stored, and analyzed (AI techniques) to enhance their value (Correani, Massis, Frattini, Petruzzelli, & Natalicchio, 2020). Following the evaluation, organizations choose the most influential triggers, set the digital transformation goals that want to achieve (Parviainen et al., 2017), and formulate multiple digital short- and long-term future scenarios (Guenzi & Habel, 2020).

2.2.2 Strategy formulation

Through the previous stage, organizations have examined their internal and external environment, evaluated each trigger, and selected to which trigger to respond (Echterfeld & Gausmeier, 2018; Martinez, 2019). To formulate a digital transformation strategy (DTS), organizations are called to answer multiple questions about the way they want to proceed; the aspects they want to transform (Guenzi & Habel, 2020; Matt, Hess, & Benlian, 2015; Parviainen et al., 2017; Schallmo et al., 2019), clarify why they want to be digitally transformed (Guenzi & Habel, 2020; Matt et al., 2015) and what they want to achieve (create or capture value) (Björkdahl, 2020; Correani et al., 2020; Guenzi & Habel, 2020; Matt et al., 2015; Parviainen et al., 2017). In this stage, a supportive Top Management team is necessary as they need to answer the above-described questions, and a boundary-spanning leader is needed to enable digital transformation strategy formulation of DTS (Zoltners et al., 2021). More specifically, TMT support is crucial at this stage because they select the digital transformation strategies (Schallmo et al., 2019), and choose the appropriate initiatives that are aligned with DTS, prioritize it, and secure that organization will remain focused (Zoltners et al., 2021).

A digital transformation strategy alters various elements of the business model (Matt et al., 2015), and improves financial and non-financial indicators (Guenzi & Habel, 2020; Matt et al., 2015). However, strategy formulation efforts are narrowed by organizations' behavior towards digital technologies, their abilities to exploit and implement the offered opportunities (Matt et al., 2015), business model's strategic renewal, organization's collaborative approach, and culture (Warner & Wäger, 2019). Thus, the selected digital transformation strategy should be in line with the existing corporate strategy (Schallmo et al., 2019); including operational and functional strategy (Björkdahl, 2020; Hess et al., 2016; Matt et al., 2015). By aligning the two strategies, organizations gradually inject elements of the new strategies into products. This alignment enables the exploitation of existing resources and capabilities and lifts possible financial barriers that enhance and complement core business (Björkdahl, 2020). Through this process, organizations collect data to trigger digital transformation strategy and at the same time review customers reactions and intervene to overcome customer experience problems (Björkdahl, 2020). Nevertheless, the expected value that will be created, and projects urgency should be considered at this stage, as it is impossible to digitally transform an entire process simultaneously (Björkdahl, 2020; Guenzi & Habel, 2020).

The formulation process is influenced by the internal and external environment (Chanas et al., 2019), and calls for organizations to combine and allocate various resources like capabilities, activities, and stakeholders (Correani et al., 2020; Sebastian et al., 2017). Organizations identify or foresee potential barriers or stakeholders that will be affected the most (Martinez, 2019) and detect possible

implementation practices (Guenzi & Habel, 2020; Parviainen et al., 2017). Hence, this stage is a representative outline of organizations' plans (Correani et al., 2020), dictates the core elements that must be transformed⁴ (Schallmo et al., 2017; Wengler, Hildmann, & Vossebein, 2021), and prescribes the implementation process by highlighting strategic actions and resource combinations (Correani et al., 2020). For example, implementation may require new job roles at employee and manager levels, strategic partnerships with other organizations (Correani et al., 2020), complementary or new processes (Correani et al., 2020; Guenzi & Habel, 2020), technology investments to enable implementation, set indicators to track progress (Guenzi & Habel, 2020). Therefore, the formulation and implementation activities could take place in parallel (Chanias et al., 2019).

Formulation is a highly dynamic process based on a repetitive digital strategy-making process and relies on previous experience and feedback loops. It is considered a learning and practice activity that continually involves and requires the involvement of all management levels and functions, consultants, and service providers (Chanias et al., 2019). This means that it is a time-evolving and gradually building process (Chanias et al., 2019; Dremel, Herterich, Wulf, Waizmann, & Brenner, 2017; Echterfeld & Gausmeier, 2018; Wengler et al., 2021). To this end, a detailed plan (Echterfeld & Gausmeier, 2018) is required to enable organizations to build the necessary capabilities for each stage (Dremel et al., 2017), and adjust the initial strategy (Wengler et al., 2021) and/or the implementation plan regularly and update the approaches and practices (Chanias et al., 2019). To successfully complete this process requires different capabilities at every stage like transformative capability to define the structure and culture in the early stage, collaborative and adopting capabilities as digital transformation strategy focus on the production process. The final stage requires capabilities to integrate systems into products, along with the necessary investments and resources (Santos & Martinho, 2020). Given that not all organizations have the same capabilities, choosing smaller and less impactful transformation projects could be a digital transformation omen and be the starting point for more intense digital transformation efforts (Björkdahl, 2020).

Types of Digital Transformation Strategies (DTS)

Digital transformation has two generic strategic orientations; either organizations exploit existing business models to be repositioned or they seek new growth opportunities by utilizing traditional IT functions and introducing new products and services (Sia et al., 2021). Nevertheless, the literature suggests various DTS classifications based on digitization's objective and the nature of the object (Echterfeld & Gausmeier, 2018), the contextual scope (narrow, broad), and intra-organizational change process (weak focus, strong focus) (Hanelt et al., 2021) as well as focusing on value creation process transformation and the way value is distributed (Vial, 2019). As organizations reach more mature digital transformation levels they choose to proceed with more sophisticated digital transformations; either simultaneously choose to utilize existing business models and transform core elements and offer new services/products or they separate business and IT. This disjunction offers greater agility to sense and seize new opportunities (Sia et al., 2021).

Regardless of the classification, a digital transformation strategy proposes multiple strategic actions that affect the internal (digital leadership and culture, process redesign/improvements), external environment

⁴ In a market-oriented digital transformation, core elements are considered employees at management and production level, "processes" and "data" (Wengler et al., 2021). These elements affect the implementation plan, too (Schallmo et al., 2017).

(customer-centricity), or both environments (digital business development, digital marketing, new technologies adoption, technology integration) (Peter et al., 2020). For the purposes of this dissertation, we choose a more generic segmentation that focuses on digital transformation orientation if it is customer- or process- or value proposition-oriented.

Customer-oriented Digital Transformation

Customer engagement transformation strategies target customer loyalty and trust and introduce features that offer a superior, innovative, personalized, and integrated customer experience. Implementing these various changes organizations try to create an omnichannel experience throughout the customer journey and on every channel (Sebastian et al., 2017). A precondition for an omnichannel experience is the complementarity of the online and offline channels and how these two channels are intertwined (Hansen & Sia, 2015). To design and formulate this strategic orientation, they rely on high-quality data and analytics to better understand customer needs and forecast demands. These alterations enhance organizations-customers communication and provide access to new data sources (Sebastian et al., 2017). A customer-oriented DT is preferred in low digital maturity stages because organizations focus on factors that affect mostly the customers, so they do not pay attention to factors that affect processes (Proksch et al., 2021).

Even though this digital transformation focuses on customer experience, it requires business model changes as it surpasses the integration of adding e-commerce and social media platforms (Hansen & Sia, 2015) and offers a new value proposition to customers (Jocevski, Arvidsson, Miragliotta, Ghezzi, & Mangiaracina, 2019). So, on the one hand, requires changes in core business model elements (customer relationship, value proposition, key resources, key activities, key partners) (Jocevski et al., 2019), and on the other hand requires organizational structural changes to support strategy implementation, and cultivate a new organizational mindset (Hansen & Sia, 2015). In other words, during this type of digital transformation strategy, organizations must advance internal operations not only to properly support digital transformation (Hanelt et al., 2021; Martinez, 2019) but also to formulate a sophisticated customer service process that will secure high-quality information (Setia et al., 2013). To this end, synergies between digital transformation orientations could be developed to support organizations efforts (Sebastian et al., 2017).

Process-oriented Digital Transformation

As discussed above digital transformation projects may require transforming elements that are not directly related to this specific strategic orientation. For example, during a customer-oriented DT organizations may need to automate some processes, starting simultaneously a process-oriented DT that is focused on changes in process automation either at the administration or production level (Wengler et al., 2021). Of course, the opposite is possible. A transformation focused on processes like a sales transformation may cause the organization to start a customer-oriented digital transformation because customers are key component of this process and are in-directly affected by this transformation (Corsaro & Maggioni, 2021). It is clear that a digital transformation process may require synergies and the digitalization of additional organizational aspects, creating a new digital transformation project.

Focusing on digitally transforming production processes, efforts start from the device and network layers by offering new complementary services to specific products (Sandberg, Holmström, & Lyytinen, 2020). This helps organizations to identify technological requirements, plan the integration of various systems, and develop data management structures to collect, store, share, and use data for production purposes (Sjödín, Parida, Leksell, & Petrovic, 2018). On the contrary in digital mature levels, digital transformation

tries to coordinate production process and the entire process system. This coordination requires organizations to analyze specific sets of information functions and expand their scope and customer operations (Sandberg et al., 2020). For manufacturing organizations, digitalization objectives are to forecast demand and achieve greater production reliability and greater profits. Thus, they rely on real-time process analytics and optimization techniques. A completely digitally transformed production process is to develop a smart factory with connected and flexible manufacturing systems that use data from different departments (sales, customer service department) to forecast, and adapt to the demand (Sjödén et al., 2018).

In process-oriented digital transformations key activities are affected, making the formulation of a long-term implementation plan a necessity to secure a connection between phases (Sandberg et al., 2020). Hence, it requires digital capabilities to be aligned with organizational capacity and current platform use (Sandberg et al., 2020), and to develop new digital capabilities that will facilitate information extraction from data (Wengler et al., 2021). Organizations in this early stages of digital transformation process are called to decide on important aspects of the implementation stage like if they are going to train existing employees or recruit new employees with this specific skillset or make structural changes (integrating departments) or collaborate with other organizations (Corsaro & Maggioni, 2021). As it disrupts processes, manager's commitment is essential as she/he ensures employee participation (Wengler et al., 2021). A supportive and well-managed leadership sets strict rules, standards, responsibilities, and conventions. It is recommended organizations follow a bottom-up approach (to gain insights) and top-down communication (to spread the digital transformation scope). This means that employee support is necessary because they provide insights for designing operations optimization and automation and influence the implementation by being willing to participate and improve their skills. Consequently, in process-oriented DT, supportive leadership, a well-defined structure, clearly-defined procedures, employee participation, and summarizing the expected outcomes to stakeholders are necessary and encourage participation (Fischer, Imgrund, Janiesch, & Winkelmann, 2020).

Value proposition-oriented Digital Transformation

Transformation strategies focusing on operations and production help organizations to offer new services and transform the customer experience by making gradual changes to business model elements by offering new value propositions, evolving the value delivery system to offer customized solutions, and value capture mechanisms (Y. Chen, Visnjic, Parida, & Zhang, 2021). A digitized solution strategy, that is driven by the R&D department, aims to reformulate the value proposition by integrating a combination of products, services, and data (Sebastian et al., 2017). This orientation type directly affects organization's revenue as a value proposition and value capture digital transformation might generate new revenue streams (Rachinger, Rauter, Müller, Vorraber, & Schirgi, 2019). However, they are directly related to organizations survival, so considering different financial factors and especially the potential revenues of the new business model is mandatory. Organizations should assess the value of the digital opportunity by identifying and comparing the added and captured value both for customers (Linde, Sjödén, Parida, & Gebauer, 2021; Rachinger et al., 2019) and providers (Linde et al., 2021).

Through digital transformation, manufacturing organizations increase existing value by complementing physical products with services. This process is called servitization (Chester Goduscheit & Faullant, 2018; Lerch & Gotsch, 2015). It is related to business model innovation since introducing digital services is the first step to digitally transforming internal and external processes (Frank, Mendes, Ayala, & Ghezzi, 2019). Because of the severe nature of this transformation, organizations are forced to secure the acceptance or

legitimacy of stakeholders and employees as they have to adopt a new entrepreneurial mindset that will enable agility (Tronvoll, Sklyar, Sorhammar, & Kowalkowski, 2020). Hence, service offerings should be aligned with digitization decisions and related transformation (Frank et al., 2019). This complementarity radically affects organizations identity and core business and operations self-perception as organizations become technology-driven (Tronvoll et al., 2020).

It is considered a data-centric digital transformation because organizations rely more on data and the extracted information than on materials (Tronvoll et al., 2020). Services are a means that help organizations gather data to enable internal improvements, and help organizations create new value both for customers and internal processes (Frank et al., 2019). In addition, they transform revenue structure as they become platform-based organizations (Gebauer, Fleisch, Lamprecht, & Wortmann, 2020). There is an interdependence between digital transformation and servitization (Y. Chen et al., 2021) and more specifically a positive connection between the level of servitization and the level of digitalization (Martín-Peña, Sánchez-López, & Díaz-Garrido, 2020). Even servitization directly affects firm performance (Gebauer et al., 2020; Martín-Peña et al., 2020), digitalization is a mediating factor between servitization and performance (Martín-Peña et al., 2020). However, digitization is necessary for servitization to have a positive effect on firm performance (Martín-Peña et al., 2020).

Servitization starts with smart service delivery (maintenance and repair), smart product optimization (production process), and smart brain which affects the innovation activities as it relates to R&D and design process (Lerch & Gotsch, 2015). As in every digital transformation, the key element is digital technologies (Y. Chen et al., 2021; Martín-Peña et al., 2020) which enable business model DT and set the foundations for the next stage (Y. Chen et al., 2021). Hence, organizations update or discard some features, elements, or services (Y. Chen et al., 2021). External partnerships with suppliers, distributors, and ecosystem partners are necessary if managers want to be more service-innovative and source missing resources (Y. Chen et al., 2021; Chester Goduscheit & Faullant, 2018). During service innovation, existing customers play a significant role because they guide the development of the new service. However, organizations should also consider the preferences of non-immediate customers as they want to create more radical services that address other customer groups (Chester Goduscheit & Faullant, 2018).

2.2.3 Mediating Factors

Before organizations start a wide digital transformation, they prioritize the processes that must be transformed according to the importance and permanence these processes have for the organization (Kretschmer & Khashabi, 2020). After completing the prioritization, the next step is to assess the factors that directly or indirectly affect the next or previous digital transformation stages. The assessment process analyzes existing operations, data, business model elements, etc. trying to specify potential gaps between the future and the current situation (Parviainen et al., 2017), identify potential problems, and find solutions or improvements (Martinez, 2019). These insights will be utilized for selecting the appropriate digital technologies that are going to be adopted and implemented (Martinez, 2019). However, this stage and the objectives of digital transformation strategy are influenced by time, finances, space, and quality; thus, a reevaluation of the objectives is necessary (Schallmo et al., 2017).

Consequently, the purpose of this stage is for organizations to evaluate their internal environment, specify their digital maturity level, and adjust the selected strategy according to the assessment results (Schallmo et al., 2019). As multiple elements must be evaluated, it may be a time-consuming process but it is essential for a successful implementation (Martinez, 2019) because existing situations and business

models define digital transformation objectives (Schallmo et al., 2017). In addition, an alignment between the digital transformation strategy and the organization's environment, customer requirements, and business objectives should be achieved (Schallmo et al., 2017).

Existing structures and capabilities assessment

When organizations formulate a digital transformation strategy, they rely on organizational capabilities as they try to overcome cultural barriers and speed up the transformation process (Gfrerer, Hutter, Füller, & Ströhle, 2020). However, the new objectives and the business scope dictate the required operational change. These changes create a gap between digital transformation efforts and current core activities that prescribe the implementation plan and provide a roadmap about the boundaries and relationships that should be developed between new and old operations (Hess et al., 2016). When there is an adequate gap between digital transformation efforts and core activities, setting boundaries between old and new operations is necessary. On the other hand, when the digital transformation efforts of a core business activity are simple, integration of existing structures is preferred but should be strongly supported by top management (Hess et al., 2016). Consequently, assessing digital readiness level (Ghobakhloo & Iranmanesh, 2021; Machado et al., 2021), internal capabilities, market needs (Lerch & Gotsch, 2015) and existing routines (Mattila, Yrjölä, & Hautamäki, 2021) is a way for organizations to foresee barriers and obstacles that are connected to existing structures and hinder innovation efforts, changes, and willingness to take risks (Hess et al., 2016).

Incumbent organizations have established and mature processes (Cichosz et al., 2020; Hess et al., 2016; Martinelli, Farioli, & Tunisini, 2021; Sebastian et al., 2017), that have been developed during the 2nd and 3rd industrial revolutions (Martinelli et al., 2021). Hence, they exploit and rely on previous investments, utilize core business activities optimizations and automation, and entrepreneurship models that have been previously adopted (Martinelli et al., 2021). Incorporating these factors enables organizations to achieve an effective implementation that will not incite negative reactions. An existing process that is at the core of the business model and has not been considered during the strategy formulation stage, could be a potential barrier that cannot be overcome even by organizations with sufficient digital capabilities and transformation management capabilities. For example, in logistic service providers where the logistics network and underlying processes are essential business model elements, the digital transformation strategy should be developed around these two elements (Cichosz et al., 2020). An additional parameter that should be considered in the implementation phase is the unlearning process of existing routines and practices. As unlearning is the aftereffect of existing processes, organizations have to first specify their needs and which processes should be unlearned, abandon existing processes, and then introduce new ones (Mattila et al., 2021).

Evaluating the existing position and determining the different combinations of knowledge-organizational learning and resources-capabilities affect the implementation phase as they indicate the different types of product innovation management that could be achieved through digital transformation (Lanzolla, Pesce, & Tucci, 2021). Organizations should assess existing know-how and intellectual property assets (Gurbaxani & Dunkle, 2019) and consider the digital capability gap between organizational and individual levels (Nasution et al., 2020). The level of digital maturity affects not only the digital capability gap but also the implementation strategy. In highly digitally mature organizations, digital capabilities at the organizational level are higher than at the individual level. Hence, the implementation strategy should be focused on communication initiatives. On the other hand, in low digital mature organizations, the focus is

steered on employee motivation and participation (Nasution et al., 2020). Based on their capabilities, incumbent organizations may choose to build exploration capabilities first through the acquisition and assimilation of startups, establish an innovation lab, or even set up a new BU or new entity before they proceed to an overall DT. Another avenue is to focus on reorganizing existing business capability platforms before proceeding to acquire exploitation or exploration capabilities to become ambidextrous (Sia et al., 2021).

Existing technologies and the adoption of new digital technologies

Existing IT infrastructures are an indicator that organizations have achieved a specific level of IT agility (Tajudeen, Nadarajah, Jaafar, & Sulaiman, 2021), centralization, flexibility (Wiesböck & Hess, 2020), and that they possess the necessary in-house capabilities like knowledge management capabilities to detect and benefit from threats and opportunities that lead to process innovation (Nwankpa, Roumani, & Datta, 2021). Furthermore, existing technology investments present a path that organizations could follow to formulate a digital transformation strategy (Sebastian et al., 2017). Being IT agile means that organizations sense market and technological changes, respond (Tajudeen et al., 2021), and have the necessary interfaces (Wiesböck & Hess, 2020). In general, IT infrastructures are a response to changes caused by digital technologies and are a building block for digital innovation development (Wiesböck & Hess, 2020). The integration of IT systems and applications improves organizational capability by enhancing collaboration and knowledge-sharing among organizational members. Therefore, IT agility impacts the innovation process, and IT systems enable organizations to implement their innovative processes which impact their innovation performance (Tajudeen et al., 2021).

The formulated digital transformation strategy lists the necessary capabilities and technology-enabled assets that will be required for its implementation (Sebastian et al., 2017). However, business strategies, organizational processes, and market offerings dictate digital technology investments, so organizations choose digital technologies that are relevant or complement business offerings (Saarikko et al., 2020). Evaluating and understanding the existing situation and potential changes is very important as new technologies are introduced either to advance existing ones or replace old ones (Cetindamar Kozanoglu & Abedin, 2021). Furthermore, expanding the IT portfolio by strategically investing in emerging digital technologies defines digital business intensity by influencing process innovation, knowledge management capability (knowledge acquisition, knowledge conversion, and knowledge application), and complementary process innovation (Nwankpa et al., 2021).

In general, organizations invest in digital technologies that are flexible and adaptable to customer demands/needs and suit the way customers interact with organization and their ideal experience (Sawy, Amsinck, Kræmmergaard, & Vinther, 2016), and in digital technologies to improve processes and enhance employee productivity (Martinez, 2019). In both cases, the implementation plan is influenced by the technology investment. More specifically, the business model dictates if the introduction of a new technology will cause major changes in the business model and the way the organization works. Thus, by adopting digital technologies in the process, organizations determine the systems or means that the organization requires to deliver the new value proposition and shape the introduction of digital elements in the organization (Martinez, 2019). In some cases, designing training activities is essential and helps organizations to adapt to rapidly changing environments. Organizations through training initiatives develop further or help employees learn new skills. Thus, collaborations with universities or other

educational organizations are preferred solutions as employees are trained in multiple fields that cannot be developed in-house (Horvath & Szabo, 2019).

During the investment process considering the operational requirements or exceeding organizational possibilities and goals is an important parameter for a successful implementation (Martinez, 2019). These parameters are important because specific digital technology investments may affect organization identity and organization's relationships with partners and/or customers (Saarikko et al., 2020). On the other hand, financial resources may hinder the digital transformation process. When DT projects are used as breakthrough projects, they require investments with medium/long repayment times and complex and integrated plans. These capital-intense investments usually are focused only on a single department per project (usually the production departments) and in some cases may be accompanied by governmental incentives (Rossini, Cifone, Kassem, Costa, & Portioli-Staudacher, 2021).

Another parameter is how organizations are planning to invest in digital technology. This choice directly influences innovation acceptance, process, quality, integration cost, and process. For buying strategies, organizations' assessment process should not be limited only to the technology type (software or hardware) but also to the type of solutions (customized or standardized). Implementing customized software is much more time-consuming. Accessing technological innovation through a technology supplier triggers innovation acceptance and the integration process quality. Buying a stake in a company, however, takes time, and the financial scope is difficult to assess (Mathauer & Hofmann, 2019). Finally, an organization's general direction influences the technology investment process. Conservative organizations adopt established and widely used technology solutions. On the contrary innovative organizations adopt newly deployed technologies that are at the early development stage (Hess et al., 2016).

2.2.4 Implementation process and practices

Up to this stage, organizations have examined and understood the different types of digitalization (A. B. Crittenden, Crittenden, & Crittenden, 2019) designed a strategy to implement, determined the digital transformation vision, and goals (Machado et al., 2021; Tekic & Koroteev, 2019), and defined how they want to lead this effort (Tekic & Koroteev, 2019). To align strategic decisions with market needs organizations contacted a market analysis (happened in the first stage) that summarized organizations missing opportunities and current position (A. B. Crittenden et al., 2019; Shahi & Sinha, 2021). Additionally, the assessment of the in-house digital technologies marked technological shortcomings and unexplored technological opportunities (A. B. Crittenden et al., 2019). By assessing the internal environment organizations name the necessary tasks to be executed to achieve the expected outcomes (Kretschmer & Khashabi, 2020). More specifically, the mediating factors stage offers valuable insights because the assessment process reveals potential challenges like lack of vision, culture, skillset (Shahi & Sinha, 2021; Zoltners et al., 2021), infrastructure restrictions, limited budget, organizational structures (teams working in silos), data security gaps (Shahi & Sinha, 2021) that may hinder implementation. This process showcases organizations shortcomings in required digital capabilities, competencies, resources (Machado et al., 2021) and assists organizations in aligning financial and human resources with strategy (Mugge, Abbu, Michaelis, Kwiatkowski, & Gudergan, 2020).

Through the previous stages, organizations list the risks, needs, and challenges that could be faced, digital transformation strategic benefits, and the consequences of failure (Machado et al., 2021; Tekic & Koroteev, 2019). Consequently, the implementation stage has a twofold objective; connect the triggering

factors with the expected outcomes, and align the existing processes with new ones by using the acquired knowledge from the previous stage (Hanelt et al., 2021). In this stage, the implementation process is planned, and the best enablers and practices are selected to support the digital transformation process. The implementation initiatives ought to be founded on organizational, managerial (Björkdahl, 2020), innovative practices (Hanelt et al., 2021), and be aligned with organizational culture to secure employee commitment and engagement for the change (Martinez, 2019). Hence, regardless of organization size, organizations must formulate an implementation plan (Cichosz et al., 2020), that will be supported by top management (Hanelt et al., 2021; Steiber et al., 2021), and will receive the required funding to support or speed up the transformation (Steiber et al., 2021).

An integrated implementation plan includes initiatives related to structural changes (Guenzi & Habel, 2020; Kääriäinen et al., 2020; Vial, 2019) that affect the leadership (Vial, 2019), and organizational culture (Kääriäinen et al., 2020; Vial, 2019). These changes aim to create and encourage innovation (Hanelt et al., 2021), promote and communicate digital transformation strategies (Hanelt et al., 2021; Zoltners et al., 2021). Furthermore, it includes initiatives that will support and encourage employee participation and improve their skills through training sessions as their participation and digital literacy affect the digital transformation process and the changes in value creation (Vial, 2019; Zoltners et al., 2021). Thus, the implementation plan must incorporate employees' and executives' different perceptions, consider their digital readiness level (Gfrerer et al., 2020), roles and incentives (Zoltners et al., 2021), encourage employee engagement, and customer orientation, and business model parameters (Kääriäinen et al., 2020).

Governance structure of digital transformation

A successful digital transformation governance requires appropriate structures, relational mechanisms, and processes that will help the organization govern this process, make all the necessary structural adjustments, and prepare organization for digital innovation (Wiesböck & Hess, 2020). To facilitate long-term success, the key responsibilities of a digital transformation management structure are to foster a consistent, coherent, and comprehensive culture based on organizational values and norms, to promote the implementation, and use of digital technologies and data (Björkdahl, 2020). Furthermore, it needs to set objectives, and formulate a strategy that encompasses steps and interactions (Horvath & Szabo, 2019; Sommer, 2019), design the structural and governance changes that are required (Horvath & Szabo, 2019; Sommer, 2019).

The literature does not specify who is responsible for governing DT, so there are several options; the IT department which is managed by the Chief Information Officer (CIO) (Matt et al., 2015; Wiesböck & Hess, 2020), the senior executive of a newly created department (a digital business unit or a digital innovation department) that focuses on digital strategy (Chanas et al., 2019; Hess et al., 2016; Kaiser & Stummer, 2020; Wiesböck & Hess, 2020), a newly created C-level position the Chief Digital Officer (CDO) (Dremel et al., 2017; Firk, Hanelt, Oehmichen, & Wolff, 2021; Matt et al., 2015; Singh & Hess, 2017; Singh, Klarner, & Hess, 2020) or the CEO (Matt et al., 2015). Finally, some researchers support that DT could also be governed by a cross-functional team (Björkdahl, 2020; Chanas et al., 2019; Guinan, Parise, & Langowitz, 2019; Ruiz-Alba, Guesalaga, Ayestarán, & Morales Mediano, 2020).

As it could be challenging to appoint a digital transformation leader, top management should focus on the formulated digital transformation strategy because it describes the person who might lead and govern digital transformation efforts. For example, it could be the executive of the most affected departments

(Hess et al., 2016). For a decentralized digital transformation strategy, it seems beneficial for each business unit or subsidiary to appoint its own CDO to manage digital transformation projects separately (Singh et al., 2020). Lego followed this management scheme to coordinate multiple transformation projects in different departments and to facilitate a more effective digitalization. However, in this case, the multiple digital officers were coordinated by the CIO (Sawy et al., 2016). In the case of a centralized digital transformation strategy, the degree of centralization varies. When the CDO proposes a holistic strategy or a strategy that promotes innovation then it is preferred to follow a centralized DTS to enable management. On the contrary, when CDO is a change agent a decentralized transformation strategy is preferable by involving more various business units or subsidiaries (Singh et al., 2020). These findings suggest that, in the digital transformation context, organizations anticipate and aim to leverage the benefits of a central authority in identifying and managing strategic change as well as overall coordination (Firk et al., 2021). Nevertheless, the appointed manager should have sufficient experience in transformational projects and align personal incentives with organizations strategic targets and progress (Matt et al., 2015).

Regardless of who manages these efforts, CEO is fully responsible for the digital transformation strategy (Hess et al., 2016) and leadership support is essential (Kohli & Johnson, 2011). CEO has to recognize the value and contribution of DT executives, set and communicate the expectations to other executives, and try to involve all executives in the digital vision (Gerth & Peppard, 2016). Especially the CEO and other TMT C-level members should be open and willing to support the transformation and IT adoption (Gerth & Peppard, 2016; Matt et al., 2015; Wiesböck & Hess, 2020). In addition, adopting bottom-up strategizing enhances TMT efforts to solve real problems through digital transformation, and formulate strategies that are not hindered by politics (Chanas et al., 2019). Finally, among TMTs' responsibilities is to enhance middle and low management participation. However, in this case except for a clear and transparent communication strategy about the innovation strategy and the related innovation areas it is necessary for the communication to be tailored to each management level in order to address manager's perceptions (Gfrerer et al., 2020).

IT department

Technology leaders like a CIO revamp organization's orientation towards exploitation as they embody a change agent that fosters transformation and has managerial change capabilities to trigger organizational behavior changes. However, for many organizations, the CIO position is not mandatory, and this position relates to external factors such as industry IT intensity or to internal factors like low IT experience in TMT functional background or IT strategic shift (Bendig, Wagner, Jung, & Nüesch, 2022). In digital transformation context, there are two approaches regarding the role of IT department in DT; it plays a key role (Gerth & Peppard, 2016; Gurbaxani & Dunkle, 2019; Kohli & Johnson, 2011), or it is less relevant (Chanas et al., 2019; Ko, Fehér, Kovacs, Mitev, & Szabó, 2021).

According to the first approach IT department, and more specifically CIO, manages DT because CIO's and CDO's responsibilities overlap (Gerth & Peppard, 2016), meaning that opting for a CDO position will not add value to the organization. When the CIO becomes the digital transformation leader, then she/he has a twofold role; it provides organizations with the necessary digital transformation tools but also manages transformation efforts by orchestrating organizational resources, establishing technologies to promote digital innovation, planning on how to achieve business goals, and seeking expertise in designing business solutions (Kohli & Johnson, 2011). A close working relationship is cultivated between CEO and CIO (Kohli & Johnson, 2011) and the CIO has a clear understanding of CEO's vision for IT (Gerth & Peppard, 2016).

The second approach acknowledges the importance of IT department but considers digital transformation a business challenge that involves the entire organization and improves profitability and efficiency (Chanas et al., 2019; Hess et al., 2016; Ko et al., 2021). This consideration imposes that IT department provides all the necessary services to support the strategy implementation or outsource them if IT department's capabilities are lacking (Koch, Chipidza, & Kayworth, 2021). Providing essential supporting services urges the TMT to evaluate how proactive and innovative is the department (Hess et al., 2016).

Nevertheless, the role of IT should not be limited to providing supportive services, but it must actively participate in strategy formulation as it offers valuable information input (Koch et al., 2021). Thus, IT department's involvement could be according to its capabilities and infrastructures (Ko et al., 2021). A well-equipped IT department with sufficient skills and infrastructure can support digital transformation efforts, so the collaboration of IT managers and digitalization executives is necessary. This collaboration is more significant for data-driven digital transformation strategies because in this case executives cannot use advanced business analytics tools and create knowledge from data (Koch et al., 2021) creating the need for a new executive position responsible for data (Shahi & Sinha, 2021). For the IT department to meet its new responsibilities organizational restructuring to define processes, roles, responsibilities and promote collaboration and cultural changes should be done. These changes will create an agile, innovative, and profitable IT department (Koch et al., 2021).

Cross-functional team

In the early stages, organizations create cross-functional teams focusing on digital transformation that includes planning, regulation, and monitoring of the processes (Butschan, Heidenreich, Weber, & Kraemer, 2019; Guinan et al., 2019). For example, an incumbent organization choosing to develop new innovative products as part of its digital transformation strategy could create a digital team with executives from different department to easily oversee processes related to product changes, collect and allocate efficient resources (Butschan et al., 2019). However, achieving cross-functional coordination requires structural changes and involving actors like employees, managers, and customers (Ruiz-Alba et al., 2020). To make the changes and achieve this level of coordination specific strategies must be set and followed (Björkdahl, 2020; Guinan et al., 2019), and strategic (digitalization, technology, processes), organizational (culture, alignment of interests, agility), and individual (attitude, motivation, empowerment) elements must be micro-managed (Ruiz-Alba et al., 2020). This is a way for organizations to remove barriers, expand the scope and ensure the alignment of digital transformation strategy, source the necessary funding (Guinan et al., 2019).

The main characteristic of these teams is diversity as they are created with executives from various departments and functional backgrounds. The diversity ensures that the digital transformation projects will be aligned with existing structures, products, and capabilities, and different stakeholders will be more easily engaged (Björkdahl, 2020; Guinan et al., 2019). In addition, accelerates the implementation process and eliminates obstacles. Although this diverse composition secures some organizational acceptance, top management support continues to be important and essential (Ruiz-Alba et al., 2020). Another characteristic of these teams is their focus on continual learning, a characteristic that should be cultivated and spread inside organizations. A continual learning mindset enables organizations to remain relative by following market requirements and developing creative behavior (Guinan et al., 2019) by exchanging information and knowledge (Björkdahl, 2020). Hence, organizations collective ability improves digital transformation process and the implementation of more complex processes and tasks (Björkdahl, 2020). However, as this mindset is adopted, it is more difficult to be managed by the team as digital

transformation proceeds. So, organizations choose to establish digital hubs as centers of excellence for agile and design thinking processes, train and mentor digital team members through leadership and onboarding programs, and train members on not only agile/design thinking methods but also leadership behaviors (Guinan et al., 2019).

Business Unit

Business units like hubs, departments, or centers are dedicated structures that focus on innovation and support digital transformation strategy (Crupi et al., 2020; Seran & Bez, 2020). They could be independent entities or dependent on other departments. A new and independent business unit underlines that organizations separate digital and main business activities. This separation is useful when digital business activities are separated from core business activities (Wiesböck & Hess, 2020). In the Hummel case, where transformation efforts were focused mainly on providing an omnichannel experience, implying that the marketing department was mostly affected, they created a business unit that was directly connected to the marketing department (Hansen & Sia, 2015). Except for supporting digital transformation processes, these hubs, if they are located inside the organization, act as a source of excellence for agile and design thinking processes (Guinan et al., 2019) and as an innovation accelerator (Seran & Bez, 2020). On the contrary, when they are external to the organization, regardless if they are private or public facilities, they are knowledge brokers and mediate interactions between unconnected actors (Crupi et al., 2020).

Digital innovation hubs have an intermediate role and create networking opportunities and collaborations with ecosystem stakeholders like universities, research centers, service providers, and corporations. In addition, it helps organizations to create collaborations, and help organizations select the best partners. These resources and connections are essential for organizations with limited resources like SMEs as they try to follow the digital transformation wave and create in the long-term a digital ecosystem that will support their efforts (Crupi et al., 2020). Regardless of their status (private or public body), digital innovation hubs' main responsibilities are to design the implementation process, choose digital advocates, and infuse digital technologies among employees to fulfill digital transformation goals. They scan the environment for potential new digital opportunities identified by individual departments, propose collaborations with start-ups, and help organizations and their departments overcome problems and obstacles like the fear of sharing data (Seran & Bez, 2020). On the other hand, in the case of smaller organizations like SMEs, innovation hubs have a consulting role by assisting them in determining the sets of products, service providers, technologies, and know-how (Crupi et al., 2020).

Chief Digital Officer

Opting for a CDO position is a top management decision and so it is directly affected by TMT's composition and discretion. Boards that are relatively old or are age-diverse are more likely to not create this position because they believe that will not add value to the organization (Kunisch, Menz, & Langan, 2022). On the contrary, a digitally oriented TMT acknowledges the importance of digital innovation by recognizing digital innovation opportunities and supports implementation initiatives (Firk, Gehrke, Hanelt, & Wolff, 2022). In addition, it underlines digital transformation's urgency because organizations try to connect new information and knowledge with the existing business model and respond to industry threats by newcomers like digital start-ups (Firk et al., 2021; Singh & Hess, 2017). External reasons like underdeveloped national digital infrastructure can force an organization to create this position as they are trying to coordinate high firm diversification and potential problems (Firk et al., 2021). Furthermore, creating this position is influenced by the presence of a CIO, firm size, and marketing intensity. Industry influences organization's intentions as they are mimicking their industry peers, forcing CEO to follow this

path. Thus, it is very common and more likely to find a CDO position in industries like media and financial services (Kunisch et al., 2022). Finally, performance issues like sales growth below average or high marketing intensity are likely to force organizations to appoint a CDO (Kunisch et al., 2022).

Regardless of the reason for creating this C-level position, the research shows that a CDO position offers valuable digital skills to organization (Kunisch et al., 2022) and the appointed executive handles challenges like organizational interdependencies and linking intra-organizational key stakeholders by introducing new internal design and structure in an attempt to enhance digital transformation (Singh et al., 2020). This position represents a milestone for many organizations and symbolizes the beginning of digital transformation because CDO is organizations digital transformation specialist (Singh & Hess, 2017), an affirmation of executive's commitment to transformation activities (Singh et al., 2020), and secures greater benefits when organizations face intensive pressures, promotes cultural elements (cross-functional collaboration) to accelerate digital transformation efforts (Singh & Hess, 2017).

As CDO has a wider role and cross-department authority, should be backed up with sufficient authority and support (Singh & Hess, 2017) and report directly to CEO (Dremel et al., 2017). Considering that CIO and CDO positions are complementary (Kunisch et al., 2022), communication and collaboration between the two executives are necessary (Hess et al., 2016). To eliminate conflicts between the two executives TMT must consider the task division and the interplay when assigning responsibilities to CDO position. For example, the CDO responsibilities are focused on aspects that are closely related to firm's business model and growth (Kunisch et al., 2022). The CDO role during this process is defined by the challenges that will be faced. A CDO with an entrepreneur role explores innovations enabled by digital technologies, formulates a DTS, and navigates digital technologies adoption. Another important role of CDO is to be an advocate of DT ("Digital Evangelist"). This role is mainly focused on communicating, convincing, and inspiring the organization to embrace DT. This type of CDO uses training programs as a tool to cope with many challenges and promote change. The final role of CDO is to be a coordinator as a successful DT demands coordination of different functional areas, departments, and stakeholders (Singh & Hess, 2017).

The main tasks of a CDO position include structural changes, coordinating activities (Firk et al., 2021; Singh et al., 2020), planning implementation initiatives like training sessions, addressing and reprioritizing acceleration tasks (Firk et al., 2021). Digital transformation is a dynamic process implying that CDOs' responsibilities will change, and the focus will be shifted to coordination needs and not on transformation urgency. Hence, CDOs' skills must evolve simultaneously and in a latter stages should be focused on coordination skills (Firk et al., 2021). In low digital maturity stages (early stages), CDOs' main responsibilities are to improve organizations knowledge about the digital challenges and encourage DT (Singh et al., 2020). Because organizations are under intense pressure as she/he has to produce the expected accelerating and coordination benefits that will argue for this position (Firk et al., 2021). In general, CDOs' main skills are IT competency, inspiration skills, digital pioneering skills, and resilience (Singh & Hess, 2017). Equally important for digital transformation are change management skills (Singh & Hess, 2017) and dynamic-problem solving and decision-making abilities for digital innovation management as it facilitates the distribution of innovation as different potential innovators collaborate to define the problem and provide a solution (Nambisan, Iyrtinen, Majchrzak, & Song, 2017).

Changes in the organizations' internal structures and processes

Existing structures indicate the challenges that organizations will face during digital transformation as they influence organizations sensing capabilities, map possible ways to spread the new culture inside the

organization, and propose how employees' capabilities can be developed (Özkan Özen & Kazançoğlu, 2021). Considering these factors, organizations are called to choose how they will implement the structural change either by creating new or by exploiting existing business units (Latilla, Frattini, Franzo, & Chiesa, 2020), creating new processes (Kääriäinen et al., 2020; Vial, 2019), introducing new internal functions to support implementation (Guenzi & Habel, 2020; Latilla et al., 2020). More specifically, they are called to segment, classify, and assign tasks. Through this process the assignment of each task will be efficient and easy as for each task managers will know the required capabilities and they can match them with employees (internal assignment) or outsource them (external assignment). In addition, matching tasks with qualified employees reduces experimentation costs and creates efficient and effective teams (Kretschmer & Khashabi, 2020).

The leadership structures suggest which changes are necessary during digital transformation. Organizations that choose to have multiple leaders (matrix structure) must proceed to structural changes (creation of new departments) to support this governance structure. The scope of the internal changes should facilitate digital transformation communication efforts, innovation efforts, and designing structures to respond to challenges (Özkan Özen & Kazançoğlu, 2021). Furthermore, a decentralized decision-making combined with a hierarchy structure that supports this decision-making process promotes agility that is necessary for digital transformation projects (Veile, Kiel, Müller, & Voigt, 2020). Consequently, not only changes in the internal structure or processes are important for the implementation stage (Sia et al., 2016) but also supporting managerial frameworks will be required to guide strategies and manage innovations (Lanzolla et al., 2021). In other words, changes in internal structure can describe changes in horizontal "coordination" and vertical "control" processes (Menz et al., 2021).

The digital transformation strategy prescribes the changes in the required process by pointing structural changes to support the new services that will add value to existing products (Raddats & Burton, 2011), the necessary collaborations between departments and monitoring mechanisms (Corsaro & Maggioni, 2021). As organizations navigate through digital transformation and become more digitally mature, new elements are at the center of organization focus and have a bigger influence on business strategy (Raddats & Burton, 2011). This focus shift signals new collaborations between the departments, the creation of cross-functional structures (Özkan Özen & Kazançoğlu, 2021) and enclosing new key stakeholders (Steiber et al., 2021). In some cases, organizations are forced to create cross-functional teams to ensure that the required collaboration between IT and business departments will take place (Dremel et al., 2017) and an organizational culture that supports DT and innovation will be established (Latilla et al., 2020).

Cross-functional working teams, as a supporting internal structure, are a solution to spread digital transformation efforts inside the organization and to instantly access data and information from multiple departments. The Miele case study describes in detail how a cross-functional team works and the positive effects of this change. The focus of Miele's digital transformation project was the R&D department; hence it was mandatory to have a "representative" in the new department that oversaw digital transformation. Even if the "representative" was an employee of the R&D department, her/his contribution was twofold by providing simultaneously insights and necessary expertise like unit's agenda, processes, workflow, etc. to its department and DT department, and by communicating digital transformation efforts to the R&D department (Kaiser & Stummer, 2020). As we can see a change in organizational structure could have multiple outcomes. Firstly, it will be a cultural shift by enabling a transformation of the organizational culture (Özkan Özen & Kazançoğlu, 2021), establishing evidence-based decision-making, promoting

constant change, and willingness to learn from failure (Dremel et al., 2017). Secondly, will help organizations overcome workforce challenges (Özkan Özen & Kazançoğlu, 2021), and traditional digital divides (Dremel et al., 2017).

The transformation of the work processes includes the introduction of a new digital technology, and the restructuring of existing organizational actions and processes (Zimmer, Baiyere, & Salmela, 2023). Prompting changes in human tasks as they become more automated and augmented require new skillsets, and new corporate management positions (Menz et al., 2021). Hence, combining the addition and subtraction logic increases the possibilities of a successful digital transformation and decreases the resistance. Those logics have different starting points; the addition logic starts with the introduction of a new workplace technology that will require new routines, while the subtraction logic begins with the need to reorganize and redesign processes because they hinder the workspace digital transformation. To this end, selecting a specific logic will affect the way the change will be disseminated as different verbs must be used in the narrative and this determines the way employees receive the change, how they respond to this, and how they will use the new technology (Zimmer et al., 2023).

To handle the consequences of structural changes strong leadership is mandatory, to support the development of new necessary capabilities, cultivate a new culture, and new decision-making process (Dremel et al., 2017). In addition, it will support communication campaigns and promote storytelling focusing on the clear, observed effects of the change and supporting the organizational change and digital transformation (Steiber et al., 2021). Hence, changes inside a department that promotes an entrepreneurial environment or adopts the interdisciplinary project teams approach might be needed (Veile et al., 2020). Organizations need to support and encourage participation by introducing a reward system with shared goals between business functions to mitigate the tendency to work in silos and to generate conflicting goals (Ruiz-Alba et al., 2020), and establishing mechanisms for digital knowledge management (Machado et al., 2021), cross-functional/units engagement (Machado et al., 2021).

Even the structural changes during digital transformation foster employees' autonomy and creativity they can also increase managers' power and give them the opportunity to micromanage every aspect of the organization as they have data for every process (Nell, Foss, Klein, & Schmitt, 2021). So, a balance between existing business departments, newly developed departments, and traditional IT departments should be achieved. The balance is necessary for organizations to overcome barriers that will be created by the existing departments (Dremel et al., 2017). Furthermore, for managers to overcome the micro-management barrier, they have to understand the limits of digital transformation, focus also on smaller data projects, have quick responses, adopt a bottom-up restructure and decentralization, and emphasize innovation and creativity by using digital collaboration or innovation tools (Nell et al., 2021). Finally, organizational changes enable a new way of thinking as happened in the Miele case as they abandon the typical Stage-Gate thinking process and adopt the design thinking approach (Kaiser & Stummer, 2020).

Improving organizations' digital capabilities

To overcome digital skills gaps and further develop inherent capabilities, organizations either build them in-house through training programs, or hire employees with new skills, or partner with other organizations to outsource them (Butschan et al., 2019; Hess et al., 2016; Khin & Ho, 2020; Özkan Özen & Kazançoğlu, 2021). An additional option is to acquire organizations with a specific digital skill set but this option is highly risky and requires sufficient investment capital. Hence, many organizations are forced to develop (in-house or outsource) training programs or create new business units (Tronvoll et al., 2020). Each of

these options has advantages and disadvantages that should be considered. The outsourcing option is low-risk and requires low initial investment but increases organization's dependence on third parties. This dependence is a major disadvantage if the outsourced or jointly shared activity is of high importance for organizations. In this case, it is suggested to acquire the partner organization (Hess et al., 2016).

One avenue to support DT efforts and help organizations overcome resource barriers is to recruit employees with specific digital skills (Tavoletti, Kazemargi, Cerruti, Grieco, & Appolloni, 2021). Before starting the recruiting process, organizations have to specify their needs, to attract employees that will fill the identified skill gaps (Butschan et al., 2019; Tavoletti et al., 2021). In addition, searching for employees with specific digital skillset will eliminate challenges like lack of IT/digital skills, low learning readiness/ability, employee resistance to change and reduce future training time (Özkan Özen & Kazançoğlu, 2021). Even though recruitment could improve workforce competencies and solve many of the above-mentioned problems, new employees should have a level of freedom to introduce new technological methods, promote innovation using existing technologies, and familiarize themselves with established practices (Jacobsson & Linderöth, 2021). A recruiting process could be challenging, so organization's ability to build or create new knowledge is highly significant (Rachinger et al., 2019). Similar goals are achieved when organizations collaborate with other highly skilled organizations. Though these collaborations expand organizations offering scope (Tronvoll et al., 2020).

For organizations with low digital skills, training programs are a key enabler for successful implementation that allows them to improve capabilities (Björkdahl, 2020). Although building in-house capabilities, processes, and knowledge could be time-consuming they create a competitive advantage for future DT initiatives (Hess et al., 2016). So, it is preferred when organizations need resources or skills that are essential for their business (Tronvoll et al., 2020). The scope of training programs, on one hand, is to introduce new digital technologies, familiarize employees with digital technology (Özkan Özen & Kazançoğlu, 2021; Veile et al., 2020), provide interdisciplinary knowledge (Veile et al., 2020). On the other hand, assists organizations in developing feedback mechanisms, and makes structural changes to improve organization's communication (Parihar & Sinha, 2021). Training programs should be offered to all employees regardless of their hierarchical levels (administrative, production, front-level, etc. employees) (Gfrerer et al., 2020). Furthermore, training options should be provided to customers when they are key stakeholders of the business model and play an important role in digital transformation success. For example, a digital transformation focusing on sales has not only to include employees in the formulation process but also end-user point-of-view (Zoltners et al., 2021).

Except for the traditional training methods (training, workshops, and further education programs), organizations can incorporate modern training methods like e-learning and scenario-based learning. Cooperation with educational institutions in the development and design of tailored educational programs that meet specific Industry 4.0 qualifications is an option (Veile et al., 2020). Organizations have to select the training program considering their resource flexibility and coordination flexibility as it may weaken or strengthen the role of the training program in strategy execution speed (Yi, Gu, & Wei, 2017). For example, in an organization with resource flexibility, a bottom-up learning program could slow down the speed of the strategic change in contrast with coordination flexibility which accelerates the speed of strategic change. However, the combination of resource and coordination flexibility has a positive moderating effect on the relationship between bottom-up learning and the magnitude of strategic change (Yi et al., 2017).

Training programs help organizations to overcome the lack of analytical thinking and deal with the complexity of interdisciplinary thinking and acting, understand the interplay between technology and human beings related to knowledge exchange, and IT/digital skills (Özkan Özen & Kazançoğlu, 2021). For a training program to achieve these purposes, a prerequisite is employee willingness to learn, top management support, a supportive work environment, and tailor-made programs to the nature of the job/task. Organizations need to eliminate hindrances that suppress innovative learning like internal peer competition, lack of appraisals, non-supportive leadership to learning activities, a result-driven approach rather than growth-driven, and heavy workload (Ngereja & Hussein, 2021). In addition, tensions between exploratory and exploitative learning are a major challenge that managers face during digital transformation. These challenges are lifted by following entrepreneurial leadership and presenting the transformation scope to employees, fostering innovation, and supporting employees' exploratory activities. Thus, ambidextrous learning should be supported by changes in operations because it has a positive impact on organizational performance and mediates the positive relationship between entrepreneurial leadership and organizational performance (Wu, Chen, Shao, & Lu, 2021).

An externality of training programs is knowledge sharing between employees. Knowledge sharing in the low levels of digital maturity is necessary and supports transformation efforts. However, as digital transformation evolves, formal and predefined ways of knowledge sharing should be established to secure mutual understanding and create an aligned learning process (Smith & Beretta, 2021). The professional relationships that are cultivated between employees could have a negative or positive effect on employee digital strategy performance following employee orientation. For example, relational capital improves digital infrastructure performance when employees with a proactive and risk-taking orientation are involved. On the other hand, employees with an innovative orientation are struggling to set strict digital strategy goals, and their performance drops even further in dense relational networks. To secure the positive effect of these relationships, organizational intervention and boundary setting are necessary (Ritala, Baiyere, Hughes, & Kraus, 2021).

Creating synergies and collaborations

The analysis so far has proposed several options for organizations to exploit and bridge the gaps that have been identified from previous stages. However, these initiatives are not always adequate, and organizations seek further support through acquisitions, alliances, mergers, or collaborations with incumbents or start-ups. Through collaborations, organizations gain access to external resources, elevate existing business models by incorporating new elements, and enjoy additional benefits like reducing costs, creating new businesses and innovations, or increasing existing market growth (Cozzolino et al., 2018).

Formulating a (strategic) alliance organizations pre-define the degree of integration and the relationships between the partners (He, Meadows, Angwin, Gomes, & Child, 2020). However, as organizations formulate various relations with other organizations, they assess and evaluate different parameters. For example, when organizations choose to collaborate with a start-up, they assess different parameters like the stream of innovation, equity sources, the link between existing business and new approach, the resource availability, and how close their "new" solution is to the company's core business (Steiber & Alänge, 2021). Evaluating these parameters ensures that the organization will collaborate with an organization that has stable financial foundations and a value proposition that will solve organizations current problems. Therefore, the digital transformation manager evaluates these parameters and tries to find the most suitable start-ups both at group-level and business unit levels (Seran & Bez, 2020). However,

collaborating with a startup may be risky, making organizations hesitant; an alternative solution is to participate in local startup programs. These programs develop solutions that answer organizations' current needs and create a first-mover advantage (Seran & Bez, 2020). Collaborating with a start-up is necessary when enterprises want to become innovative, however, the selected concept is far from the core business and they want to improve their dynamic capabilities (Steiber & Alänge, 2021).

Digital maturity level is related to the types of collaborations that organizations seek (Beliaeva, Ferasso, Kraus, & Damke, 2020; Cichosz et al., 2020). Digitally mature organizations have a diverse partnership portfolio as they seek to source various intangible and tangible assets to help them reach digitalization goals (Beliaeva et al., 2020). Being part of an ecosystem gives the choice to rely on business ecosystems' digital capabilities which is a way to overcome internal barriers such as inflexible processes and employee's unwillingness to participate. Another externality of a business ecosystem is that organizations access new valuable resources but also are exposed to new opportunities that can trigger further digital transformation efforts (Mann, Karanasios, & Breidbach, 2022). Hence, complicated networked relationships are positively associated with the production of more complicated innovation. On the other hand, partner diversity, which exists in advanced networks, affects digital entrepreneurship, implying that different actors are necessary for prolific digital entrepreneurship (Beliaeva et al., 2020).

Nevertheless, we should not overlook the problems that could arise in a partnership like a disagreement on project emphasis and goals, a conflict between organizational goals, a poor commitment from digital partners, and a lack of continuous improvement (Aghimien, Aigbavboa, Oke, Thwala, & Moripe, 2020). To overcome these obstacles organizations must develop effective governance structures and performance management (He et al., 2020) that will help partners configure partnering relationship terms, establish a commonly accepted organizational culture, and predefine partnering procedures (Aghimien et al., 2020). Similar problems arise when the organization is part of a business ecosystem regardless of being the orchestrator or a follower. Hence, before entering an ecosystem is necessary to identify and understand which digital capabilities that are possessed by the ecosystem actors fit better to organization's existing structure, and that all actors share the same understanding, internal legitimacy, and aligned business goals (Mann et al., 2022). A solution to problems related to external participants has been to acquire or ally with other companies that have previous experience in collaborating with external participants (Cozzolino et al., 2018).

Collaborations influence organizations' thinking systems, employees, and involved stakeholders. As third-party organizations or departments are involved, a new thinking system is introduced based on interdisciplinary thinking and acting (Özkan Özen & Kazançoğlu, 2021), collaborative learning is enhanced and employees' technical skills are improved (Tronvoll et al., 2020). As organizations get a holistic focus, sharing knowledge and synergies between employees and stakeholders is necessary to align and coordinate different disciplines (Smith & Beretta, 2021). However, this coordination is successful and sustainable through enhanced stakeholder management, organization management system (Özkan Özen & Kazançoğlu, 2021), and a new reward system to facilitate employee participation (Smith & Beretta, 2021). To collaborate with organizations outside the organization, is mandatory to adopt new digital technologies that will enable this collaboration but also will increase employees' autonomy and introduce new agile working ways. However, it is important to control this autonomy, so executives should introduce from the beginning some boundaries and work frameworks through training workshops to develop a shared understanding of agile teams, autonomy, and control (Smith & Beretta, 2021).

Promoting and communicating digital transformation

Communication initiatives are facilitated by a corporate culture that supports flexibility, openness, willingness to learn, and an entrepreneurial mindset. Organizations should promote open-to-employee communication and enable discussions across hierarchical levels and organizational borders (Veile et al., 2020). Enhanced communication capabilities, and communication practices like suggestion boxes, or letting employees frequently participate in management meetings, boost employee participation and assist organizations to better disseminate information. In addition, innovative approaches like the participatory design of technology or the implementation of semi-autonomous workgroups help organizations reduce employee resistance and increase their contribution (Vereycken, Ramioul, Desiere, & Bal, 2021). Communication practices are more significant when digital transformation affects core business and operations as the changes must be introduced and explained not only to employees but also to stakeholders to gain the required legitimacy (Tronvoll et al., 2020). Thus, corporate culture changes should be supported and adopted first by top management and then by lower hierarchical levels (Veile et al., 2020).

A communication channel between employees and top management is necessary as employees especially front-line employees provide useful information and facilitate employee involvement. This communication channel to be fruitful should be open, and an agent of direct communication with employees (Yi et al., 2017). An open-door communication approach is a precondition for an agile organization and should be adopted at every hierarchical level by directly contacting employees, teams, and departments (Parihar & Sinha, 2021). In addition, open and direct communication helps organizations directly share various information, facilitate discussions about competitors' strengths and strategies (Yi et al., 2017), encourage creativity, and innovation (Parihar & Sinha, 2021), and employees' participation in strategic decision-making (Yi et al., 2017). Finally, this type of communication promotes informal conversations between employees and managers (Yi et al., 2017), knowledge exchange regardless of hierarchical positions and departments, accelerates the learning process, promotes a common vision, and cultivates an entrepreneurial spirit so organization to be flexible and mentally open like a start-up (Bravi & Murmura, 2021).

In addition, choosing how and which business unit will internally disseminate the information is vital as unnecessary information could have negative effects (Ruiz-Alba et al., 2020). The way organizations deliver the change message is an enabler for organizational change (Haumer, Schlicker, Murschetz, & Kolo, 2021). Thus, organizations need to assess and elaborate on the key message that will be used to communicate the change (Ruiz-Alba et al., 2020). Demographic and psychobehavioral segmentations are required for tailored messages and successfully targeting employees based on their personalities. Personality type and sociodemographic variables like age and gender influence engagement and reduce cognitive dissonance. For example, open and extrovert personality types are easier to be influenced by personalized messages than neurotic personality types (Haumer et al., 2021). Finally, organizations and management teams should pay attention to communication among employees during a technology adoption period or DT. Especially, if there are employees that have the power to influence their co-workers. Communication that promotes a negative attitude toward change is a potential threat with negative consequences. In this case, top-level executives should intervene and emphasize a positive and inclusive vision of the future (Bagrationi & Thurner, 2020).

Overviewing implementation process

Even if the implementation plan is well-designed and planned, organizations must adjust and update the practices during strategy implementation. Implementation activities help organizations gather data that presents how digital transformation is evolving (Guenzi & Habel, 2020). This data can be exploited and help organizations establish practices to monitor the process and interfere when adjustments are needed (Guenzi & Habel, 2020; Martinez, 2019). Some implementation practices like interrelationships across teams a type of monitoring mechanism that helps organizations identify problems (Jenkin & Chan, 2010) and reduce coordination costs (Kretschmer & Khashabi, 2020). However, a well-structured monitoring mechanism that continually evaluates implementation and prompts digital transformation strategy adaptation is necessary (Matt et al., 2015). Monitoring mechanisms need to be objective and reliable to provide a comprehensive overview and to ensure that the desired deliverables will be produced (Jenkin & Chan, 2010).

Performance indicators (KPIs) related to cost, speed, user satisfaction could be a monitoring mechanism, too, that oversees implementation and ensures that organizations will not deviate from initial goals (Guenzi & Habel, 2020; Zoltners et al., 2021). A recommended monitoring process is multiple testing, and assessing the feedback from different sources like the minimum viable product, early experience team, deploy-learn-iterate, user-led training, and user feedback loop (Zoltners et al., 2021). Multiple testing or following a methodology like proof of concept is a practical way to evaluate progress (Parviainen et al., 2017) and may be necessary as organizations design the new digital business model and propose options for each element of the digital model (Schallmo et al., 2017).

Furthermore, employee assessment activities should be established. Employees are an enabler for a successful digital transformation as they enable flexibility to environmental changes and are one of the challenges that organizations face during digital transformation (Butschan et al., 2019). Establishing monitoring activities and performance indicators helps organizations to overview different activities in the implementation stage. However, for a holistic approach evaluation should be multileveled (Struyf, Galvani, Matthyssens, & Bocconcelli, 2021). Another positive outcome of monitoring mechanisms is that introduce a learning approach that is based on interactions and makes each project adaptable to environmental characteristics and dynamics (Jenkin & Chan, 2010).

2.2.5 Digital Transformation outcomes

Securing the acceptance and cooperation of various stakeholders inside and outside the organization is necessary before starting to implement a digital transformation strategy. A way to side stakeholders with the digital transformation plan is to cite the economic-driven outcomes that will be gained by enhancing and redefining the existing value proposition (Gong & Ribiere, 2021). Hence, many researchers are focused on improvements in organizational financial and non-financial performance (Martín-Peña et al., 2020; Vial, 2019; Wang, Feng, Zhang, & Li, 2020). The financial outcomes are mainly focusing on variables that describe firm performance and growth (Hanelt et al., 2021; Sjödin et al., 2018; Vial, 2019). Researchers list specific financial KPIs that mirror the financial benefits of a successful digital transformation such as Return on Investments (ROI) (Koch et al., 2021; Wang et al., 2020), Return on Assets (ROA) (Kohtamaki, Parida, Patel, & Gebauer, 2020; Wang et al., 2020), Return on Sales (ROS), and Return on Equity (ROE) (Wang et al., 2020). On the other hand, the non-financial outcomes (Table 2) focus on business improvements (Bravi & Murmura, 2021; Hanelt et al., 2021; Vial, 2019; Wang et al., 2020), product improvements (Bravi & Murmura, 2021; Hanelt et al., 2021; Wang et al., 2020), and on the

positive impact that digital transformation has on structures, and management (Hanelt et al., 2021), customers (Hanelt et al., 2021; Wang et al., 2020). Furthermore, it includes positive outcomes that enhance organization’s competitive position (Hanelt et al., 2021; Vial, 2019), reputation (Vial, 2019), innovativeness (Vial, 2019), and market share (Wang et al., 2020).

Categorization	Source
Business processes	(Vial, 2019) (Hanelt et al., 2021) (Manita, Elommal, Baudier, & Hikkerova, 2020) (Bravi & Murmura, 2021) (Wang et al., 2020) (Vial, 2019) (Sjödín et al., 2018)
Structures & management	(Hanelt et al., 2021) (Sjödín et al., 2018) (Vial, 2019)
Customer improvements	(Hanelt et al., 2021) (Wang et al., 2020)
Product related improvements	(Hanelt et al., 2021) (Manita et al., 2020) (Tsao, Barus, & Ho, 2021) (Sjödín et al., 2018) (Wang et al., 2020)
Competitive advantage	(Hanelt et al., 2021) (Vial, 2019) (Naglič, Tominc, & Logožar, 2020) (Wang et al., 2020) (Sjödín et al., 2018)

Table 2: A broad categorization of non-financial outcomes of digital transformation.

The implementation process has a major effect on digitalization outcomes, thus, implementation practices play an important role (Jenkin & Chan, 2010; Sjödín et al., 2018; Tsao et al., 2021; Yoshikuni, 2021). Even when implementation is successful, in specific digital transformation types or early stages, financial outcomes like ROI may not be clear and organizations must reach a certain level of digital maturity (Björkdahl, 2020; Koch et al., 2021; Kohtamaki et al., 2020). From low to moderate digitalization levels, financial performance (measured in ROA) could be negative and insignificant. Hence, it is useless to compare organization’s indicators with competitors, to determine the positive effect (Wang et al., 2020). On the contrary, from moderate to high levels, performance becomes positive and significant, improving financial performance indicators (Kohtamaki et al., 2020). Another reason why financial outcomes are not noticeable from the beginning is the digitalization paradox that is focused on revenue enhancement as technology investments and cost deployment have a significant role in performance (Gebauer et al., 2020; Kohtamaki et al., 2020).

Additionally, digital technology characteristics affect financial outcomes. Simple, easy-to-implement IT systems with low deployment costs directly affect financial performance. More complex IT investments that are high quality, expensive, and require more advanced organizational capabilities increase the digital transformation budget as they require more funds to be allocated for investment and implementation purposes. Expensive investments enable the digitalization paradox (Kohtamaki et al., 2020). Hence, stakeholders and executives should be patient and let the digital transformation process evolve (Koch et al., 2021). Uncertainty, which is a common factor in digital transformation literature, defines the strategic decision process and the performance outcome. However, organization capabilities moderate the relationship between transformation strategy and implementation. More specifically, innovation dynamic capabilities and improvisational capabilities moderate strategy-making activities and corporate performance. On the other hand, environmental uncertainty moderates only the relationship between capabilities (improvisational capabilities in innovation) and corporate performance (Yoshikuni, 2021).

Digital transformation strategy (Manita et al., 2020; Naglič et al., 2020; Sjödin et al., 2018), company orientation (Naglič et al., 2020), and company scope (Manita et al., 2020) influence differently the expected outcomes and organizational performance. For example, organizations with export-orientation that follow a process-oriented digital transformation focus on outcomes that enable firms' international market expansion into emerging markets and export performance. In addition, real-time processes of digitalization enable organizations to expand their reach, create an international network, and compete easily in commercially attractive, fast-developing markets (Naglič et al., 2020). On the other hand, the digitalization outcomes of service-oriented organizations mainly are non-financial like reduced data collection time and advanced prognostics solutions, process optimization, and automatization, improving productivity and efficiency, and offering new and improved quality services (Manita et al., 2020). When digital transformation is focused on the production process (creating a smart factory) then possible direct benefits are increased process efficiency, lower operational cost, increased product quality, increased safety, and sustainability, and indirect effects are the prospect of higher sales growth, greater market penetration, and increased firm profitability (Sjödin et al., 2018).

2.3 Factors that affect digital transformation process

By shedding more light on each digital transformation stage, it was noticed that there is a list of factors that affect holistic or specific stages of the digital transformation process. In this section, these factors are clustered into 6 categories and are about organization (identity, orientation and environment, size, industry, and business model), top management (TMT's commitment, functional background, behavior, and personal characteristics), middle management, employees (influence, commitment, resistance, and digital literacy), financial resources, time (execution speed, strategy time horizon) and scale.

2.3.1 Factors related to organization

Digital disruption destabilizes and misaligns the existing identities of all the involved elements in business model, forcing organizations to reinvent themselves and transform the entire organization, the products, the producers, and value proposition. In this case, a reintroduction and reconstruction of organization's identity are necessary and are the most suitable strategy for organizations to overcome an identity crisis (Utesheva, Simpson, & Cecez-Kecmanovic, 2016). Organization identity is considered a central mechanism that steers adaptation efforts to disruptive innovations and provides a rich explanation of anomalies in standard disruptive innovation theory (Kammerlander, Konig, & Richards, 2018). In addition, it dictates the way organization communicates, and collaborates with other organizations (Prügl & Spitzley, 2021), the scope and time horizon of DT, and the relationships with employees (Ano & Bent, 2021). In smaller organizations, active in traditional sectors, organization identity is affected by reputation, brand awareness and customer value, and it is the triggering event that powers digital transformation (Bravi & Murmura, 2021).

Furthermore, a unique identity characteristic that is reflected in family-owned organizations is related to the legacy that the old generation wants to leave for the next (Ano & Bent, 2021; Prügl & Spitzley, 2021). This owner structure is characterized by a strong sense of business continuity making the change management efforts to be long-term (Ano & Bent, 2021), and the organizational identity is more emphasized and is reflected in business, and strategic decisions (Prügl & Spitzley, 2021). Owner's entrepreneurial legacy influences innovative behavior, and digital strategy is formulated according to personal involvement, commitment, respect, and visionary attitude toward digital technologies (Ano & Bent, 2021). The fact that in family-owned organizations different generations coexist and collaborate to

embrace digital opportunities should not be overlooked. Their contribution differs as older generations offer the necessary organization experience and organization knowledge and younger generations bring creativity, flexibility, and innovativeness (Ano & Bent, 2021) and develop collaborations to balance reputational risks and firm advancements (Prügl & Spitzley, 2021).

A digital orientation enables organizations to embrace digital technologies that fit business and consumers' digital needs by offering digital solutions that change business models and create a new experience (Khin & Ho, 2020). In addition, a strategic vision or orientation toward digitalization empowers process innovation capabilities that are dependent on the investment strategy (Tajudeen et al., 2021). An orientation towards digital technologies fosters a digital mindset to disrupt industry and exploit opportunities to create new digital solutions. Only when the digital orientation is combined with sufficient digital capabilities creates digital innovations that have a positive effect on financial and non-financial performance (Khin & Ho, 2020). Nevertheless, many incumbents have not cultivated a digital orientation and are unable to create new digital solutions. In this case, starting a digital transformation process by focusing on smaller-scale projects and then expanding them would promote digital orientation (Saarikko et al., 2020).

Another factor that is included in this cluster is organization size which affects organization's ability to identify digital transformation opportunities (Ekman, Thilenius, Thompson, & Whitaker, 2020; Kääriäinen et al., 2020). The starting point of any digital transformation process is to identify the needs and the opportunities that accompany this strategic move; however, this ability is related to organization size. Micro-enterprises (a sub-category of SMEs) or solo entrepreneurs require additional support to identify digitalization opportunities and brainstorm new solutions as they are unable to dedicate long periods or resources to scan and monitor the external and internal environment. Then, the support of an external organization is necessary to navigate them through digitalization, help them gain insights, identify digital opportunities, brainstorm solutions, and design their digital development (Kääriäinen et al., 2020). On the other hand, bigger organizations like multinationals require another form of support for sensing and implementing DT. Even the headquarters formulate the digitalization strategy, continuous communication, engagement, and information exchange are necessary because subsidiaries provide valuable insights for DTS updates and are considered DT triggers for headquarters (Ekman et al., 2020).

Furthermore, organization size affects the formulation stage (Buer, Strandhagen, Semini, & Strandhagen, 2021; Ekman et al., 2020; Kretschmer & Khashabi, 2020; Schmitt, Decretton, & Nell, 2019). For smaller organizations, however, organization size is a significant restriction than the production environment (Buer et al., 2021) as the selected strategic orientation affects directly the digital transformation process and resource allocation (Hess et al., 2016). For a multinational, the transformation process is quite complex as strategy is defined by the headquarters and executed by the subsidiaries. Subsidiaries set the execution pace and the subsidiary performance rate influences the processes and the transformation outcomes (Ekman et al., 2020). To avoid strategic reformulations and gain additional value through digital transformation the headquarters is actively involved in the formulation stage of digital talents and subunit managers. This practice eliminates the tensions between headquarters and subunits. However, for subunit managers and employees to participate in the formulation process, headquarters should promote processes that increase trust, justice, social interactions, and collaborations across the organizations. By doing this, tacit and contextualized knowledge is shared (Schmitt et al., 2019). On the contrary, smaller organizations like SMEs formulate digital transformation strategies with greater impact. For example, transforming specific processes and activities to improve response time (Kretschmer & Khashabi, 2020).

For smaller organizations or organizations with limited resources, the digital readiness level assessment is significant and necessary, as an unsuccessful digital transformation effort could be financially disastrous and jeopardize organization's survival. The role of assessment is twofold; it helps organizations underline their shortage of employees, financial capital, and R&D activities that restrict transformation efforts (Buer et al., 2021). On the other hand, it underlines all the necessary competencies and resources for developing vital capabilities to support digitalization efforts (Ghobakhloo & Iranmanesh, 2021). Lacking resources limits organizations' opportunities to digitally transform and invest in different digital technologies (Buer et al., 2021; Kretschmer & Khashabi, 2020). When SMEs face this restriction, they explore tailored-made solutions to overcome the stumbling block of constrained needs, competencies, and financial resources (Buer et al., 2021; Kretschmer & Khashabi, 2020). An externality of investing in tailored-made solutions is that they force organizations to invest in IT capabilities that let them transform both administrative and manufacturing processes (Buer et al., 2021).

Furthermore, firm size is a potential enabler or barrier for digital technology investments (Horvath & Szabo, 2019) and dictates how organizations are going to source the digital technology; whether they are going to develop in-house, acquire, or ally with a technology organization (Mathauer & Hofmann, 2019). Obviously, larger organizations with sufficient financial flexibility have more options for collaboration as they have sufficient capabilities to develop in-house technologies and resources to overcome potential barriers (Horvath & Szabo, 2019; Mathauer & Hofmann, 2019). On the contrary, smaller organizations do not have sufficient resources, hence, they need to ally or buy technology partners. However, for these organizations adopting digital technologies is easier even if they lack financial resources because the organizational structure and processes are less complex, and fewer technology dependencies or barriers exist as factors that make digital technology adoption easier. Furthermore, the driving force in small-size organizations is customer satisfaction so they are willing to invest in new technologies even when they are not directly profitable as they have lower profitability expectations. Nevertheless, SMEs have to consider factors that are related to firm, environment, and relations before they proceed with technological innovation (Mathauer & Hofmann, 2019).

Another digital transformation stage that is affected by organization size and is challenging for SMEs because of the limited resources and capabilities is implementation stage specifically selecting the implementation practices. In this case, external support is a choice that enables organizations to develop the necessary capabilities for digital transformation (Buer et al., 2021; Ghobakhloo & Iranmanesh, 2021). Collaborating with experienced organizations (Ghobakhloo & Fathi, 2020) or participating in research projects and knowledge-sharing networks (Buer et al., 2021), is an entry point for SMEs to resources, experienced digital transformation executives, and digitally mature organizations (Ghobakhloo & Fathi, 2020). Especially, access to resources and experienced executives are crucial elements for initial digital transformation efforts as they guide and help them to assess readiness (Ghobakhloo & Fathi, 2020). Through partnerships and collaborations with digital mature partners, organizations develop a preassessment capability that enables organizations to cultivate change management competencies, information, and digital technology expertise and digitalization strategic road mapping expertise (Ghobakhloo & Fathi, 2020; Ghobakhloo & Iranmanesh, 2021). Therefore, the assessment stage is very important, as it prepares organizations with limited resources to adopt emerging technologies with a lower-risk adoption process (Buer et al., 2021).

Relying on collaborations is a preferred option not only for small organizations that try to solve the limited resources and capabilities problem and achieve agility but also for multinational subsidiaries that are

obligated to collaborate with other organizations to implement the global digital transformation strategy. In multinational cases, collaboration with external partners is required under two conditions. When adopting new software, systems, and applications to operationalize the dictated transformation strategy and when multinationals operate in emerging markets or countries. However, different types of collaborations are suited to specific cases. For open innovation processes knowledge, acquisitions are considered a solution when it comes to transforming the global way of creating value through digital technologies into a greater capacity to innovate in customers and technology in the different local markets. On the other hand, exploitation matters only when the multinational wants to translate its knowledge of digitalization into a greater marketing innovation capability (Arias-Pérez, Velez-Ocampo, & Cepeda, 2021). This example verifies the conclusion from (Del Giudice et al., 2021) research that organization size could be negatively correlated with agility and adaptability because of the increasing complexity of its structure, the inertia of its processes, and the formality of its greater bureaucracy.

Another inhibitor that prescribes existing resources and access to key resources and assets is the business model. A service-oriented digital transformation implies that organizations must invest in digital assets that until now were not a required resource. However, developing or acquiring these assets from scratch could be costly, so they choose to merge or acquire organizations with this digital knowledge and capabilities (Tavoletti et al., 2021). When a business model is under threat and there is high uncertainty, organizations choose their collaborations in accordance with their technological intensity and size. They are choosing non-equity alliances over equity alliances, and equity alliances over acquisitions is the preferred solution as research in media firms has presented. Acquisitions are a more viable solution when the acquired business possesses, assets and digital capabilities that help organizations to offer new products/services and increase revenues (Shao, 2010).

Business models impose restrictions on formulating a digital transformation strategy. Organizations whose business models are based on predefined services, for example, audit organizations, must consider the digital transformation constraints and how they will align them with a service that is highly regulated and standardized (Manita et al., 2020). On the other hand, changes in value proposition define the range of collaborations with digital technologies organizations and the changes in management systems. To proceed with these changes and investments organizations are obligated to assess the existing needs, existing technologies, and future needs to develop new capabilities, and acquire new resources (Ghobakhloo & Fathi, 2020; Lerch & Gotsch, 2015). Consequently, the digital readiness assessment is in both cases vital for a successful transformation and dictates the initiatives that organizations should follow in the implementation stage to offer new services and successfully adopt the new technologies.

Industry influences the digitalization of business model elements and the extent of optimization (Rachinger et al., 2019). The maturity level of industry's digital technologies and business model digital readiness level for digital operations determines digital transformation strategy; so it could be disruptive led by a business model or technology or it could be more conservative (Tekic & Koroteev, 2019). The imposed industry digital transformation strategy predefines the required digital technology investments. For LSPs organizations, a common transformation strategy is process optimization that requires capital demanding digital technologies investments. As they are capital-intensive investments means that organizations cannot rely only on equity and should seek other funding solutions. However, small organizations in this sector cannot apply for funding options from financial institutions is not an option due to risk and low profit margins (Cichosz et al., 2020). Furthermore, industry determines the required competencies configurations for the implementation stage. For example, organizations in a technology-

intensive industry improve their technological capability by adopting digital technologies in the entire process for long-term success. However, in low-technology intensity industries, existing resources are integrated with digital resources to improve organization's agility and flexibility or to expand the market share (Liu, Yang, & Liu, 2021).

2.3.2 Factors related to top management

Top management embodies the managerial change capabilities that boost organizational behavior changes inside an organization (Bendig et al., 2022). Hence, the success of digital transformation is highly associated with management commitment and weakly by strategic goals (Ko et al., 2021). Securing management commitment at top executive levels is the main challenge that organizations face at the beginning of formulating a digital transformation strategy (Sommer, 2019). Committed management which is embodied in supportive leadership is mandatory as top management relies on executives to enable employee participation and adopt newly introduced functions (Horvath & Szabo, 2019). The support of the top management team (namely decision-makers) and their commitment are necessary as they motivate organizations to achieve digital transformation results (Ko et al., 2021).

Top management support is essential throughout the digital transformation process starting from the early stages when they have to take the initiative and respond to digitalization threats (Sia et al., 2016), formulate (Björkdahl, 2020; Ko et al., 2021; Sia et al., 2016), and execute the selected digital transformation strategy (Björkdahl, 2020). In latter stage, they have to assess organizations digital maturity and readiness stage (Ruel, Rowlands, & Njoku, 2021) to make the right decisions about investing and aligning the necessary resources (Sia et al., 2016). Thus, supportive leadership behavior is necessary for any successful transformation because digital transformation leader becomes a digitalization advocate and sets the example for agile behavior (Sommer, 2019). However, they are not only simply cheering for digital transformation efforts, they influence the transformation process and ensure that everyone inside the organization works towards this common goal (Björkdahl, 2020).

Given the fact that digital transformation affects every aspect and department of the organization, the support of all C-level executives is necessary, so they must be informed about digitalization to co-drive digitalization demands from their departments and their business ecosystems (Sawy et al., 2016). Since collaboration between different departments is necessary, securing their support means that it will be easier for digital transformation leaders to manage conflicts between executives and departments (Holmlund, Strandvik, & Lähteenmäki, 2017; Sia et al., 2016). Nevertheless, conflicts are expected to arise as each executive has a unique business view that dictates what is important, what should be monitored, and what is done. Organizational restrictions and boundaries prescribe their view on which functions can be applied to their departments or can be improved (Holmlund et al., 2017). Therefore, managers should adopt a problem-solving approach and system-level interventions (Horvath & Szabo, 2019). Managing conflicts between executives and/or departments and intervening when cognitive conflicts have unwanted consequences is vital during digital transformation (Wang et al., 2020). Consequently, specific leadership skills are mandatory to manage transformation and design the strategic processes and contents, accelerate the strategy execution, and harmonize the change process (Hanelt et al., 2021).

Top management commitment sets the expectations for the departments that actively participate in digital transformation like the IT department (Ko et al., 2021) and leverages the benefits of integrating heterogeneous information systems throughout departments and ensure the link between corporate strategy and culture (Ruel et al., 2021). During senior management meetings and strategic transition

periods, each executive should interact with other executives. As managers' mental models determine the beginning of the digital transformation (Holmlund et al., 2017), having a senior manager who can modify executives' mental models and unify the various mental models is critical. As a result, efforts promoting changes in management attitude and top management teams with agile leadership are essential (Sommer, 2019). Hence, recruiting new executives is a facilitator for providing fresh thoughts and viewpoints to senior management and initiating strategic transformation activities (Holmlund et al., 2017; Horvath & Szabo, 2019), and be a solution for the organization to deal with adaptation pressures (Bendig et al., 2022).

Among the responsibilities of top management are decentralizing the authority (Latilla et al., 2020), and cultivating a corporate culture that encourages innovations, tolerates failures, and allows each TMT member to own and express their own opinions (Wang et al., 2020). Management could cultivate this environment by promoting a risk-taking environment (Parihar & Sinha, 2021), creating psychological safety, and tolerance, promoting experimentation, sharing, and allowing employees to challenge the rules (Ngereja & Hussein, 2021). These environments promote a collective engagement that encourages learning activities and the development of collective innovative solutions during project development (Ngereja & Hussein, 2021). Nevertheless, these activities must be evaluated and managed in a way that maximizes the likelihood of success as creative workers are driven by the opportunity rather than the consequences of achievement (Parihar & Sinha, 2021). Organizations enhance learning and cognitive capabilities by adopting cognitive technologies that facilitate new organizational settings, redesign process configurations, and regenerate human and machine-based capabilities. Cognitive capabilities help organizations at the initial level sense and perceive changes in the internal and external environment, adapt and react, and at high levels envision, proact, and interact-collaborate with other systems (Elia & Margherita, 2021).

Management commitment to digitalization efforts should be expressed also in the implementation stage. The first step is the creation of a CDO position. However, the range of CDO's influence is moderated by TMT's hierarchical structure that prescribes the affected by the way information is exchanged, the collaborative behaviors of TMT members, and the decision-making participation. Hence, TMTs with flat structures enable CDO's coordinative role as she/he can seize all the benefits of this coordinating position and achieve high levels of effectiveness (Firk et al., 2022). Opting for the creation of this C-level position is influenced by CEO's functional background in digital technologies (Singh et al., 2020) and country's digital transformation characteristics (Firk et al., 2021). A CEO with a functional background in digital technologies may consider that a CDO position is not necessary and will not have an impact on digital transformation. In these cases, transformation may be headed by the CEO or be appointed to another executive with digital expertise like a Company Strategy Officer or Chief Information Officer (Singh et al., 2020). But more recent research has shown that the combination of a CEO with diverse work experience with a CDO might have bigger influence on infusing digital knowledge on digital innovation on TMT level (Firk et al., 2022). The effect that CEO and TMT have on digital transformation governance structure implies that organizations must assess the TMT's digital knowledge, design training programs or workshops to develop their competencies and redesign existing structures to enhance CDOs' efforts to trigger digital innovation (Firk et al., 2022).

Behavioral and personal characteristics influence digital transformation (Björkdahl, 2020) and dictate manager's openness to new experiences created by strategic issues and not technical and operative ones (Diller, Asen, & Späth, 2020). An extroverted manager enables employee motivation, and business

networking in contrast to a neurotic manager who hinders adaptation, change, and business progress (Diller et al., 2020). In the same line, behavioral characteristics and decision-making logic influence the decision process. An innovative manager follows a looser decision approach that is based on exploiting organizations existing sources to find new revenue streams by exploiting digital technology opportunities to offer new products/services. On the contrary, conservative managers are selective and try to acquire all the necessary means to achieve this goal. Even though both decision-making approaches could have a potential positive impact, managers should find a balance between these two approaches by considering their resources and strategic goals regarding new or enhanced in-house abilities (Baber, Ojala, & Martinez, 2019).

Even if they rely on their instinct they must consider organizations market position, the decision's objective (Baber et al., 2019), technological trends (Chawla & Goyal, 2021), and organizational frames (Klos & Spieth, 2021). These factors not only influence management and leadership decisions, set boundaries that must be managed, but also help management sense disruptions (Klos & Spieth, 2021). However, managers are obligated to balance the individual and organizational sensemaking mechanisms and choose which sensemaking mechanisms are suitable for each situation. For example, when managers forecast a technology adoption or assess the adoption of new technology, they must consider only organizations abilities and adapt their knowledge and skills, respectively (Klos & Spieth, 2021). However, this influence can be scaled down as digital technologies help managers improve both their decision-making and employee and company performance appraisal. So, a driving force for investments in Industry 4.0 technologies is managing expectations, management aspiration to increase control, and enabling real-time performance measurement (Horvath & Szabo, 2019).

Organizational performance is affected by TMT decisions as they are the ones that govern digital transformation (Wang et al., 2020). Hence, managers need to manage conflicts by monitoring and applying appropriate tactics to manage TMT's cognitive conflict at different stages of digital transformation. The impact of cognitive conflict on digital transformation strategy is more significant on long-term financial performance especially when a TMT's cognitive conflict is high compared with when it is moderate or low. On the other hand, cognitive conflict has an inverted U-shaped moderate effect on the relationship between digital transformation strategy and short-term financial performance (Wang et al., 2020). Another conflict that TMT is called to manage during digital transformation is among departments. The IT department, as the department responsible for the adoption of digital technologies, is the advocate of the new digital technology that deals with employee resistance. To minimize resistance impact, top management executives must intervene, balance the dynamics between the two groups, and find a common ground, so the implementation plan will proceed (Pachidi, Berends, Faraj, & Huysman, 2020). A way to overcome technology adoption resistance for organizations that deal with multiple digital maturity levels is by creating intra-firm collaboration teams (Cichosz et al., 2020).

Owner structure affects the way the innovation need will be expressed inside the organization (Mathauer & Hofmann, 2019). Family ownership, CEO tenure, the involvement of non-family managers, and generational involvement direct organization's willingness to adopt digital innovations (Basly & Hammouda, 2020). However, a business orientation towards change, helps family-owned organizations realize more easily the benefits and competitive advantages of digital technologies and DT in general (Basly & Hammouda, 2020). For non-family-owned organizations, the willingness to innovate is expressed from inside the organization. On the contrary, in family-owned organizations, the willingness to innovate regularly comes from outside the organization (Mathauer & Hofmann, 2019). A family member's

involvement in TMT is a constraining factor for innovation especially when there is no correlation with existing capabilities (Ceipek, Hautz, De Massis, Matzler, & Ardito, 2021; Mathauer & Hofmann, 2019). However, technological innovations that are close to existing technology investments are enhanced when family members are part of TMT. To enable innovations that are not related to core technological investments, family-owned businesses are required to appoint a non-family CDO (Ceipek et al., 2021). To act entrepreneurially, family-owned organizations have to combine different factors such as leadership teams, organizational structures, processes, and employees (Basly & Hammouda, 2020).

2.3.3 Middle management influence

Undeniably, the lack of management support due to poor management capabilities intensifies the change resistance, especially in organizations that are starting their DT process (Cichosz et al., 2020). However, light should be shed on the influence of middle management. Middle manager's resistance should be considered as it plays an essential role in organization changes and technology adoption process, and examine the influence that middle managers have on the entire digital transformation process and especially in the implementation stage (Horvath & Szabo, 2019). Middle manager support is essential considering the unique relationship that exists between employees and middle manager which is based on mutual trust. Consequently, for technology adoption organizations need to secure local or middle managers' support (Bäckström & Lindberg, 2019).

When organizations adopt technologies and promote employee-driven innovation they heavily rely on employee participation, and the support from local managers encourages employees to utilize the offered innovation tools. This implies that a middle manager who rejects the adoption of a new tool sets in danger the digital transformation strategy because she/he simultaneously rejects all the new ideas that are unrelated to existing client projects, and forces organizations to address low-performance issues (Bäckström & Lindberg, 2019). To overcome barriers like this organizations must encourage manager's exploitation initiatives that will accelerate digital transformation process. These initiatives are a precondition to cultivating an organizational context that promotes communication and collaboration between middle managers. Setting new rules like "attain a consensus before reporting to top management and board", clarifying the responsibilities, and setting performance goals do not only encourage collective participation in strategic decisions but also middle manager's communication and collaboration. This support is enough, as the case study results present, to trigger a series of initiatives on behalf of middle managers like regular meetings to be able to participate in strategic planning (Su, Mao, & Jarvenpaa, 2023).

Nevertheless, TMT must monitor the relationships between middle managers and moderate the competitive and collaborative dynamics between them. One key responsibility of the top management is to facilitate and balance the competitive factors and conflicts between middle managers by promoting and guiding middle managers to build complementary capabilities meaning cross-functional synergies that will improve collaboration and communication (Su et al., 2023). At the same time, TMT must design practices that will secure middle and low managers' participation by setting up regular meetings and cultivating their organizational capabilities to overcome cultural barriers and speed up transformation, actively including them in digital transformation process and making them accountable for DT success (Gfrerer et al., 2020).

2.3.4 Employees

Even though digital transformation is managed by C-level executives, employees' commitment, skills, and innovative ideas are fundamental for the implementation phase (Gong & Ribiere, 2021). Employee participation defines the success of the strategic change (Butschan et al., 2019), increases the speed, and decreases the magnitude of the strategic change (Yi et al., 2017). Hence, the positive impact of employee participation in Industry 4.0 initiatives is undeniable regardless of technology use, country level, and firm size (Vereycken et al., 2021). Accepting the significance of employee participation in digital transformation projects (Butschan et al., 2019; Yi et al., 2017), organizations regard employees' digital literacy as an organization affordance and actively involve the HR department in the digital transformation process (Cetindamar Kozanoglu & Abedin, 2021). The involvement of the HR department in digital transformation strategy formulation (Butschan et al., 2019; Vereycken et al., 2021) and implementation is essential as different technologies demand different implementation practices on behalf of HR (Vereycken et al., 2021). The HR department will provide the necessary information regarding the existing level of human capital and will forecast necessary additions or training projects (Butschan et al., 2019).

A factor that moderates the dynamic relationship of employees with technologies is digital literacy. Employees should be capable to learn and adapt their behavior through interactions with other employees and with technology (Cetindamar Kozanoglu & Abedin, 2021). The adoption of multiple digital technologies forces changes in business models, imposing mandatory training activities to reskill employees (Lauterbach, Mueller, Kahrau, & Maedche, 2020; Schlegel & Kraus, 2021) and tailored support efforts (Lauterbach et al., 2020) as different digital technologies require different capabilities (Butschan et al., 2019; Manita et al., 2020; Schlegel & Kraus, 2021). Thus, a qualified workforce is an indicator of highly flexible employees and departments that will let organizations create new structures to fit the new working environment, foster the usage performance of the adopted digital technology, and enhance firm success (Butschan et al., 2019). Even when organizations adopt digital technologies that focus mainly on operations (adoption of IIoT technologies in manufacturing organizations) the cognitive capabilities have a bigger impact on technology's usage performance than the processual competencies (Butschan et al., 2019). Consequently, encompassing digital literacy as a parameter to manage DT enhances digital technology use, improves manager's expectations, understanding of technology use, and possible improvements (Cetindamar Kozanoglu & Abedin, 2021).

Except for digital competencies, managers should pay attention to the way employees use digital technology (Cetindamar Kozanoglu & Abedin, 2021), existing culture (Cetindamar Kozanoglu & Abedin, 2021), and digital mindset (Solberg, Traavik, & Wong, 2020). Employees perceive digital transformation changes differently. Their attitude towards digital transformation is shaped by the effect that this change has on their work routines. Thus, multiple strategies and in some cases, tailored-made solutions that encourage employees and managers' participation must be formulated (Gfrerer et al., 2020). During implementation, employees are obligated to follow the specified routines imposed by digital technology, but they also have to adjust the digital technology to develop innovative routines that will provide answers to their personal needs. Acknowledging these dynamics and designing an implementation plan around them will transform not only the digital workspace but also the digital technology itself. This influence is the result of the balance that employees try to achieve between following the pre-specified digital routines and the offered flexibility of digital technologies (Rossi, Nandhakumar, & Mattila, 2020).

Furthermore, understanding employees' digital mindset is an indicator of employees willingness to engage and their attitude toward digital transformation (Solberg et al., 2020). Monitoring this parameter

is essential because employee resistance during a technology adoption process severely affects the implementation stage by producing inefficient and ineffective implementation solutions that do not cover organization needs (Cichosz et al., 2020). Employee resistance is a significant barrier to digitalization projects, and the level of resistance is directly connected with the effect that the adopted digital technology will have on employees' everyday tasks (Pachidi et al., 2020). However, adopting digital technologies to improve and benefit work life, like digital technologies that promote remote working, might overcome resistance as they cultivate and develop a digital mindset, and train employees to develop a new innovative culture (Parihar & Sinha, 2021). These observations are useful input to a detailed implementation plan that will decrease resistance and will help employees with underdeveloped skills to be open to change, change their mindset, and overcome their fear of new or missing skills (Cichosz et al., 2020).

To develop customized implementation plans and treat each cluster differently, clustering employees according to their competencies and digital mindset is a solution. For clusters where employees are skeptical or understand technology opportunities but do not have the necessary digital capabilities, organizations can apply implementation practices that will reduce their resistance like introducing a mentor, a role model, or a trusted change agent. This change model will provide the required information that will shift their point of view and move them into a new digital mindset. Another solution for cases like this is to relocate employees to new positions inside organizations or help them find another job outside the organization or include them in cross-functional teams to collaborate with highly skilled employees. On the other hand, a cluster of employees who are open-minded in digital transformation can be used by managers as advocates for digital transformation strategy. Particularly, they could use their skills and competencies to be leaders of digital change or lead digital transformational initiatives with others. Therefore, self-awareness and consideration for employees, enhance managers positive influence toward the formulation of a digital mindset inside the organization by presenting growth-oriented and expandable beliefs (Solberg et al., 2020).

Finally, light should be shed on how employee perception affects the organization identity changes. Employees are an important factor that must be incorporated into digital transformation strategy and are a source of competitive advantage (Ano & Bent, 2021), it is important to consider the effect of digital disruption on employees' perception of organizational identity and organizational role identities (Kammerlander et al., 2018). During digital transformation process, employees explain and adapt digital disruptions to their identity perception, raising various responses that are affected mainly by the changes that digital disruption causes, so they can be perceived as identity-challenging or identity-enhancing. Disrupted role identities help managers to easily address these challenges as they do not affect the core entities of the organization. Especially, adaptable organizational role identities are especially necessary for flexible innovations as they trigger adoption flexibility when the domain identity is enhanced and 'bold retreats' when the domain identity is challenged (Kammerlander et al., 2018). However, employee response to organizational identity changes is a significant barrier, especially in family-owned organizations because employees are a key element of the business model and employees related parameters like employee self-responsibility, autonomy, and innovativeness are extremely important. Their influence in digital transformation projects is undeniable and should be incorporated into strategic decisions, by planning and implementing practices that minimize their resistance (Ano & Bent, 2021).

2.3.5 Financial resources

Mediating factors, the strategy formulation and implementation stage are influenced by financial resources (Björkdahl, 2020; Matt et al., 2015; Schallmo et al., 2017; Sebastian et al., 2017). Limited financial resources confine organizations' ability to invest in digital technologies, transform the value creation process, and make structural changes (Matt et al., 2015). In addition to the implementation stage, insufficient financial capabilities put a in stake digital technology investments, which are an important part of digital transformation. Organization's current well-being and its prospects are reflected in its financial ability to fund digital transformation, either by utilizing internal funding options or using external financing options if the first choice is not feasible (Hess et al., 2016). Financial restrictions or limited resources force organizations to remain committed to one strategy, even though various growth opportunities may arise from digital technology investments. Hence, it is necessary for organizations to commit to one digital transformation strategy and make the required investments, define investment criteria (Sebastian et al., 2017), and identify gaps between the future and current situation (Parviainen et al., 2017).

During transformation, organizations may need to sacrifice existing revenue streams (Gurbaxani & Dunkle, 2019) or face negative ROI (Ruiz-Alba et al., 2020) to obtain future higher financial and non-financial results. Possible negative results mean that, except for financial resources, organizations should have strategic flexibility and alignment capabilities to respond to negative effects (Gurbaxani & Dunkle, 2019). Furthermore, as strategy implementation evolves, organizations might deal with budget restrictions because digital technology investments are expensive, and the investments do not produce positive results from the beginning (Ruiz-Alba et al., 2020). Many budget restrictions can be overcome by designing an implementation plan that takes into account low performance issues brought on by poor technology use, unwilling employees, unexpected outcomes from wrong talent management and recruitment strategy, and organization's inability to rightly exploit the digital transformation opportunities (Ruiz-Alba et al., 2020). Hence, strategic agility and alignment capabilities are considered attributes that help organizations overcome these problems and apply the best solutions.

In addition, the assessment process highlights the important role of the manager who must carefully assess existing technology capabilities and identify new competencies that will be required (Hess et al., 2016). TMT plays a critical role as it decides how resources will be allocated and chooses the most valuable opportunities as organizations financial stability depends on it (Björkdahl, 2020). Hence, they should be objective and not underestimate or overestimate employees' capabilities, focus on future required capabilities, and forecast needs. To achieve this, managers should be creative and find ways to reskill or upskill employees to be ready to take different jobs or roles inside organization (Solberg et al., 2020). Finally, organization size may impose financial restrictions given the limited access to funding and capital. Hence, SMEs require additional financial support mechanisms like public support to invest in digital technologies are crucial (Buer et al., 2021; Ghobakhloo & Fathi, 2020; Ghobakhloo & Iranmanesh, 2021)

2.3.6 Strategy scale and execution speed

The scale and the execution speed are two factors that affect the strategy formulation and the implementation stage. On one hand, organizations are called to decide if the digital transformation will be department- or process-level (Kretschmer & Khashabi, 2020), and on the other hand, they choose the strategy execution speed that affects implementation (F. Li, 2020). Regardless of scale, it is likely that additional changes will be required in other departments or processes as a snowball effect will be created. Process digital transformation of one department will affect the processes of other connected

departments, implying that executives must plan a transformation project for the affected departments. This example clearly presents the importance of assessing organizational connections between structures, processes, and information flows (Kretschmer & Khashabi, 2020).

Focusing on the execution speed (slow, radical, or gradual), it is noticed the influence on the implementation stage, and the adopted processes. A slowly executed transformation proposes a series of experiments that are used to evaluate and adjust the strategy and the implementation, as it is an iterative, recursive, learning process. An incremental transformation represents the radical approach that is developed, evaluated, and recalibrated frequently through execution. The last approach is developed gradually by using successive temporary advantages that will create a dynamic, sustainable advantage (F. Li, 2020). Nevertheless, execution speed is influenced by the organization's years of activity and investment decisions (A. B. Crittenden et al., 2019). Well-established organizations choose a digital transformation strategy that is not radical but is strategically designed and aligned with their existing strategy. In these cases, organizations have carefully assessed the existing business model and identified the required changes. This approach lets incumbent organizations invest in digital technologies that protect their core business, enhance customers, and improve existing advantages (A. B. Crittenden et al., 2019). In addition, by being careful and methodical, incumbents are not disrupters but are early movers and remain competitive (A. B. Crittenden et al., 2019; Langley & Rieple, 2021).

2.4 The role of digital technologies in digital transformation

Digital technologies are the core element of a digital transformation process as organizations adopt them to trigger organizational changes, and fuel disruptions in organizations internal and external environment that force them to digitally transform (Vial, 2019). They propose a new type of product architecture, the layered modular architecture, that relies on digital technologies' unique characteristics, reprogrammability, homogenization of data, and self-referential nature (Yoo, Henfridsson, & Lyytinen, 2010). Transitioning from a hierarchical product architecture to a layered modular architecture enables the development of digital innovation which is a combination of digital and physical components (Hylving & Schultze, 2020; Yoo et al., 2010). Obviously, digital innovations should be supported by appropriate organizational structures, organizational culture that encourages engagement with digital technologies, and the creation of new business opportunities and organizational capabilities (Wiesböck & Hess, 2020). In addition, for successful product digitization, organizations have to adopt a transformative logic that affects not only the products but also the processes (Hylving & Schultze, 2020; Yoo et al., 2010) and the involved parties (Hylving & Schultze, 2020).

Digital technologies have a twofold role; thought recursive cycles generate new complementing digital business concepts (Wiesböck & Hess, 2020), and enable product digitization (digital innovations) that change the balance of competitive dynamics (Yoo et al., 2010). These roles set digital technologies as a core part of strategy formulation (Yoo et al., 2010). Consequently, business strategies and IT strategies are highly intertwined and must be considered simultaneously (Sia et al., 2021), and digital technologies investments should be in line with the business model (Martinez, 2019). Digital technologies manage digital transformation (Schneider & Kokshagina, 2021) creating two types of organizations; a technology organization that develops and deploys digital technologies and an organization where digital technologies are the reason for their existence as they use them to deliver new products or services (Menz et al., 2021). Except for their influence on strategy, digital technologies disrupt every organizational aspect including marketing, customers, management, employees, leadership, governance (Schneider &

Kokshagina, 2021), internal structures and design, corporate (competitive) advantage, and firm scale, scope, boundaries (Menz et al., 2021).

Additionally, they improve organization capabilities to utilize simultaneously exploration and exploitation techniques. More specifically, IT ambidexterity enables organizational agility by facilitating the development of operational ambidexterity. However, the relationship between IT ambidexterity and operational ambidexterity is moderated by the emergence of change that organizations must deal with (Lee, Sambamurthy, Lim, & Wei, 2015). Ambidexterity during market or competition change periods is significant (Lee et al., 2015), so the fact that IT technologies and digital technologies enable organizations to achieve structural (Park et al., 2020) and contextual (Åkesson et al., 2018) ambidexterity, advance the importance of IT. Structural ambidexterity is achieved through digitization as it complements centralization and collaboration between different business units, and is crucial in highly competitive markets regardless organization's size (Park et al., 2020). To pursue ambidexterity inside organization's structures a continual investment in IT technologies is required before and during the digitalization initiatives. However, as employees' involvement and participation have a significant role during IT investments; training programs for efficient use of the technology should be planned at the same time to achieve structural ambidexterity (Park et al., 2020).

When digitization affects core business, ambidexterity is an enabler for reshaping existing configurations of business model elements like in the case of newspaper organizations when digital disruption affected content, production, and distribution. However, in this case, because we refer to contextual ambidexterity, attention should be paid to individuals and senior management roles (Åkesson et al., 2018). Managing an IT transformation program is extremely challenging and requires ambidextrous capabilities to resolve conflicts and tensions across multiple organizational levels. Thus, an ambidextrous IT transformation program that provides IT-enabled competitiveness requires dynamic processes and aligned efforts on behalf organization and IT managers (Gregory, Keil, Muntermann, & Mähring, 2015). Intellectual capital (human capital, relational capital, and structural capital) has a key role in balancing organization's explorative and exploitation abilities. However, the role of Technology Absorptive Capacity is critical as it sets directions for organization's intellectual capital that should follow to succeed in organizational ambidexterity (Mahmood & Mubarik, 2020).

The significant role of digital technologies in digital transformation is clear from the early literature were organizations like hotel chains utilized mobile, analytics, platform, and location-based technologies to improve customer experience and systematize internal processes. This infrastructure was planned to be exploited in the future to customize processes based on each hotel's needs (Westerman et al., 2011). However, in recent research, digital technology shortcomings hinder digital transformation efforts. These shortcomings are not only linked to limited investments but also to employee resistance, and organization culture. Employee resistance and unwillingness to adopt new technologies hinder digital technology adoption and digital transformation efforts forcing organizations to transform organizational culture and reframe the transformation message to align employee needs (Mann et al., 2022). Therefore, it is worth evaluating employee digital capabilities level and existing technological infrastructure as they facilitate digital transformation efforts.

2.5 Emerging research avenues

A digital transformation strategy is commonly confused with digital (business) strategy and IS strategy. Digital (business) strategy is based on digital resources and creates additional value for organization by

combining organization's technical (IT investments) and organizational factors (Bharadwaj et al., 2013). Therefore, digital (business) strategy describes organization's vision for future digital business model (Hess et al., 2016) as it defines parameters like scope, scale, speed, and value creation and capture opportunities (Bharadwaj et al., 2013). However, the digital (business) strategy does not provide guidelines for the actual transformational steps (Hess et al., 2016). On the other hand, IS strategies are concentrated on the efficient management of IT infrastructure and application systems. Due to this narrow focus, they lack of transformational and business-centric orientation that is needed in digital transformation (Hess et al., 2016). A digital transformation strategy focuses on the transformational aspect and guides organizations and management teams through the transformation process and the way they will integrate and use digital technologies (Hess et al., 2016). Nevertheless, digital strategy and DT are connected as the first one is a necessary foundation and influences the product/services digitalization level (Proksch et al., 2021). This implies that digital business strategy literature can be exploited to guide and provide some initial directions about digital transformation research.

Digital transformation disrupts existing business models and reconstructs them by producing new organizational forms or transforming key elements of the business models like distribution channels. One of the most famous digital disruptions that cause the digital transformation of the music and broadcasting industry is Spotify and Netflix (Hinings et al., 2018). Thus, many research papers propose frameworks that help organizations navigate through DT. However, any of these frameworks rely on existing frameworks. Therefore, a proposed research avenue recommends incorporating different theoretical perspectives and suggesting guidelines on how organizations can analyze and measure the effectiveness and efficiency of DT (Steiber et al., 2021). Exploiting established theoretical models creates a conceptual framework that enhances and elaborates our current knowledge about DT (Hanelt et al., 2021), and better captures the essence of DT rather than focusing on narrow, single points of view (Jedynak et al., 2021).

Nevertheless, as digital transformation changes could be severe and totally alter a business or an industry, there is a need to study how these new forms are developed, how they are diffused, how they gain legitimacy, and the regulations that should accompany them (Hinings et al., 2018). Although research papers pay attention to digital transformation importance they do not shed light on the way organizations could achieve this process (Shahi & Sinha, 2021). For example, many organizations are unable or need external support to cope with digitalization challenges, they synergize or share knowledge with organizations outside and inside their industry (Caputo, Pizzi, Pellegrini, & Dabić, 2021). Thus, more light should be shed on digital transformation journey and particularly on the processes, success, risks, and failures (Chanas et al., 2019). In the literature are presented multiple case studies that describe different implementation practices based on adopted digital technologies as researchers try to set them as an example for other organizations and practitioners (Martinez, 2019). As DT is an evolving process and a company-wide effort, organizations need to have a clear strategic vision of their position in the digital world (Gurbaxani & Dunkle, 2019). One of the main responsibilities of digital leadership is to communicate the strategic vision at every hierarchical level and be truly committed to execution (Sawy et al., 2016). In addition, it is very important to understand the interactions between top management and middle managers. Thus, exploring and presenting key practices on how top management can enhance/encourage middle managers participation and active involvement (Su et al., 2023). Consequently, the creation of this type of framework will define key managerial practices that are required (Sia et al., 2021).

Except for the implementation way, it is important to find ways to evaluate the DT process and specify the conditions that pre-digital organizations have to meet to declare a DT successful (Chanas et al., 2019).

As we focus on pre-digital organizations, and incumbent organizations, a parameter that should be included and examined is how organization's existing situation (size and digital maturity or other contingences such as owner structure, or scope of services) affects the implementation and the outcome of DT (Cichosz et al., 2020). In addition, DT causes changes inside organizations that affect employee satisfaction, commitment, and organizational identification (Hanelt et al., 2021). On the other hand, it is useful to examine how customer preferences and social practices affect the business model and products (Hanelt et al., 2021). This could include developing research avenues that investigate how digitalization is helping organizations gain a better understanding of customers' needs, explore opportunities, and translate them into products/services that enable value (Ruiz-Alba et al., 2020).

In general, it is important both from academic and practitioners' views to specify the success and performance measurements of DT, and to list the required skills, and the new organizational formats (Schneider & Kokshagina, 2021). Even though some research papers have proof that DT affects financial performance (Kohtamaki et al., 2020; Soluk & Kammerlander, 2021), further research should focus on specific outcomes like sales growth, company market value (Kohtamaki et al., 2020), market leadership, customer satisfaction, and revenue growth (Soluk & Kammerlander, 2021), and in organizational performance in general (Hanelt et al., 2021). Finally, more research papers have to identify the configurations of innovation and integration mechanisms in DT with high performance (Hanelt et al., 2021).

Over the last few years, many researchers have proposed research avenues based on dynamic capabilities theory that will help the academic and practitioner community implement successful digital transformations. (Vial, 2019) propose three future research avenues related to dynamic capabilities that will contribute to digital transformation. Under this spectrum, Vial eagers researchers explore how organizations can build organizational dynamic capabilities to support the ongoing DT process, examine the role of integrative capabilities in the context of digital platforms and ecosystems, and investigate the micro-foundations that help us understand and explain how DT unfolds in practice. Other research avenues propose researchers examine the influence that the internal and external environment or ecosystem has on dynamic capabilities development (Chirumalla, 2021), and analyze the micro-foundations of digital transforming capability and other dynamic capabilities in different (national) cultural contexts (Sousa-Zomer, Neely, & Martinez, 2020).

3. A RESEARCH FRAMEWORK FOR THE DIGITAL TRANSFORMATION PROCESS

The presented literature review streamlined the digital transformation process. Combining the stages proposed in the previous chapter and the selected theoretical foundation we structure a research framework that will enhance our understanding of digital transformation. The proposed research framework uses dynamic capabilities as a theoretical foundation to define the different stages and key activities. Furthermore, the chapter focuses on specific contextual factors that it is believed to have great influence on the digital transformation process. These contextual factors are employees, middle managers, manager's perceptions, organization identity and beliefs, and time parameters like scale, execution speed, and horizon.

The structure of this chapter is as follows. Starting by presenting the theoretical background of the research framework in Section 3.1. Section 3.2 summarizes the theoretical foundation of our research. Section 3.2 to 3.4 present the 3 dynamic capabilities (sensing, seizing, and transforming) and analyze the stages that are included under each dynamic capability. Section 3.5 presents the financial and non-financial outcomes of DT. All the contextual factors that affect digital transformation are presented in Section 3.6

3.1 Theoretical background of the research framework

Researchers use dynamic capabilities theory as a theoretical foundation to understand and explain the digital transformation process. They are a means for organizations to become digitally mature (Chirumalla, 2021) because they support organization's efforts to build and sustain a competitive advantage (Helfat & Raubitschek, 2018), but also they enhance aligning process (Yeow, Soh, & Hansen, 2018). Dynamic capabilities are used by organizations to respond to disruptive forces by sensing the need for change (sensing capabilities), assessing the existing situation (seizing capabilities), and managing strategic change (transforming capabilities) (Warner & Wäger, 2019). This repeated cycle of sensing, assessing, and managing actions takes place throughout the digital transformation process, however, their scale and contribution are different in every stage (Yeow et al., 2018).

The higher-level dynamic capabilities definition proposed by Teece, (2018) matches the digital transformation stages presented in Chapter 2. More specifically, (Teece, 2018) proposes that the sensing activities include "environmental scanning, which brings disorganized information and unstructured data from the external environment into the organizational system. Managers at various levels must generate and test hypotheses about latent consumer demand, technological possibilities, and other forces that affect the firm's future". Similar activities are included in the first two stages of the digital transformation process where organizations identify opportunities or threats from the environment and design a digital transformation strategy as a response. Next, Teece, (2018) focuses on seizing capabilities, and defines them as "capabilities that determine how quickly the system can respond to opportunities and threats once they have been identified and deemed important. The activities involved include investing to commercialize new technologies and designing (or updating) and implementing business models for various products and services". Organizations to respond quickly to changes or disruptions, it is necessary to assess specific parameters in order to know their internal environment. The literature so far has proposed some parameters like existing structures, capabilities, and technological infrastructure. This information enables digital technology investments and setting a tailored made implementation plan.

After that organizations utilize various practices and design an implementation plan. This stage is part of the transforming capabilities that are “responsible for keeping the elements of the organizational system aligned both with each other and with the strategy. These capabilities are most critical when a new business model involves a significant change to the organization’s design or conflicts with an existing business model” (Teece, 2018).

The final stage that is described in the literature is digital transformation outcomes. In dynamic capabilities theory, outcomes are not part of dynamic capabilities but the research has shown that they affect indirectly organization performance results (Pavlou & El Sawy, 2011). Dynamic capabilities influence the financial performance (Helfat & Raubitschek, 2018; Karimi & Walter, 2015) by enhancing value capture system (Helfat & Raubitschek, 2018), and organization revenue (Karimi & Walter, 2015). Organizations with high integrative capabilities lower transaction costs so organizations facilitate boundary expansion and improve their value capture system (Helfat & Raubitschek, 2018). Dynamic capabilities are directly associated with revenue generated from digital products and indirectly affect revenue generation through digital platform capabilities for digital noncore products. Thus, the ability to collectively reconfigure resources improves response performance to digital disruptions which is also affected directly and indirectly by first-order dynamic capabilities (Karimi & Walter, 2015).

The above paragraphs outline the importance of dynamic capabilities and further support the research shift that considers dynamic capabilities a “tool” that helps researchers and practitioners better understand and manage digital transformation. In addition, they provide an outline of the actions that are included in each stage. To further support our statement and ground the proposed research framework, we analyze in detail each dynamic capability and how it is related to digital transformation.

3.2 Sensing Capabilities: Identifying triggering factors and formulating a Digital Transformation Strategy

Sensing capabilities help organizations identify threats, opportunities (Warner & Wäger, 2019; Yeow et al., 2018), or potential financial profits (Demeter, Losonci, & Nagy, 2021). They allow managers and organizations to enhance their subjective perception of environmental change, their ability to identify and exploit opportunities, and their adaptive management innovation process (Demeter et al., 2021). However, exploiting these opportunities and responding to threats, sensing capabilities should be combined with an in-depth knowledge of core product (Helfat & Raubitschek, 2018). It is clear that sensing capabilities heavily rely on business insights. Digital technologies investments can boost organizations insights and accelerate sensing capabilities (Warner & Wäger, 2019). This means that financial resources can enhance or limit organizations reflexes and seizing capabilities throughout the sensing process (Steiber & Alänge, 2021).

Furthermore, organizations innovation focus, existing core business, and strategy time horizon influence sensing capabilities but they require organizations to balance initiatives focusing on innovation and existing core business and have long-time planning (Steiber & Alänge, 2021). Possessing innovation capabilities means that organizations could create more innovation opportunities and improve response rates to innovation threats (Helfat & Raubitschek, 2018). On the other hand, operational capabilities enhance organizations efforts to identify internal triggers through sensing activities like the usage of existing business processes, the development, and usage of basic technical infrastructure, and analyzing data to enhance sensing activities (Soluk & Kammerlander, 2021).

A systematic assessment of the internal and external environment is required (Demeter et al., 2021; Soluk & Kammerlander, 2021; Warner & Wäger, 2019), as these insights are exploited for formulating multiple transformation strategies to grasp opportunities or respond to threats. Necessary sensing sub-capabilities for identifying the triggering factors are digital scouting or scanning (Warner & Wäger, 2019; Yeow et al., 2018), learning and calibrating (Yeow et al., 2018), and extracting knowledge (Chirumalla, 2021). To support these sensing capabilities organizations must extract knowledge from multiple data by formulating data-enabled mechanisms, relying on data and information visualizations, and collaborations (Chirumalla, 2021). On the other hand, for the digital transformation strategy formulation stage planning a digital scenario (Chirumalla, 2021; North, Aramburu, & Lorenzo, 2020; Warner & Wäger, 2019; Yeow et al., 2018), crafting a digital and/or innovative mindset (North et al., 2020; Warner & Wäger, 2019), and identify resource requirements (Yeow et al., 2018) are important sub-capabilities. Consequently, sensing dynamic capabilities is not only influence the first stage of this process but also the next stage, the Digital transformation strategy formulation stage.

3.2.1 Scanning for triggering factors

Environmental scanning capabilities are a precondition for a digital transformation process, as organizations must identify triggering factors and changes in the internal and external environment of the organization (Liu et al., 2021). A source for these triggering factors are technology developments that affect the entire ecosystem both customers and organizations (Vial, 2019), or changes in international dynamics that can respond only with strategic changes (Westerman et al., 2011). The triggering sources and their significance are determined by organizations' decision-makers who define digital transformation strategy and the implementation plan (Cozzolino et al., 2018). Figure 1 lists all the internal and external factors that affect core business (Hess et al., 2016), infrastructure, opportunities for new collaborations, and working style (Chanias et al., 2019).

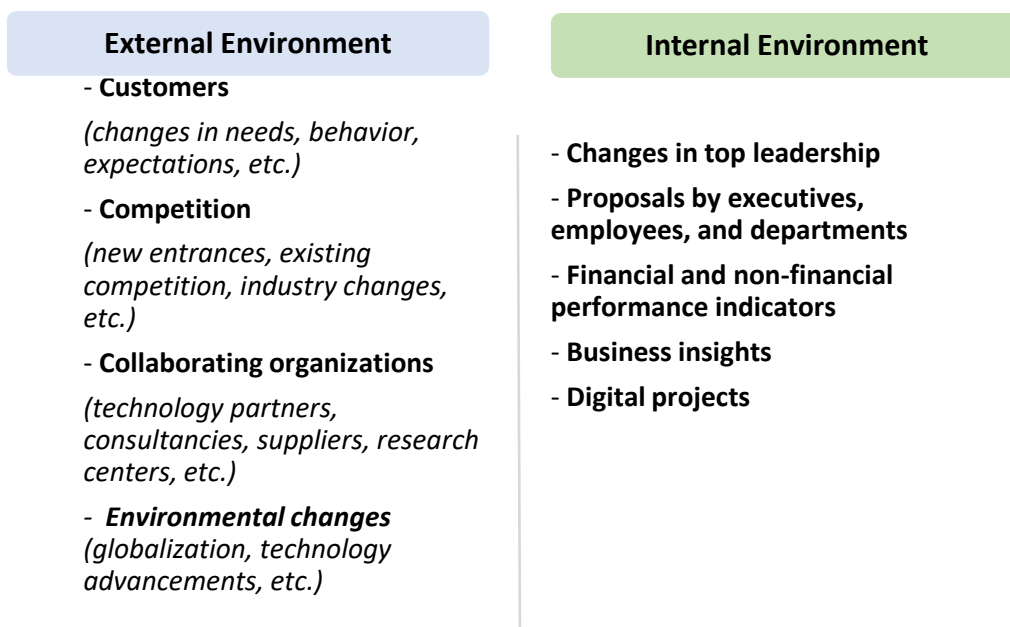


Figure 1: Internal and external triggering factors.

The external environment encompasses industry changes (Acciarini et al., 2021), and destabilizing competitive dynamics that change market balances as new business models are created and new businesses enter the market (Åkesson et al., 2018; Cozzolino et al., 2018; Sia et al., 2016; Steiber et al., 2021; Westerman et al., 2011). Various changes originate from customers as their needs, behaviors, and expectations change over time (Acciarini et al., 2021; Setia et al., 2013; Sia et al., 2016; Westerman et al., 2011). These changes prescribe a new digital transformation strategy (Setia et al., 2013), and suggest new strategic directions (Hanelt et al., 2021; Martinez, 2019; Schallmo et al., 2017, 2019; Sia et al., 2016; Vial, 2019). The DBS case study clearly underlines the influence that external changes had on organizations' strategic orientation. More specifically, the rise of digitally demanding customers, new competitors that change the balances inside the industry, and opportunities from new digital platforms impose the organization to adopt a DTS (Sia et al., 2016). Furthermore, collaborating organizations like technology partners trigger digitalization opportunities by proposing technological advancement (Åkesson et al., 2018; Cozzolino et al., 2018; Hess et al., 2016; Sia et al., 2016), or other collaborating organizations (Steiber & Alänge, 2021) like consultancies, research centers, suppliers, etc. These partnerships or collaborations can disrupt an organization and force them to redesign its strategy or operations or can provide insights to be used for an organization's digital transformation (especially consultancies or research centers).

On the other hand, changes in the internal environment may be proposed by executives (Åkesson et al., 2018; Chanas et al., 2019) or by a change in the top management team (Sia et al., 2016; Tripsas & Gavetti, 2000). The Polaroid case study underlines the effect that leadership (CEO, management team, executives) has on identifying opportunities and how a change in top management steers strategic orientation in new directions (Tripsas & Gavetti, 2000). Also, employees regardless of their hierarchical level might suggest improvements or foresee necessary changes and opportunities that are related to their everyday tasks (Åkesson et al., 2018; Steiber et al., 2021; Westerman et al., 2011). Another parameter of the internal environment is the opportunities that are created by the development process of digital innovation or a new digital initiative (Steiber et al., 2021; Tripsas & Gavetti, 2000). Even if R&D or IT departments are the departments that are expected to identify triggers and changes, departments like Marketing have the required capabilities to predict market changes or changes in customers' needs that would affect organizations. For example, in an examined case study the Head of the Marketing department foresaw future EU regulation changes and by analyzing internal data pinpointed inefficiency problems in distribution channels (Chanas et al., 2019). The above case showcases that non-financial (Chanas et al., 2019) or financial (Hess et al., 2016; Steiber et al., 2021) performance indicators could force organizations towards DT. Another set of triggers is related to organization operations like potential business issues (Hess et al., 2016; Sia et al., 2016) or business insights (Vial, 2019; Westerman et al., 2011).

3.2.2 Formulating a Digital Transformation Strategy

Relying on the insights from the previous stage they can be used as input to formulate multiple digital transformation strategy scenarios and define their objectives (Echterfeld & Gausmeier, 2018; Guenzi & Habel, 2020; Martinez, 2019; Parviainen et al., 2017), the strategic actions that must be followed (Wengler et al., 2021) and choose the activities or processes to be transformed (Correani et al., 2020). Organizations are called to answer questions like why they want to be transformed (Guenzi & Habel, 2020) and what they want to achieve (create or capture value) (Björkdahl, 2020; Guenzi & Habel, 2020; Parviainen et al., 2017). Answering these questions organizations can align digital transformation strategy with overall business strategy including operational and functional strategy (Björkdahl, 2020; Hess et al., 2016; Matt

et al., 2015; Schallmo et al., 2019). Only through this alignment organizations can enhance and complement core business (Björkdahl, 2020).

There are different points of view on digital transformation orientation. Among the first scientific work focusing on digital transformation was a publication on MIT Sloan Review in collaboration with Capgemini; where they identify customer experience, operational processes, and business models as the main patterns of digital transformation (Westerman et al., 2011). These strategic orientations remained relatively invariably in literature. Occasionally, the literature focuses only on customer experience (customer engagement strategy) or operational processes (digitized solutions strategy) (Sebastian et al., 2017) or includes strategies that empower employees (Sia et al., 2016). In more recent research, (Doukidis, Spinellis, & Ebert, 2020) propose an additional strategic orientation (called organizational transformation) that encompasses business strategy integration, human resources development, new organizational structures/functions/alliances, talent acquisition, and exploitation. In researcher’s view, empowering employees and supporting initiatives as proposed in this work should be considered as implementation practices that help organizations easily implement a digital transformation strategy, eliminate bottlenecks, and achieve a successful transformation. For the purposes of this research, we rely on the categorization proposed by (Westerman et al., 2011) (Table 3), hence the digital transformation can be customer-oriented (Hansen & Sia, 2015; Jocevski et al., 2019; Proksch et al., 2021; Sebastian et al., 2017), process-oriented (Corsaro & Maggioni, 2021; Sandberg et al., 2020; Sjödin et al., 2018; Wengler et al., 2021), or value proposition-oriented (Y. Chen et al., 2021; Chester Goduscheit & Faillant, 2018; Lerch & Gotsch, 2015).

Digital transformation strategic orientation	Description and key strategic options	References
Customer-oriented	Omnichannel experience Advance customer experience Seamless sales process	(Hansen & Sia, 2015; Jocevski et al., 2019; Proksch et al., 2021; Sebastian et al., 2017; Westerman et al., 2011)
Process-oriented	Process automatization and optimization Production redesign process Administrative redesign process	(Corsaro & Maggioni, 2021; Sandberg et al., 2020; Sjödin et al., 2018; Wengler et al., 2021; Westerman et al., 2011)
Value-oriented	Servitization Reformulate value proposition	(Y. Chen et al., 2021; Chester Goduscheit & Faillant, 2018; Lerch & Gotsch, 2015; Westerman et al., 2011)

Table 3: Digital transformation strategy formulation options.

We should underline that there is a dependence between the different strategic orientations. When organizations choose a customer-oriented transformation the goal is to create an omnichannel experience by integrating online and physical stores by utilizing multiple platforms and channels (Hansen & Sia, 2015; Sebastian et al., 2017; Westerman et al., 2014), and sophisticating the customer service process (Setia et al., 2013). However, to complete this digital transformation improvements in back-office processes are required to support new services/products or the omnichannel experience (Hanelt et al., 2021; Jocevski et al., 2019; Martinez, 2019; Westerman et al., 2014). Applying a process-oriented DT, organizations automate or optimize the production or administrative processes (Wengler et al., 2021). On administrative process transformations, organizations try to increase workers' productivity, thus they

adopt digital technologies to facilitate everyday tasks (Fitzgerald, Kruschwitz, Bonnet, & Welch, 2014). These improvements affect performance indicators like efficiency, scalability, flexibility, simplify the strategy execution and strategic decisions (Kane, Palmer, Phillips, Kiron, & Buckley, 2017; Westerman et al., 2011), and improve performance overview (Westerman et al., 2011). On the other hand, a production process transformation does not only automate further production line but also connects products' device and service layers (Sandberg et al., 2020). So, a process-oriented transformation is an essential part creates a valuable competitive advantage for organization (Westerman et al., 2014).

A customer- and process-oriented digital transformation strategy are the most common choices for a digital transformation, and it is easier for organizations to make these changes. A value proposition-oriented digital transformation is considered more mature because it affects the boundaries between businesses and industries either by offering new value propositions capable of reconstructing an industry or by creating new digital businesses (Y. Chen et al., 2021; Westerman et al., 2014). Therefore, onboarding all the directly or in-directly affected stakeholders and securing their acceptance is very important (Tronvoll et al., 2020). In this transformation type, organizations tend to offer complementary digital services that enhance product value or are offered as a new product. The introduction of a new product/service from an organization is an opportunity for the organization to enter a new market and a new source of revenue (Rachinger et al., 2019; Westerman et al., 2011). As organizations inject digital innovation elements into their model and combine physical products with digital services they start a servitization process (Chester Goduscheit & Faullant, 2018; Frank et al., 2019; Lerch & Gotsch, 2015). Consequently, these changes are considered triggers for other organizations and force them to begin a DT process because it destabilizes the market.

It is important to number some of the factors that affect this stage. One main factor is the source of disruption because it influences the formulation process and execution speed. When disruption is caused by competitors then organizations have to respond quickly to sustain their competitive position and market share (Kane, Palmer, Philips Nguyen, Kiron, & Buckley, 2015). During formulation, it is important organizations to consider the effect on internal and external stakeholders (Chanas et al., 2019), the transformation scale (Kane et al., 2017), and financial resources restrictions (Matt et al., 2015). The chosen DTS affects the execution speed (F. Li, 2020) which is influenced by organization's year of activity, too (A. B. Crittenden et al., 2019). In addition, digital transformation strategy orientation affects the way organizations invest in digital technologies and the way they choose to source them (A. B. Crittenden et al., 2019), the implementation stage (Correani et al., 2020; Guenzi & Habel, 2020; Martinez, 2019; Matt et al., 2015; Parviainen et al., 2017), and the expected outcomes (Guenzi & Habel, 2020). Organizations should include and/or combine various resources, capabilities, activities, and stakeholders during strategy formulation (Correani et al., 2020). Thus, it is recommended to commit only to one strategy, especially in the early stages (Sebastian et al., 2017). Even organizations have defined their digital transformation strategy they must make adjustments as it is an evolving and building process (Echterfeld & Gausmeier, 2018) with a long-term horizon (Chanas et al., 2019; Dremel et al., 2017; Echterfeld & Gausmeier, 2018; Wengler et al., 2021). But even if it is a long process, scale (North et al., 2020), time horizon (Bharadwaj et al., 2013), and execution speed (F. Li, 2020; North et al., 2020) are considered and affect both the formulation and implementation stage.

3.3 Seizing Capabilities: Assessing digital readiness level and adopting digital technologies

This stage is called a building phase and is affected by the previous stage (sensing capabilities) and helps organizations reconfigure the necessary resources for implementing the formulated strategy (Yeow et al., 2018). Seizing capabilities are related to organizations strategic agility to respond rapidly to unexpected threats and opportunities. Strategic agile organizations create flexible processes to introduce products faster, to change or refocus organization's centricity and invest in expandable digital technologies like cloud computing, social media (Warner & Wäger, 2019). Relying on them organizations formulate a more detailed strategy, select and commit to resources to better manage the tensions by designing an implementation plan (Yeow et al., 2018). As sensing and seizing capabilities are necessary for digital transformation process, being lacking means that organizations might source them through collaboration, partnerships, etc. (Steiber & Alänge, 2021).

Even some form of dynamic capabilities like change management and digitalization strategic planning competencies provide organization with a certain degree of maturity which is a prerequisite, it is important for organizations to evaluate their readiness level to determine which capabilities and resources should be further developed or acquired, and specify capital and time needs (Ghobakhloo & Fathi, 2020). For smaller organizations with limited financial resources, this assessment is essential as an unsuccessful digital transformation is threatening their existence (Ghobakhloo & Fathi, 2020). The assessment process may force organizations to re-formulate the transformation strategy or adjust the execution time and scale plan (North et al., 2020). In addition, it enables the formulation of an implementation plan that exploits organizations integrative capabilities and facilitates the transformation of the business model, governance structure, and orchestrates external stakeholders like asset providers, external input suppliers, internal inputs, and complementary assets (Helfat & Raubitschek, 2018).

In addition, seizing capabilities supports new technology investments which is an essential part of digital transformation process. The previous mapping process of existing technological infrastructure helps organizations improve their operational capability and invest in new digital technologies that will support organizations in effective strategic decision-making, enable routine reorganization, and recognize, assimilate, and commercialize new information (Soluk & Kammerlander, 2021). Evidently, the IT department has a central role in this process, so, an IT department with a definite level of dynamic capabilities like dynamic digital platform capability, dynamic IT management capability, and dynamic IT knowledge management capability is a digital transformation facilitator. These dynamic capabilities will be a solid ground for necessary infrastructure changes, designing and executing changes to business processes that control IT resources and practices, and facilitating firm-wide IT knowledge creation, transfer, and retention (T. Li & Chan, 2019).

Consequently, under the seizing capabilities we have two stages. Firstly, we have the assessment stage where organizations assess existing capabilities and knowledge (Gurbaxani & Dunkle, 2019; Lanzolla et al., 2021; Lerch & Gotsch, 2015; Westerman et al., 2011), existing processes (Aggarwal, Posen, & Workiewicz, 2017; Hess et al., 2016; Mattila et al., 2021; Sebastian et al., 2017), existing technology investments (Eggers & Park, 2018; Sebastian et al., 2017). Secondly, we have the investment stage where organizations are called to invest in new digital technologies to support digital transformation efforts (Soluk & Kammerlander, 2021). This assessment lets decision-makers reformulate, if necessary, the digital transformation strategy, choose new digital technologies, and develop a detailed implementation plan.

3.3.1 Assessing existing resources

Well-established organizations rely on the existing processes and business models that define digital transformation objectives, and on organizational capabilities to eliminate cultural barriers and accelerate the transformation process (Gfrerer et al., 2020). Underlying organizations efforts to align organization's environment and new strategies (Schallmo et al., 2017). As digital transformation causes disruptive changes inside organizations, they are called to assess their (digital) readiness level (Ghobakhloo & Iranmanesh, 2021; Machado et al., 2021; Schallmo et al., 2019), and to formulate accordingly an implementation plan (Hess et al., 2016; Lanzolla et al., 2021; Nasution et al., 2020). Organizational capabilities set the directions for the developed strategy and organization's focus. The Polaroid case study indicates that existing organizational capabilities like know-how capabilities, manufacturing capabilities, and distribution capabilities define organization orientation and even influence CEO and management team decisions (Tripsas & Gavetti, 2000). Consequently, a new strategy does not only require the development of new capabilities but also the adoption of new organizational beliefs (Tripsas & Gavetti, 2000).

Being an incumbent organization implies that existing resources, processes, and experiences have been reached (Cichosz et al., 2020; Hess et al., 2016; Martinelli et al., 2021; Sebastian et al., 2017) and might be utilized for digital transformation purposes. The assessment process prescribes if organizations will pursue new capabilities or strengthen existing ones. This choice defines the implementation plan and which practices are more suitable (Sia et al., 2021). Another parameter that should not be overlooked for incumbent organizations is the well-established operational routines and the required technology investments. These parameters are part of organization experience and may influence implementation plan (Eggers & Park, 2018). Thus, it is important to pay attention to path dependence between processes that are incorporated into routines (Aggarwal et al., 2017). For example, an organization that has invested in a digitized process platform possesses technology and business capabilities means that has access to data insights, supporting transactions, and protocols for back-office operations, so a process digital transformation is achievable. On the other hand, an organization that has advanced its digital service platform infrastructure and related capabilities could focus on customer experience digital transformation as they boost the creation and implementation of digital innovation by investing in technology and business services, cloud-based services, data storage, analytic mechanism and connections with the digitized process platforms (Sebastian et al., 2017).

Another important parameter to be assessed in this stage is employees' digital capabilities. As organizations adopt digital technologies, they develop certain digital capabilities to effectively use the new technology. Digital capabilities enable digital transformation and let employees handle transactions in a digital platform environment, solve effectively and quickly problems due to newly adopted digital technology, transition easily from one technology to another, and integrate the knowledge from business analytics in future decisions (analytics capabilities) (Westerman et al., 2011). The purpose of a digitalization strategy is to align business strategy and IT strategy, equivalent capabilities should be developed (Aggarwal et al., 2017). Therefore, assessing existing know-how, intellectual property assets (Gurbaxani & Dunkle, 2019), and digital capabilities gap (Nasution et al., 2020) is extremely important. Assessing and listing organizations digital capabilities enables implementation as they can exploit alternative implementation options like recruiting employees. However, when entering the organization, recruits have to adapt to existing routines and follow the routinized behavior of their co-workers (Aggarwal et al., 2017). Hence, it is important for organizations to rely on existing routines and capabilities

that can easily be adapted and alternate due to technological changes. In addition, this statement underlines the weight that manager’s strategic choice have (Aggarwal et al., 2017) during the assessment and the implementation stage. Consequently, there is a connection between organization’s existing capabilities and operations, managerial decisions, and performance.

Existing IT infrastructures are an indicator of some level of digital capabilities (Nwankpa et al., 2021; Tajudeen et al., 2021), IT agility (Tajudeen et al., 2021), and some level of centralization, and flexibility (Wiesböck & Hess, 2020). Organizations with a diverse technology portfolio are considered preadapted and agile as they have advanced sensing mechanisms for technological and market trends (Patel & Husairi, 2018). Besides, various complementary technologies and directly sourced insights from customers help organizations respond to disruptive changes by finding solutions to problems and developing new strategies (Roy, Lampert, & Stoyneva, 2018). Utilizing and exploiting existing technological infrastructures underlines the importance of linking existing and new digital technologies and processes is important for successful implementation (Taylor & Helfat, 2009), as new technologies are introduced either to advance existing ones or replace old ones (Cetindamar Kozanoglu & Abedin, 2021). Also, it is an indicator that they acknowledge the need for change and understand the importance of new information, absorb it, and use it for commercial purposes (Cohen & Levinthal, 1990).

Organization absorptive capability is related to knowledge acquisition and assimilation, creating a sustainable competitive advantage for organizations due to agility. In addition, transformation and exploitation dynamic capabilities let organizations exploit the necessary information and innovate or develop products/services that boost their competitive advantage (Zahra & George, 2002). Thus, absorptive capability should be developed both at individual and organizational levels so that organizations accept and acknowledge the value of new information. For organizations with intense R&D activities, the absorptive capability is mirrored in R&D department, making R&D investments more important. As previously mentioned, organizations overcome this obstacle by choosing the appropriate implementation practices such as recruiting new employees, partnering with consulting services, and perhaps making acquisitions could be a solution (Cohen & Levinthal, 1990).

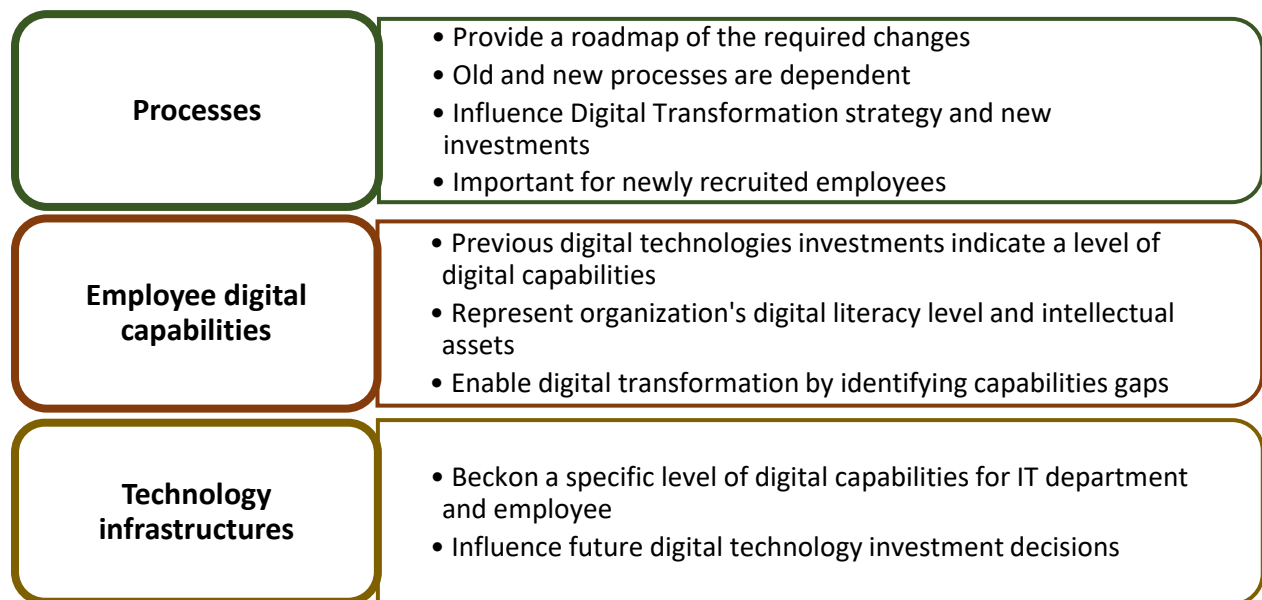


Figure 2: Elements incorporated in the assessing existing resources stage.

3.3.2 Investing in digital technologies

Digital technologies are undoubtedly an essential element of digital transformation (Hess et al., 2016; Matt et al., 2015; Sebastian et al., 2017). Either by being the source of disruption for the organization (Vial, 2019) or by being a dimension of digital transformation (Gurbaxani & Dunkle, 2019). Digital transformation strategy sometimes dictates the way digital technologies are going to be utilized during the implementation (Kane et al., 2017). Furthermore, the new investments influence the implementation plan (Horvath & Szabo, 2019; Martinez, 2019) as different practices must be exploited to facilitate the technology adoption. However, it should be underlined that this stage is heavily influenced by various contextual factors like financial resources (Mathauer & Hofmann, 2019; Rossini et al., 2021), organizational direction (Hess et al., 2016). Therefore, technology investments are dictated by company objectives, organizational procedures, and market offers, thus companies select digital technologies that are relevant to or complement business offerings (Saarikko et al., 2020). Hence, evaluating and comprehending the current state and possible changes is critical as new technologies are introduced to either enhance or replace existing ones (Cetindamar Kozanoglu & Abedin, 2021).

Given the fact that digital transformation is an evolving process, organizations should invest in digital technologies that are flexible and adaptable to customer demands and suit their preferences (Sawy et al., 2016), and improve organizations operation and employee productivity (Martinez, 2019). Furthermore, the new digital technology should fit organization's approach toward digital technologies, and be aligned with organizational culture, organization processes, existing behaviors, and be in accordance with IT department capabilities (Hess et al., 2016). Another parameter that is important to be considered when technology is selected is the maturity stage of the technology, based on Technology Life Cycle (TLC) because it affects the way incumbent organizations are going to source them. For example, in the early stages of TLC (era of ferment) is preferred internal sourcing over external sourcing as it is easier to transition to an outsourcing solution during the era of incremental change (a later stage of TLC). However, a condition for an organization to be able to internal source technology is to possess sufficient internal skills and knowledge from past technology applications as internal resources, capabilities, and knowledge influencing organization's ambidexterity (Patel & Husairi, 2018).

3.4 Transforming capabilities: Implementation initiatives

Reconfiguring or (digital) transforming capabilities help organizations navigate and manage digital transformation process. They are an enabler to manage the rising tensions between the existing and new business models (Warner & Wäger, 2019). These tensions can be restricted by utilizing bottom-up and evolutionary approaches (Chirumalla, 2021) or plan implementation initiatives and strategic configurations (Yeow et al., 2018). This implies that top management needs to be committed to strengthening reconfiguration capabilities to transform assets and resources (Steiber & Alänge, 2021). Transformation capability is enhanced by a risk-taking culture (Sousa-Zomer et al., 2020), partnerships, technology-based acquisitions, and digital investments (Chirumalla, 2021; Sousa-Zomer et al., 2020). In any case, designing supporting managerial frameworks is necessary to guide strategies and manage innovations (Steiber & Alänge, 2021). Making the assessment process of existing processes, structures, and capabilities a necessary stage to design a detailed implementation plan to simplify the transition (Chirumalla, 2021).

Digital transformation is an evolving and long-term process, forcing organizations to develop various dynamic capabilities to secure successful implementation. Furthermore, the implementation plan

influences the level of reconfiguration capabilities that are required to manage the process (Steiber & Alänge, 2021). Hence, continuous renewal is a necessary capability in this stage encompassing transformational activities that enhance local autonomy, engagement in strategic partnerships, quick learning by employees, and modifying brand management (Soluk & Kammerlander, 2021). Transforming sub-capabilities propose different initiatives that could help organizations implement a successful digital transformation and navigate through innovation ecosystems (Warner & Wäger, 2019). At the same time transforming sub-capabilities improves management visions, and helps them adopt a giraffe view (Chirumalla, 2021). Simultaneously, these initiatives boost organizations transformative capabilities (Chirumalla, 2021; Sousa-Zomer et al., 2020). Implementation is supported through changes in governance structure to enhance flexibility and assist management purposes (Warner & Wäger, 2019). Also, changes in organizational processes may be necessary to integrate processes and IT know-how (Chirumalla, 2021) or to create nimble, agile, and multi-divisional structures (Sousa-Zomer et al., 2020).

Employees are a key parameter of an implementation plan. Organizations utilize transformation capabilities such as recruiting new employees (Warner & Wäger, 2019), training existing employees (Warner & Wäger, 2019), or formulating strategic training mechanisms (Chirumalla, 2021) to improve digital maturity or exploit digital-savvy employees capabilities to boost their transformation capability (Sousa-Zomer et al., 2020). Employees with technical skills and a digital mindset become digital transformation advocates and support the change (Sousa-Zomer et al., 2020). Thus, organizations and CEOs should cultivate human and organizational capital through training programs on current technologies so they will be capable of exploiting this knowledge to acquire new skills for new R&D projects (Bendig, Strese, Flatten, da Costa, & Brettel, 2018). Except from the training initiatives, promoting an inclusive culture and making employees feel like a member of an extended family are very important in family-owned organizations in agribusiness sector (Cannas, 2021).

Even though various parameters are listed in transforming sub-capabilities the literature proposes that a continuous monitoring process is required and sub-capabilities like leveraging, creating, accessing, and releasing are necessary (Yeow et al., 2018). Monitoring processes are necessary when digital transformation efforts focus on innovation and strategies that are close to the existing business core. Many obstacles and resistance factors arise from different stakeholders, including their view in decision-making process establishing a monitoring process is a simple solution to eliminate this obstacle (Steiber & Alänge, 2021). However, digital transformation obstacles can be overcome by financial opportunities (cash opportunities) as they are willing to reconfigure their decision-making process and develop their dynamic capabilities (Soluk & Kammerlander, 2021).

On one hand, this stage connects indirectly the triggers with the digital transformation outcomes, and on the other hand, it is connected with the digital readiness assessment stage as an alignment with existing processes is necessary (Hanelt et al., 2021). The literature review identified 6 key implementation practices that help organizations overcome barriers which are presented below (Table 4).

Implementation initiatives	Proposed options	Description
Governance structures	Head of a Department	IT department A dedicated business unit A new department

Implementation initiatives	Proposed options	Description
	Cross-functional teams	Including executives and employees from different departments
	C-level executives	Chief Digital Officer Chief Executive Officer
Restructuring organizational processes	Introducing new entities	Create new or merge existing departments Add new functions to existing departments
	Exploiting existing entities	Restructure functions and processes (involve stakeholders, department collaboration) Cross-functional units
Enhancing organization's skillset	Training programs	Eliminate employee resistance Retain highly skilled employees Knowledge sharing between employees
	Recruiting programs	Employees with specific skills Infuse a new way of thinking and innovation
Establishing collaborations	Collaboration or partnership agreements Acquisitions	Digital maturity level dictates the type of collaboration Financial resources Inter-organizational relationship diversity Creation of an ecosystem Facilitate knowledge exchange
Communicating the change	Communication practices Offering benefits	Open and direct messages Tailored-made messages Financial and non-financial benefits
Creating monitoring processes	Adoption of various assessment techniques	KPIs Assessment methodologies Regular meetings Analyze feedback data Cross-functional teams

Table 4: Overview of the implementation initiatives and the proposed options.

3.4.1 Governance structures

Digital disruptions require solid governance structures and qualified managers to interact, allocate resources in the appropriate directions, and monitor and shape organizational culture (V. L. Crittenden & Crittenden, 2008). Appointing a digital transformation advocate inside the organization is mandatory not only to make the strategic and managerial decisions like choosing the appropriate digital technology but also to cultivate a digital transformation culture, communicate digital transformation to employees and executives, and coordinate, and monitor all efforts (Singh & Hess, 2017). Hence, organizations are called to create governance structures (Chanias et al., 2019; Steiber et al., 2021; Vial, 2019) that will provide strong and stable leadership (Cichosz et al., 2020; Steiber et al., 2021). The governance structures could be prescribed by the digital transformation strategy as it showcases the departments and/or the processes that will be mostly affected during the implementation (Hess et al., 2016).

The purpose of the governance structures is to formulate (Singh & Hess, 2017) and lead digital transformation (Kane et al., 2017), spread innovation efforts (Kane et al., 2017), and set innovation as a high priority (Singh & Hess, 2017). These structures could be the Head of a department either it is the IT

department (Matt et al., 2015; Wiesböck & Hess, 2020), or the mostly affected department (Hess et al., 2016) or the head of a newly created department focusing on digital efforts (Chanias et al., 2019; Kaiser & Stummer, 2020; Wiesböck & Hess, 2020). Many organizations emphasize the importance of digital transformation and the new orientation and choose to create a new independent department (Chanias et al., 2019). This type of structural change like the formulation of a new department has various roles. Firstly, provides a smooth transition between the old and new business by being an intermediate between existing and required capabilities (Svahn, Mathiassen, & Lindgren, 2017; Yeow et al., 2018), secondly improves dynamic capabilities as it helps them to sense new opportunities, seize them and transform them (Yeow et al., 2018), and finally it considers a landmark of the new strategic direction (Tripsas & Gavetti, 2000). Nevertheless, a precondition that organizations must consider before establishing a new department or unit is the dependence level that this unit will have. For these units to be successful and impactful, it is proposed to be independent of the core business and free to develop new strategies. Only this way they will accelerate organizations sensing, seizing, and transforming capabilities (Steiber & Alänge, 2021)

Another governance option is the creation of a cross-functional team (Björkdahl, 2020; Butschan et al., 2019; Chanias et al., 2019; Guinan et al., 2019; Ruiz-Alba et al., 2020) with executives with diverse backgrounds, and from different departments to secure management team's support (Svahn et al., 2017). However, the main drawback of cross-functional teams is member's diversity that might put in danger transformation efforts (Chanias et al., 2019). The final option is digital transformation to be governed by C-level executives (Dremel et al., 2017; Firk et al., 2021; Matt et al., 2015; Singh & Hess, 2017; Singh et al., 2020). When DT is managed by a C-level executive, either a new C-level position is created the Chief Digital Officer (CDO) position (Dremel et al., 2017; Firk et al., 2021; Matt et al., 2015; Singh & Hess, 2017; Singh et al., 2020), or the CEO becomes the head of DT activities (Matt et al., 2015). Regardless of the management structure management team's support and not only CEO's support are required. Top management support strengthens the digital transformation promoting communication initiatives that target employees at every hierarchical level (Gerth & Peppard, 2016; Kohli & Johnson, 2011; Svahn et al., 2017).

3.4.2 Restructuring organizational processes and organizational chart

Changes in the internal processes are necessary to facilitate digital transformation changes or to complement existing processes. A precondition is a flexible and agile environment (Mugge et al., 2020; Shahi & Sinha, 2021) that supports organizations needs to be business- or customer-centric as well as agile and innovation-oriented (Chanias et al., 2019). To achieve this goal a series of changes must be planned and executed as a supporting mechanism to implement digital transformation (Correani et al., 2020). These changes promote a supportive organizational culture (Cichosz et al., 2020), and a department information-sharing culture that facilitates collaboration and engagement with key stakeholders (Cichosz et al., 2020; Shahi & Sinha, 2021). To achieve this organizations could create new or exploit existing business units (Latilla et al., 2020), and establish new processes with new internal functions (Guenzi & Habel, 2020; Kääriäinen et al., 2020; Latilla et al., 2020; Vial, 2019).

The formulated transformation strategy dictates which process changes should be implemented to enhance digital transformation (Menz et al., 2021; Raddats & Burton, 2011; Veile et al., 2020), which department should collaborate (Dremel et al., 2017; Kaiser & Stummer, 2020; Latilla et al., 2020; Özkan Özen & Kazançoğlu, 2021), and which key stakeholders to be involved (Steiber et al., 2021). Changes in organizational processes will not only enable an easy change in organizational culture but also will help

overcome workforce challenges (Özkan Özen & Kazançoğlu, 2021) and traditional digital divides (Dremel et al., 2017). As digital transformation evolves, organizations become digitally mature and develop new products or services that combine knowledge from different business units. In this case, structural changes like cross-functional teams are mandatory and capable of promoting transformation, digital innovation inside the organization (Kaiser & Stummer, 2020; Kane et al., 2017), and simplifying data sharing between various departments (Kaiser & Stummer, 2020).

This point, it should be underlined the importance of existing processes because they are not only used for digital transformation strategy formulation but also for implementation purposes (Sebastian et al., 2017). The linkages between existing and new processes eliminate the failure of a technological change (Taylor & Helfat, 2009) and create a feeling of continuity and alignment inside the organization (Hess et al., 2016). Furthermore, complementary departments must be added, and existing ones must be upgraded or merged to successfully achieve a technological transition. However, between the new supporting departments and new core technology, organizations need to establish some linking activities either between new and old departments' functions (intra-complementary linkages) or between the new technology and the required departments for the new technology (core-complementary linkages) or between different departments and teams of different departments (inter-complementary linkages). In some cases, organization needs to create linkages with external organizations as it is unlikely organizations to possess all the necessary recourses and capabilities (Taylor & Helfat, 2009).

3.4.3 Enhancing organization's skillset

Management teams introduce new digital technologies to the organization, but employees regardless of their hierarchy have the power to adopt or not the new investments (Correani et al., 2020). Initiatives like process change enable implementation but organizations should also consider planning initiatives that will motivate employee participation like learning programs, formulating supporting systems and policies to assist implementation (Crittenden & Crittenden, 2008). For organizations to successfully implement a digital transformation strategy employee acceptance is mandatory and applies to any strategic orientation. Consequently, the research framework classifies employee development and participation as an initiative and not as a strategic orientation as proposed by (Doukidis et al., 2020) and (Gurbaxani & Dunkle, 2019).

For organizations to design an integrated initiative that will enhance employees' or organizations digital capabilities is essential to have a clear picture of organization's digital literacy level and their role in adoption process (Cetindamar Kozanoglu & Abedin, 2021). However, identifying the missing skills and deciding how to react is one of the key challenges management teams face (Westerman et al., 2011). Therefore, the assessing stage is considered crucial for the development of an implementation plan that will tackle the different challenges that organizations may face during digital transformation. Employee resistance forces organizations to search for solutions to advance digital capabilities, support the development of additional and find alternative human resources solutions to respond to galloping digital technologies (Bonnet & Westerman, 2020). We have identified two supporting mechanisms; training programs (A. B. Crittenden et al., 2019; Mugge et al., 2020; Sia et al., 2016; Westerman et al., 2011) and recruiting programs (Shahi & Sinha, 2021; Tavoletti et al., 2021; Westerman et al., 2011). Both of these practices advance employees' creativity (Tekic & Koroteev, 2019), entrepreneurial characteristics (Mugge et al., 2020; Tekic & Koroteev, 2019), and cultivate an innovative and adaptive culture (Shahi & Sinha, 2021).

Regardless of organizations choice it is important to list the missing digital capabilities both at employee and organizational level and draft programs that will fill these gaps. The training programs are a practice that organizations apply to eliminate employee resistance (Butschan et al., 2019; A. B. Crittenden et al., 2019; Hess et al., 2016; Khin & Ho, 2020; Mugge et al., 2020; Özkan Özen & Kazançoğlu, 2021; Sia et al., 2016). They advance existing skills and are a means to maintain highly skilled employees as most of the employees want to work for organizations that follow a digital approach (Kane et al., 2015). Furthermore, they enhance knowledge sharing between employees (Smith & Beretta, 2021). Thus, they must not be limited to specific hierarchical levels (Gfrerer et al., 2020). Even though they are a time-consuming activity they facilitate organization's competitive advantage (Hess et al., 2016; Tronvoll et al., 2020). Organizations can develop training programs in-house or outsource them to educational institutions. The second option is preferable when organizations do not want to spend resources on developing in-house training programs (Smith & Beretta, 2021).

Another option is to recruit employees with specific digital capabilities (Shahi & Sinha, 2021; Tavoletti et al., 2021; Westerman et al., 2011). To recruit suitable talents a list of missing digital capabilities is necessary before investing in new employees to ensure that the new employees will have sufficient digital skills (Özkan Özen & Kazançoğlu, 2021). However, as the new employees represent organizations "ideal" employee and the new mindset that wants to be spread inside the organization, they must have some level of freedom and flexibility to disseminate their mindset. Hence, digital transformation executives must provide a flexible and open environment in which they can share and propose new ways of thinking and introduce new technical approaches to stimulate innovation by utilizing current technology, and get acquainted with established practices (Jacobsson & Linderöth, 2021). As the recruiting process may be challenging and expensive, a supplementary initiative is for organizations to collaborate with highly skilled organizations (Tronvoll et al., 2020).

3.4.4 Establishing collaborations

Existing capabilities and resources might not be sufficient for implementing a new strategy, forcing organizations to establish new collaborations. Different types of inter-organizational relationships describe relationships with different levels of flexibility, interdependence, and control (de Leeuw, Gilsing, & Duysters, 2019). A diverse partnership portfolio lets organizations quickly respond to disruptions and achieve higher adaptability (de Leeuw et al., 2019), reflects a level of digital maturity (Beliaeva et al., 2020). In general, collaborations, partnerships and acquisitions are a common way for organizations to get insights into an unfamiliar industry or technology during digital transformation. These options help organizations to exchange and gain knowledge even if this knowledge is coming from organizations in other industries (Chanas et al., 2019; A. B. Crittenden et al., 2019; Doukidis et al., 2020; Mugge et al., 2020; Svahn et al., 2017).

However, it is important for the partnering organizations to define the degree of integration between partners and the relationship type between partners (e.g. ownership, contract, and trust) (He et al., 2020). This way, from the beginning an effective governance structure (He et al., 2020), a commonly accepted organizational culture and a predefined partnering procedure (Aghimien et al., 2020) need to be established. Organizations with sufficient financial resources can overcome problems arising from partnerships or collaborations by acquiring other organizations or choosing to collaborate only with established organizations with previous experience (Cozzolino et al., 2018; Gurbaxani & Dunkle, 2019). In any case, before proceeding to a collaboration or an acquisition organizations have to assess different parameters (Seran & Bez, 2020; Steiber & Alänge, 2021). For example, when organizations choose to

collaborate with a startup they evaluate startups financial stability, the stream of innovation, the resource availability, etc. (Steiber & Alänge, 2021).

Except for established organizations, or startups, organizations may collaborate with business incubators and accelerators, national and regional agencies, venture associations, etc. that provide access to valuable complementary knowledge, resources, and skills possessed by other members (Giudici, Reinmoeller, & Ravasi, 2017). Organizations being part of an ecosystem increase their exposure to valuable resources and new opportunities that could enable digital transformation (Mann et al., 2022). All the above-mentioned ways support organizations efforts to successfully implement a digital transformation strategy by overcoming resource restrictions. In addition, they help organizations implement initiatives that are necessary for digital transformation (Correani et al., 2020) and confine the risk of failure (Hess et al., 2016). Outsourcing is a means for organizations to have access, and acquire tangible or intangible resources, adopt an externally focused business plan (Mugge et al., 2020), be open to the external environment, and empower stakeholder's participation (Machado et al., 2021).

3.4.5 Communicating and promoting the change

Except for the advancements in digital skills and capabilities, incumbent organizations introduce practices and initiatives to further promote digital transformation and employee participation. Communication initiatives are crucial when digital transformation affects core business and operations. In this case, they must introduce and explain to employees the transformation strategy to secure their acceptance and participation (Tronvoll et al., 2020). Organizations rely on communication practices like internal storytelling (Steiber et al., 2021), launching promotional campaigns which can include emails, intranet posts, manuals, posters, submission ideas (Chanias et al., 2019), suggestion boxes (Vereycken et al., 2021). Letting employees participate in management meeting (Vereycken et al., 2021) or organize workshops about digital innovation and digital technologies (Chanias et al., 2019; Svahn et al., 2017) can be considered a communication practice that enables employee participation. Securing employee participation means that middle managers are convinced and are willing to participate and influence employees by supporting and promoting digital transformation efforts. Economic, structural, social, and cognitive motives are some tools that top management could use to encourage middle-manager participation. Middle manager participation is necessary as it influences the organizational structure, social context, and cognition (Taylor & Helfat, 2009).

In some cases, the above communication practices may not be enough, thus, many researchers suggest offering personal advancements, awards and recognitions, and financial incentives (Fitzgerald et al., 2014; Taylor & Helfat, 2009). Combining various practices and providing sufficient benefits facilitates communication efforts and promotes a culture of digital prioritization (A. B. Crittenden et al., 2019). Yet, communication efforts must be complemented by a culture that supports flexibility, openness, willingness to learn, and entrepreneurial mindset (Veile et al., 2020). Establishing open and direct communication regardless of the hierarchical level and with key stakeholders (Machado et al., 2021) is necessary to inform stakeholders about the purpose of digital transformation (Kane et al., 2015). This type of communication has a twofold role; firstly, it enables implementation, and secondly, provides valuable insights to top management as all employees are involved and can pitch their ideas or suggestions (Yi et al., 2017).

Finally, selecting the appropriate department that will disseminate the message will affect employees' behavior toward change (Haumer et al., 2021; Ruiz-Alba et al., 2020). The message should be direct, informative, and elaborating (Ruiz-Alba et al., 2020), and in line with audience characteristics (Haumer et

al., 2021). A clearly defined message should be communicated through multiple digital channels (Chanas et al., 2019; Mugge et al., 2020; Sia et al., 2016), hence, organizations invest in communication and connection digital technologies that improve connection and communication between employees and between employees and executives (Westerman et al., 2011). Another way to improve communication between employees is through cross-functional teams as they spread and encourage collaboration (Kane et al., 2017). However, management team should be conscious of a negative attitudes that may spread between employees and intervene when they think is necessary (Bagrationi & Thurner, 2020).

3.4.6 Creating monitoring structures

Even though this initiative has not been proposed by many researchers, it is important to evaluate the digital transformation progress and is one of CDO's responsibilities (Singh & Hess, 2017). Digital transformation strategy encompasses different projects that are aligned to fulfill the chosen strategy; a regular monitoring mechanism is required to assess the progress of the individual projects and initiatives (Doukidis et al., 2020). Hence, they must be objective, reliable and represent a comprehensive overview. These characteristics ensure that the desired deliverables will be produced (Jenkin & Chan, 2010). During the implementation organizations collect a handful of implementation data that can be exploited and used for monitoring purposes (Guenzi & Habel, 2020; Martinez, 2019). Monitoring mechanisms not only evaluate implementation stage but also provide insights for necessary digital transformation strategy adaptations (Matt et al., 2015).

Monitoring specific KPIs is a formal evaluation process organizations use (Guenzi & Habel, 2020; Machado et al., 2021; Zoltners et al., 2021), hence they must be objective and reliable to provide a holistic overview (Jenkin & Chan, 2010). However, monitoring digital transformation KPIs is a struggle because organizations can not immediately identify which KPIs are more appropriate because they do not have made the necessary cultural changes or they lack the appropriate management skills (Fitzgerald et al., 2014). To overcome this kind of problems there are other practices like regular meetings across functional boundaries or holding workshops involving multiple organizational levels (Chanas et al., 2019), or assessing the feedback data (Zoltners et al., 2021), or adopting assessing methodologies like continual pilots (Steiber et al., 2021) or multiple testing (Parviainen et al., 2017; Zoltners et al., 2021) or proof of concept (Parviainen et al., 2017).

3.5 Measuring digital transformation outcomes

Strategy, implementation, and performance are three independent factors; however, how organizations implement the chosen strategy affects the performance (V. L. Crittenden & Crittenden, 2008; Jenkin & Chan, 2010; Sjödin et al., 2018; Tsao et al., 2021; Yoshikuni, 2021). A well-designed strategy with bad implementation leads to negative results. On the other hand, a poor strategy supported by a detailed implementation plan could improve organizations' KPIs results (V. L. Crittenden & Crittenden, 2008). Except for the digital transformation strategy (Manita et al., 2020; Naglič et al., 2020; Sjödin et al., 2018), factors like company orientation (Naglič et al., 2020), and company scope (Manita et al., 2020) may influence the expected digitalization outcomes and organizational performance. All the above-mentioned factors influence the performance outcomes of digital transformation, so organizations should pay equal attention to strategy development and implementation initiatives.

Organizations through digital transformation are anticipating financial outcomes like a new revenue stream and non-financial outcomes like remaining competitive and fulfilling customer needs (Westerman

et al., 2012). The financial outcomes are focusing mainly on financial performance (Hanelt et al., 2021; Vial, 2019), firm growth (Vial, 2019), market share (Wang et al., 2020) and new forms of value (Hanelt et al., 2021). Some researchers mentioned specific financial KPIs that reflect digital transformation financial outcomes such as Return on Investments (ROI) (Koch et al., 2021; Wang et al., 2020), Return on Assets (ROA) (Kohtamaki et al., 2020; Wang et al., 2020), Return on Sales (ROS), and Return on Equity (ROE) (Wang et al., 2020). However, financial outcomes are visible only to digital mature organizations (Björkdahl, 2020; Koch et al., 2021; Kohtamaki et al., 2020; Westerman et al., 2012) or have a negative sign in the early stages of digital transformation (Westerman et al., 2012). In general, the financial outcomes are focused on improvements in organizational performance (Martín-Peña et al., 2020; Vial, 2019; Wang et al., 2020).

Thus, in the early stages organizations focus on the non-financial outcomes (Björkdahl, 2020; Koch et al., 2021; Kohtamaki et al., 2020) and closely monitor KPIs that focus on sales or productivity (Matt et al., 2015), business improvements (Bravi & Murmura, 2021; Hanelt et al., 2021; Vial, 2019; Wang et al., 2020), management (Hanelt et al., 2021), customers (Hanelt et al., 2021; Wang et al., 2020), and product (Bravi & Murmura, 2021; Hanelt et al., 2021; Wang et al., 2020). Through digital transformation organizations wish to become innovative (Matt et al., 2015; Vial, 2019) either by creating new value forms, or utilizing novel interacting approaches to interact with customers (Matt et al., 2015), and enhance operational efficiency, organizational performance, and industry improvements (Vial, 2019). Non-financial outcomes are related to organization's competitive position as digital transformation enhances organizations competitive advantage (Hanelt et al., 2021; Vial, 2019), and reputation (Vial, 2019).

3.6 Contextual factors

The literature review indicated that there are 5 broad categories of factors that may affect a digital transformation process. These 5 categories are related to employees (employee participation and resistance), middle manager, time (execution speed, time horizon, scale), organization (organization identity, orientation, industry, and business model), and manager (functional background, cognition), (Table 5). However, the last two categories are correlated and, in many cases, as research shows they are considered identical or are highly interdependent because top management's perception and point of view are mirrored in organizational beliefs, identity, and orientation. In addition, organization response to technological change and exploitation capabilities is the combined result of managerial cognition and organizational orientation (Eggers & Kaplan, 2009).

For the purposes of this dissertation, it will be considered that financial resources have no influence in the digital transformation process. This will be secured by selecting organizations that have sufficient financial resources to implement a digital transformation process. This selection criterion is quite important because limited financial resources influence technology adoption activities and initiatives to invest in new resources to facilitate adaptation (Eggers & Park, 2018; Hess et al., 2016), strategy formulation and implementation (Björkdahl, 2020; Matt et al., 2015; Sebastian et al., 2017) However, the influence of this factor is not only visible in the investment and implementation stage. It affects also activities related to sensing and seizing (Steiber & Alänge, 2021) meaning that can set in danger the entire transformation process (Matt et al., 2015). In some cases, organization size incorporates financial resources (Eggers & Park, 2018). Small-sized organizations or organizations with limited financial resources pay more attention to assessment processes and future steps (Ghobakhloo & Iranmanesh, 2021) because it is related to organization's survival. This parameter influences implementation and the support they will need (Ekman

et al., 2020; Kääriäinen et al., 2020), the way they will source digital technology and implement digital technologies (Horvath & Szabo, 2019; Mathauer & Hofmann, 2019), and the way they choose to collaborate (Arias-Pérez et al., 2021; Buer et al., 2021; Ghobakhloo & Fathi, 2020; Ghobakhloo & Iranmanesh, 2021). We believe that examining the influence of financial resources or the influence of organization size on the digital transformation process could be a future research avenue as it holistically affects this process and strains organizations implementation options.

Factors	Digital Transformation Research Framework				
	Triggering factors	Strategy formulation	Assessment	Technology investments	Implementation
Employees					
Participation or resistance					x
Organization					
Organization identity	x	x	x	x	x
Organization orientation				x	x
Organization size	x	x	x	x	x
Specific characteristics		x	x	x	
Management					
Cognition	x	x		x	x
Commitment	x	x		x	x
Middle management					
Participation					x
Time parameters					
Scale		x			
Time horizon		x			
Execution speed		x			x

Table 5: Overview of the factors influencing the 5 main stages of digital transformation research framework.

3.6.1 Organization identity, orientation, specific characteristics, and size

Organization identity is shaped by top management, and employees' existing cognition and beliefs (Eggers & Park, 2018), and organizations' routines, procedures, capabilities, and general beliefs (Tripsas, 2009). These elements make organization identity a construct that directly influence the executives and employee's cognition and beliefs by narrowing or expanding their sensing capabilities to internal and external changes (Tripsas, 2009). Hence, it affects organization's ability to identify triggers (Tripsas, 2009), and their response and adaptation process to disruptive innovations (Kammerlander et al., 2018). This factor may be one of the reasons that many organizations fail to digitally transform (Kammerlander et al., 2018). In more detail, the organization identity is not only limited to the triggering stage (Kammerlander et al., 2018; Tripsas, 2009) and formulation stage (Ano & Bent, 2021). On the contrary, it is detected in the entire transformation process and especially in implementation process (Ano & Bent, 2021; Prügl & Spitzley, 2021; Tripsas, 2009) by defining the way organizations communicate, and collaborate with other organizations (Prügl & Spitzley, 2021), and build and handle the relationships with employees (Ano & Bent, 2021). Finally, organization identity should be a considerable parameter in the investment stage as investments hinder implementation initiatives. When a new technology is not aligned with organization

identity, this misalignment forces managers to exploit implementation opportunities to transform organization identity by acquiring the new necessary competencies, or technological capabilities and creating a roadmap to adjust technology to organization identity and transform strategic beliefs (Tripsas, 2009; Tripsas & Gavetti, 2000).

Organization identity is mirrored in organization orientation. Organizations with a digital orientation embrace easily digital technologies and digital solutions that disrupt their business model (Khin & Ho, 2020), and focus on new technological changes and general changes (Eggers & Kaplan, 2009). Organizations with this kind of orientation have developed advanced sensing and seizing mechanisms. Considering that digital transformation strategy affects comprehensively an organization, organizations should not only focus on their current orientation but also consider future scope and orientation (Hess et al., 2016). In addition, an environment that is oriented around reasonable risk-taking (Parihar & Sinha, 2021), psychological safety, and tolerance forces employees to experiment, share, and challenge the rules (Ngereja & Hussein, 2021); elements that enable the implementation phase. Even though organization orientation is important to trigger an inside disruption we should keep in mind that new organization beliefs are further developed only when they are aligned with existing organizational beliefs. Previous organizational beliefs are an obstacle to the necessary technological change like in the Polaroid case (Tripsas & Gavetti, 2000), and are a bottleneck during technological change or digital transformation process.

Finally, industry directions constrain digital transformation efforts (Cichosz et al., 2020). The maturity level of industry's digital technologies and business model's digital readiness level determines digitalization strategy; so a transformation strategy could be disruptive and be led by a business model or technology, or it could be more conservative (Tekic & Koroteev, 2019). Organizations in the same industry have similar competencies. Thus, organizations follow similar implementation initiatives to configure the required competencies (Liu, Yang, & Liu, 2021). Furthermore, business model elements hinder the development of dynamic capabilities that accelerate the implementation process (Cannas, 2021). The assessment stage is influenced by the business model that directly affects the implementation stage (Shao, 2010), and digital transformation strategy formulation stage (Manita et al., 2020). In general, business model sets restrictions for organizations as it defines organization's existing resources and access to key resources and assets (Ghobakhloo & Fathi, 2020; Lerch & Gotsch, 2015; Tavoletti et al., 2021). Some business models (especially agribusinesses) are highly influenced by environmental uniqueness, cultural and social territorial sources to define their corporate identity, and competitive advantages. Therefore, it is necessary to combine managerial and organizational dynamic capabilities with territorial identity to quickly respond to market and technology changes (Cannas, 2021).

The final organizational contextual factor that will be examined in this dissertation is organization size. Organization size, namely the number of employees holistically influences the digital transformation process. Starting with the triggering stage (Ekman et al., 2020; Kääriäinen et al., 2020), the strategy formulation stage (Buer et al., 2021; Ekman et al., 2020; Kretschmer & Khashabi, 2020; Schmitt et al., 2019). Smaller organizations may not have the ability to sense changes or formulate a transformation strategy (Kääriäinen et al., 2020) but they choose to formulate strategies that will have greater impact (Kretschmer & Khashabi, 2020). On the other hand, bigger organizations have complex processes to formulate and implement a digital transformation strategy as the strategic decisions are taken from the headquarters and the implementation is assigned to branches (Ekman et al., 2020). As mentioned before digital transformation is a capital-intensive process setting the assessment stage extremely important for

organizations with limited resources (Buer et al., 2021; Ghobakhloo & Iranmanesh, 2021; Kretschmer & Khashabi, 2020). Finally, technology investments (Horvath & Szabo, 2019; Mathauer & Hofmann, 2019) and implementation plan are executed according to organization size. Bigger organizations have more resources to develop in house a technology (Mathauer & Hofmann, 2019) or select initiatives that will support better implementation (Buer et al., 2021; Ghobakhloo & Fathi, 2020; Ghobakhloo & Iranmanesh, 2021).

3.6.2 Management cognition and commitment

Almost in every section of the literature review, it is mentioned that management support is essential for every stage of digital transformation process (Kane et al., 2015; Matt et al., 2015; Ruel et al., 2021; Sebastian et al., 2017; Sia et al., 2016). Therefore, management commitment is an enabler for creating the strategic framework of digital transformation and setting the expectations for the IT department as they support the implementation (Ko et al., 2021). However, top managers understanding of digital transformation value is a precondition (Björkdahl, 2020; Hanelt et al., 2021; Ko et al., 2021; Sommer, 2019). Top management support is an important parameter that should be cultivated from the beginning of the transformation process (Ruel et al., 2021; Sommer, 2019). Equally important is the support of local or middle managers, especially when a digital technology adoption takes place (Bäckström & Lindberg, 2019) because their resistance directly affects organizational changes and technology adoption process (Horvath & Szabo, 2019), and IT department's response (Pachidi et al., 2020). As management commitment and support is crucial for a successful digital transformation, executives replacements are an option when high level executives are unwilling to participate (Horvath & Szabo, 2019).

Parameters that may affect top management team support are functional (Eggers & Park, 2018; Singh et al., 2020) and cognitive background (Eggers & Park, 2018; Tripsas & Gavetti, 2000), and demographics (Eggers & Park, 2018). The literature shows that CEOs with digital technologies functional background are opting for a CDO position (Singh et al., 2020). Cognitive background is correlated with organization capabilities to develop or upgrade a technology or sense a disruption. Managerial cognition influences top management decisions during technological change, and is correlated with organizational beliefs (Tripsas & Gavetti, 2000). In addition, managerial cognition affects organizations entering strategies, and responds to market uncertainties (Eggers & Park, 2018). Specifically, cognitive capabilities have a twofold impact, they are the reason for differences in performance indicators among organizations and act as a mediator between organizational context and strategic change (Helfat & Peteraf, 2015).

Managers and top management cognitive capabilities and personal beliefs about existing and new technologies may hinder organizations evolvement and transition to a new technology (Eggers & Kaplan, 2009). The importance of cognitive capabilities and the human factor is underlined in the Polaroid case study; where the beliefs remain static from 1981-1996 because every CEO in this period was a former employee or part of the top management team. However, in 1996, the CEO was appointed an executive who was not part of the organization and had no relationship with the organization. After this time mark, a change in strategic beliefs is noticed that pinpoints a new strategic beginning for the organization. Another conclusion from this case study concerns the connection between managerial cognition and organizational beliefs (Tripsas & Gavetti, 2000).

Digital transformation is an evolving process so managerial capabilities must evolve and grow in parallel. Managerial capability is connected with different stages of dynamic capabilities (Helfat & Peteraf, 2015) meaning that different capabilities and skills are necessary for each stage. More specifically, attention to

changes and perception is important in the early stage, then problem-solving and reasoning capabilities (Helfat & Peteraf, 2015), and IT competence skills (Singh & Hess, 2017), and finally communication capabilities and social cognition (Helfat & Peteraf, 2015). Because it is rare for a manager to possess all these capabilities and skills collaboration with other executives could be required (Helfat & Peteraf, 2015). However, when organizations' executives have low managerial capabilities, it is possible for the organization to face intense change resistance. Especially, in the early stages when organizations start a digital transformation this problem becomes obvious and more intense (Cichosz et al., 2020).

3.6.3 Employee participation

Undeniable, the implementation phase is highly influenced by employee commitment, participation, and willingness (Cetindamar Kozanoglu & Abedin, 2021; Cichosz et al., 2020; Gong & Ribiere, 2021; Solberg et al., 2020; Vereycken et al., 2021). Employees regarding the hierarchical level are a key stakeholder of organization's internal environment and employee digital literacy mirrors organizations flexibility (Butschan et al., 2019), and prescribes necessary implementation initiatives (Lauterbach et al., 2020; Schlegel & Kraus, 2021). Hence, we adopt Cetindamar Kozanoglu & Abedin, (2021) conclusion that employees' digital capabilities are an organizational affordance. This implies that considering this construct during the digital transformation process, helps managers forecast employees' barriers, and prepare a response or manage their impact (Cetindamar Kozanoglu & Abedin, 2021). Furthermore, managers should pay attention to employee technology use, existing culture (Cetindamar Kozanoglu & Abedin, 2021), and digital mindset (Solberg et al., 2020).

Employees' digital mindset (Solberg et al., 2020), existing culture (Cetindamar Kozanoglu & Abedin, 2021), and the way digital technology is adopted and used (Cetindamar Kozanoglu & Abedin, 2021; Rossi et al., 2020) are factors that influence the implementation stage as employee participation increases the strategic change speed and decreases the fear of strategic change (Yi et al., 2017). Understanding employees' digital mindset helps organizations evaluate their attitude toward digital transformation and their willingness to engage (Solberg et al., 2020). To overcome resistance and encourage participation, organizations can cluster employees and target them through personalized solutions and communication messages (Solberg et al., 2020). The importance of the human factor sets HR as an entity that must be included in digitalization decisions (Cetindamar Kozanoglu & Abedin, 2021) and be directly involved in strategy formulation (Butschan et al., 2019; Vereycken et al., 2021), assessment (Butschan et al., 2019) and implementation (Vereycken et al., 2021). In addition, due to the importance of digital technologies in digital transformation, IT department plays an important role, so the top management team should evaluate departments' capabilities, too, as to how proactive and innovative is the department (Hess et al., 2016).

3.6.4 Middle manager

Except for employee resistance a factor that may hinder digital transformation process is middle manager resistance (Horvath & Szabo, 2019). Middle managers are the bridge between top management and employees. The unique relationship between middle manager and employees that is based on mutual trust sets middle managers acceptance, and support even more important for a successful implementation (Bäckström & Lindberg, 2019; Horvath & Szabo, 2019). Therefore, their support and acceptance secure a smooth adoption of any new digital technology (Bäckström & Lindberg, 2019). Top management should cultivate the right environment to encourage middle manager participation and involvement in this process. A digital transformation change could only be achieved with cultural changes that promote consensus, and setting new rules to enhance collaboration between middle managers

(Gfrerer et al., 2020; Su et al., 2023). Nevertheless, closely monitoring the relationships and the competitive or collaborative dynamics between middle managers is a task under top management responsibilities to blunt competitive factors (Su et al., 2023).

Each middle manager has a unique business view and a personal agenda that must be fulfilled to achieve departments' indicators. Also, each middle manager has a vision of the processes that must be transformed which can be different from top management (Holmlund et al., 2017). Hence, it is expected conflicts between middle managers to arise. Top managers should intervene and manage these conflicts as they can hinder digital transformation efforts (Wang et al., 2020). These interventions are necessary as digital transformation holistically affects the organization and collaboration between departments is mandatory. Executive support enables digital transformation process and increases organizations change for a successful digital transformation as conflicts would be managed more easily (Holmlund et al., 2017; Sia et al., 2016).

3.6.5 Scale, execution speed, and time horizon

Scale (department- or process-level) (Kretschmer & Khashabi, 2020; North et al., 2020), time horizon (Bharadwaj et al., 2013), and execution speed (F. Li, 2020; North et al., 2020) are 3 parameters that affect both the formulation and implementation stage. Defining the scale of transformation is connected to strategy formulation process (Kane et al., 2017). In the previous chapter was mentioned that digital transformation orientations are interrelated, and starting a customer-oriented digital transformation may lead to a process-oriented transformation as back-office processes must be supported. Even if a digital transformation targets a department, it is possible to disrupt processes in departments that are closely linked to it. Therefore, the assessing stage is important as it maps organizational connections (Kretschmer & Khashabi, 2020).

Digital transformation is a building process underlying the long-term horizon of the digitalization strategy (Chanas et al., 2019; Dremel et al., 2017; Echterfeld & Gausmeier, 2018; Wengler et al., 2021). Even if organizations draft a strategy with a long time horizon the execution speed could be slow, radical, or gradual. The execution speed is influenced by the strategy formulation stage (F. Li, 2020) which is influenced by organization's year of activity, too (A. B. Crittenden et al., 2019). The execution speed parameter is directly connected to the implementation stage and the initiatives that organizations will choose to implement the strategy (F. Li, 2020). Incumbent organizations adopt not radical approaches that are aligned with existing strategies and have carefully assessed all the business model elements (A. B. Crittenden et al., 2019). Meaning that they will adopt an implementation strategy that will gradually transform organizations.

3.7 Research framework overview

Combining different theoretical perspectives, dynamic capabilities theory, and existing frameworks provide a lens to clearly comprehend how digital transformation projects unfold in practice and develop a conceptual and wide framework (Hanelt et al., 2021; Jedynak et al., 2021; Steiber et al., 2021; Vial, 2019). The proposed stages are supported directly or indirectly by the dynamic capability theory, thus activities related to sensing, seizing and transforming capabilities are included. More specifically, the first two stages rely on sensing dynamic capabilities, the next two stages describe key seizing activities assessing necessary resources and investing in digital technologies to enable transformation. Transforming dynamic capabilities support the implementation stage where organizations combine different initiatives to draft

a holistic implementation plan. The last stage mirrors the success of the digital transformation process hence we focus on digital transformations' positive financial and non-financial outcomes.

The proposed research framework consists of 6 stages (Figure 3). The digital transformation process starts when organizations identify opportunities or threads in the internal or external environment that force them to respond by formulating a digital transformation strategy. Organizations evaluate the triggers and focus on the disruptions that are worthy to respond and formulate a transformation strategy. The formulating process defines digital transformation orientation (customer-, operation- or value proposition-oriented). Organizations formulate various strategic initiatives to fulfill their strategic goals. As employees are the main stakeholder in the internal environment their capabilities and their mindset must be regarded in the strategy formulation stage. Thus, recent research proposes the participation of HR department in the entire transformation process and especially in strategy formulation, assessment and implementation stage.

Before proceeding with the implementation an assessment focused on existing processes, employees' capabilities, and technology infrastructure is necessary. This stage is very important if organizations want to utilize existing resources and draft a coherent implementation plan that connects existing and future situations. As organizations assess their internal environment may need to reformulate the digital transformation strategy. In this stage, the participation of the HR department is necessary, too, accompanied by the IT department. Including both departments eliminates the need for strategy re-formulation. In addition, having a comprehensive overview of technology infrastructure and capabilities will enable the technology investment stage by choosing the appropriate technologies as digital technologies are a key component of digital transformation, and affect the implementation plan.

The final stage that is associated with the success of a digital transformation process is the implementation stage and consists of 6 initiatives that enable organizations' efforts to become a digital mature organization and encourage participation. The assessment stage is directly connected with this stage because it provides insights into organizations' needs, and deficiencies that prescribe which initiatives will be more useful and enhance implementation efforts. For example, initiatives like introducing new governance structures, restructuring processes, and recruiting initiatives to uplift organizations skills are designed to assist management efforts. Redesigning the internal processes or creating new processes to support employees might enable employee participation. On the other hand, initiatives like training or learning programs are tools for managers to eliminate negative reactions, and a communication and promotional means for digital transformation.

The new technology investments and the deficiencies prescribe the type and the number of collaborations that are required for implementation, as it is impossible to develop and support every technology in-house or every training program. Another initiative that is extremely important for a successful implementation, is communication initiatives. Communication initiatives like promotional campaigns summarize internal storytelling that clearly and directly describes the digital transformation purpose and transform organization's mindset and culture. In addition, to encourage participation and acceptance organizations may use digital technologies that enable communication, techniques like cross-functional teams, and tailor-made messages. Finally, a vital management initiative is to monitor the implementation process and intervene when discrepancies occur. Considering that digital transformation is a capital-intense and evolving process, thus a continual evaluation is needed to adjust either digital transformation or the implementation initiatives.

As mentioned above, the implementation stage influences outcomes, therefore, the monitoring initiatives from the previous stage are a tool for organizations to prevent unexpected outcomes and intervene by re-formulating the implementation plan or the strategy. For the purpose of this research, digital transformations' negative outcomes are excluded, and light is shed only on the positive financial or non-financial outcomes. Even though financial resources are not visible in the early stages of digital transformation, they must be discussed in digital transformation as it is one research avenue that should be elaborated both for academic and managerial purposes. On the contrary, non-financial benefits are more easily identified and organizations rely on them to further promote digitalization efforts inside the organization.

Special mention should be made to all the contextual factors that influence the research framework. Managerial and organizational factors are highly interrelated as managers' perceptions are mirrored by organizations beliefs and vice versa. Furthermore, organization capabilities and culture (including beliefs, orientation, etc.) influence the success of digital transformation. These two factors are considered interdependent because managers beliefs about digital transformation, technology adoption, or investments are mirrored to organizations orientation and identity. Hence, they mainly influence sensing capabilities as organizations must rely on this capability to sense shifts in their ecosystem and formulate a relevant strategy. Given the importance of these factors, the dissertation tries to validate the proposed research framework, and further explore their influence on the entire digital transformation process. Another contextual factor to be regarded is scale (department-, project- or organization-wide) and the time horizon (short- or long-term) that influences formulation and implementation stage.

The Henfridsson & Lind, (2014) model shed light on the influence that direct and in-direct subcommunities have on strategy formulation. More specifically, sub-communities that are directly affected by the new strategy intervene and steer management decisions toward a strategy that will be more beneficial. On the other hand, in-directly affected sub-communities participate in this process, by promoting innovation and ensuring that the emergent strategy will fit both sub-communities existing processes and learnings. This conclusion stirred this research into exploiting a sub-community that directly or indirectly influences digital transformation efforts. Employees regardless the hierarchical level are one sub-community that is directly affected by digital transformation decisions and defines the success of digital transformation. Hence, it is important to understand how organizations exploit the various implementation initiatives to encourage employee participation and if specific initiatives affect more the implementation process. It is clear that the existing situation (structures, digital skills, technologies) affects the implementation plan because the established culture dictates employee's behavior and how they will use or respond to the adopted digital technology. These restrictions force managers or decision makers to consider organization affordances and develop a plan combining various implementation initiatives that will successfully transform organization and encourage participation.

Parameters like employee participation and resistance directly influence the implementation process as organizations exploit various initiatives to encourage their participation and secure their approval. But employees' indirect influence on formulation, assessment, and technology investment stage should be also considered. However, as it is impossible to engage employees in management processes, organizations should engage middle managers who bridge the top management and employee gap. The importance of employee factor in digital transformation imposes the exploration of how managers exploit the implementation initiatives to successfully implement a transformation strategy that encourages employee participation. We will try to understand how organizations encourage employee participation

by actively involving middle managers in the assessment stage. Furthermore, relying on the dynamic capability theory and proposed research avenues, the research will try to understand the connection and the aligning process between assessment-technology adoption stage, and the implementation stage.

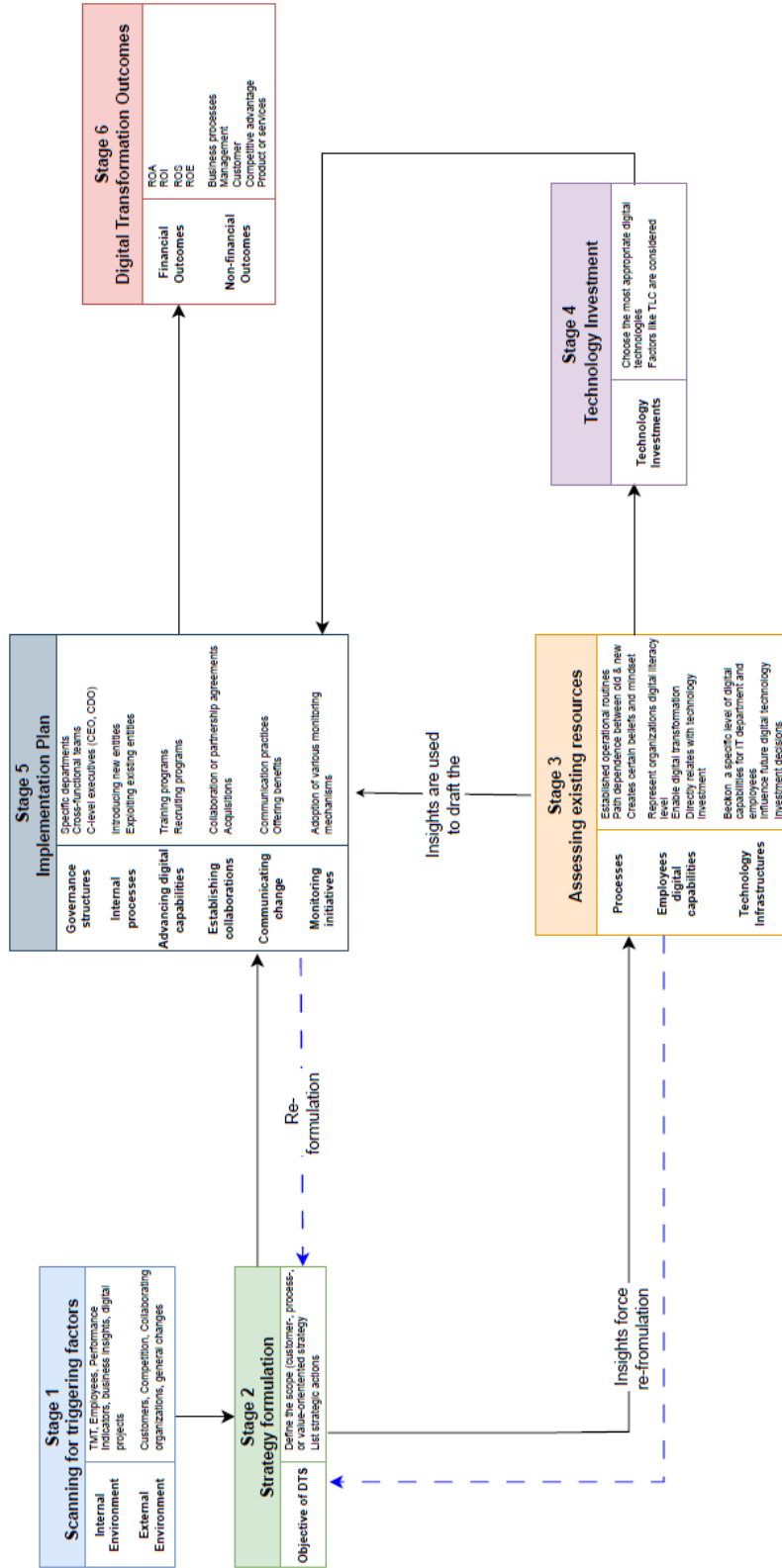


Figure 3: Proposed research framework.

4. RESEARCH METHODOLOGY

In this chapter, the research methodology of this Ph.D. dissertation is presented, namely the plan to answer research questions and meet research objectives. The examined literature and dissertation's objectives prescribe the research approach that will be followed. A qualitative research approach is considered the most appropriate fit since it will try to explore the digital transformation process, and recommend ways to align existing resources with organization future situation. Furthermore, this research approach is recommended for formulating a theory as the research will examine the digital transformation process of multiple organizations from different industries enabling the creation of general conclusions.

The structure of this chapter is as follows. Section 4.1 presents the chosen research approach by justifying the choice to conduct a qualitative research study. Section 4.2 briefly describes the proposed research framework and breaks down the research approach of this dissertation. In addition, in this section, the research questions of each research stage are presented. The last section of this chapter is devoted to describing the research design and showcasing in detail the research protocol that was followed to eliminate biases and achieve high-quality research.

4.1 Research approach

According to Robson & McCartan, (2016) constructivism or constructionism represents a view that all the social properties are constructed through the interactions between people, and they are related. The key enabler of digital transformation is individuals and how they receive and adapt to changes opposed to digital transformation. One of the main purposes of this dissertation is to capture the way digital transformation is applied by organizations and how it affects key stakeholders like employees. According to their experiences and mindset, they interpret the meaning of these actions, creating the right environment for researchers to examine their complexity of views (Creswell, 2014; Robson & McCartan, 2016). This interpretation sets constructivism as the most appropriate philosophical worldview as represents a view that focuses on the interactions between people and the way they interpret social properties (Robson & McCartan, 2016). In addition, this worldview is aligned with my personal beliefs that personal background (functional, cultural, and personal) shapes our worldview, our understanding of specific actions, and our decisions. Therefore, the constructive worldview is the best fit for this dissertation supporting the adoption of more general and broad questions that let participants express their views (Creswell, 2014) and aim to help researchers understand a phenomenon or a process (Robson & McCartan, 2016).

Although the selected philosophical worldview prescribes a qualitative research design (Creswell, 2014) there are additional reasons for this choice. Firstly, considering the aim of this dissertation implies that multiple constructs need to be examined and explored to come to firm conclusions to ground our theories (Hancock & Algozzine, 2006). To ground new theories an inductive logic must be adopted to help researchers collect data, and interpret theoretical ideas that will raise new concepts (Robson & McCartan, 2016). Secondly, the utmost goal of researchers' efforts is to understand how organizations manage digital transformation projects and how they encourage employee participation (Hancock & Algozzine, 2006). To achieve this goal, researcher's openness and receptivity are mandatory and the values of all the involved entities are accepted and considered (Hancock & Algozzine, 2006). Thirdly, qualitative research lets

researchers gain a holistic systemic, encompassing, and integrated overview of the content they are studying by analyzing social arrangements, the way an organization works, and the rules that are applied (Miles, M. B., Huberman, A. M., & Saldaña, 2020). Finally, this research design lets researchers present participants' understanding of the examined topic and explore the factors that affect their decisions or the influence this specific situation has (Hancock & Algozzine, 2006). Consequently, choosing quantitative research will only limit the scope and expected outcomes of this research and will not support our efforts to understand insider's perspectives (Figure 4).

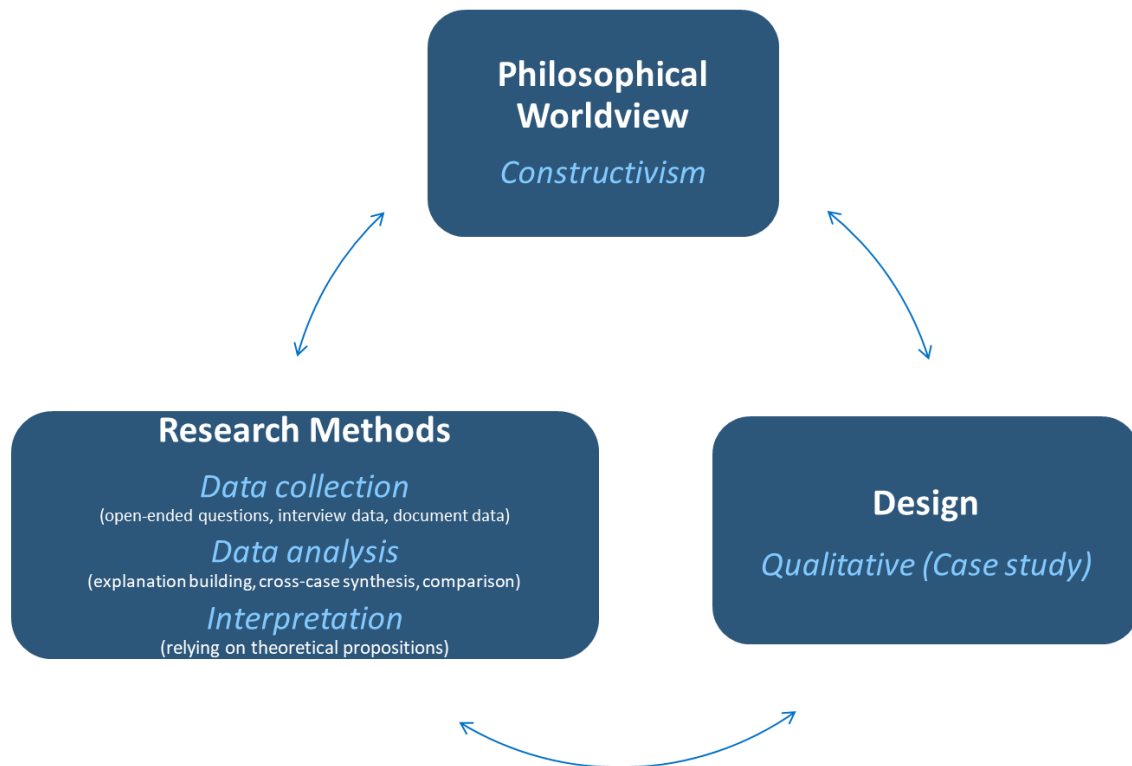


Figure 4: A qualitative research approach. The research approach presentation was adopted by (Creswell, 2014).

Creswell, (2014) lists 5 major types of qualitative research design types such as narrative research, phenomenology, grounded theory, ethnographies, and case study. We chose to conduct a case study research that allows researchers to examine holistically real-life events such as organizational processes (Yin, 2009). The case study research design is the most appropriate technique to bridge the literature research gaps and to provide answers to dissertations' research questions after analyzing the evidence collected from the field (Eisenhardt & Graebner, 2007). Exploiting the opportunities provided by this specific design the dissertation is going to build a new theory from cases relying on data analysis practices that explore digital transformation efforts and explain the connections between constructs (Eisenhardt & Graebner, 2007). Consequently, the aim of these efforts is to formulate a novel, testable, and empirically valid theory. This theory has been evaluated by parsimony or logical coherence criteria, and the provision of convincing grounding in the offered evidence has been checked (Paré & Elam, 1997).

Furthermore, the three conditions (type of research question, the extent of control, and focus degree on contemporary vs historical events) that must be met for this research method are met (Yin, 2009). The first and most important condition that differentiates the various research methods is the research

questions (Yin, 2009). A case study answers more explanatory research questions like “how” and “why” (Eisenhardt, 1989; Yin, 2009) and helps researchers identify operational links that will enhance the organizational knowledge (Yin, 2009). The second condition describes the investigator’s control over and the access level she/he has on behavior events (Yin, 2009). In case study methodology, the investigator is a direct observer who records everything that sees or listens to, and she/he is unable to manipulate the evolution of the events (Yin, 2009). Under the case study methodology, researchers come to conclusions by combining multiple data collection methods like archives, interviews, questionnaires, and observations (Eisenhardt, 1989; Yin, 2009). The last condition examines if the research examines a contemporary or not event (Yin, 2009). Digital transformation is a relatively new research field that requires researchers to collect and encompass various experiences to conclude and understand its progress and outcomes. As we investigate a contemporary phenomenon in a real-life context, the case study research design considers ideal (Eisenhardt & Graebner, 2007; Yin, 2009). Finally, it is a methodology that is popular in digital transformation literature as it helps researchers explore digital transformation process and get practical insights into this relatively new research field.

The above conditions align with the research objectives to understand an evolving phenomenon and generate a theory by collecting and analyzing data from different sources. Hence, it is the most appropriate technique that helps to formulate an inductive theory (Eisenhardt & Graebner, 2007). In addition, in a qualitative research data are collected in participant’s setting, and the data analysis process follows an inductive approach that lets researchers come to general theme conclusions and interpret the meaning of the data (Creswell, 2014). The research chose to conduct a “plausibility probe” case study as it enables us to explore the potential validity of the research model that could be further tested in the future (Eckstein, 2000). As the research proceeds, it is planned to apply an inductive data analysis, which is in accordance with qualitative research design, to enhance existing theory by making interpretations and identifying patterns from analyzing our data (Creswell, 2014).

4.2 Research questions

The main objective of this research is to understand how organizations achieve a successful digital transformation. Literature urges researchers to explore the way digital transformation efforts are diffused inside organizations, how they gain legitimacy (Hinings et al., 2018), and particularly the aspects that determine the success or the failure of digital transformation projects (Chanas et al., 2019). Hence, this dissertation has developed a research framework that presents the main stages of digital transformation and the connections between each stage (Figure 5). According to this research framework digital transformation process is broken down into 6 stages representing different milestones. A starting point is the identification of the triggering factors, followed by the strategy formulation stage. However, for organizations to implement this strategy they need to assess existing resources and capabilities that would facilitate or hinder the implementation. During the assessment organizations may be forced to reformulate their strategy. As well, these insights facilitate the execution of the next stage as they are investing in digital technologies and contemplating in the implementation plan. The implementation plan defines the success of the digital transformation or force organizations to reformulate their strategy to achieve their goals.

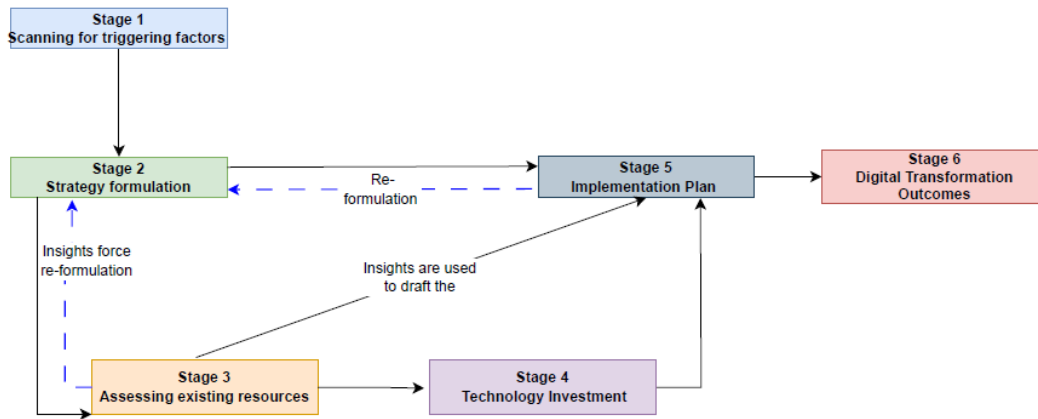


Figure 5: Overview of the proposed research framework.

To test the research framework and our assumptions we choose to follow the qualitative research approach. This research approach is in line with the researcher’s worldview, objectives to further explore and understand this research topic, and dissertation’s purpose to outline and understand how organizations can achieve a successful digital transformation. To effectively test its fit and address the related research questions, a two-stage case study research was designed (Figure 6). A multiple case study is in alignment with the exploratory purposes of this research stage as we seek to examine how digital transformation is happening and provide new insights for future research.

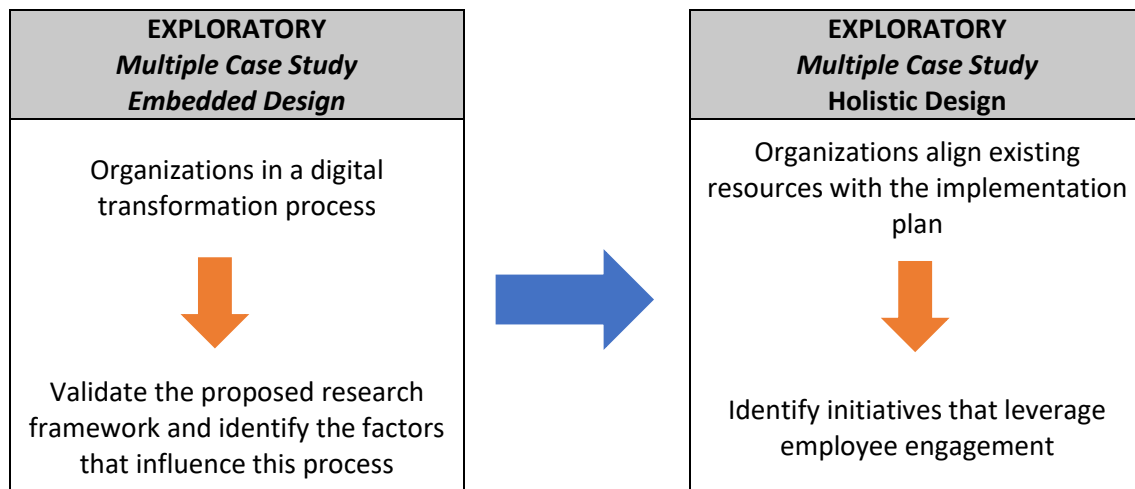


Figure 6: Research Approach.

In the first stage of the research, an embedded multiple-case study (Yin, 2009) or a common antecedent (Eisenhardt, 2021) design have been adopted. A common antecedent design implies a diverse sample (Eisenhardt, 2021) that supports our objective to combine diverse organizations (belonging to different industries) that have different processes. Following the pattern that has been adopted in the literature, meaning that the research is not focused on organizations from one specific industry, the proposed research framework combines best practices from different organizations belonging to different industries. Furthermore, choosing multiple-case study blunts concerns about the uniqueness of the case. This diversity produces and enables analytical conclusions and makes our evidence more compelling. In

general, a multiple-case study is considered more robust (Yin, 2009) and the embedded design creates more opportunities for replication and variation (Eisenhardt, 2021).

The purpose of the first stage of the research approach is to validate the proposed research framework and pinpoint the key stages of digital transformation. In addition, it seeks to list and validate the factors that have great influence in each stage. Existing research suggests researchers rely on current knowledge and formulate holistic research frameworks that encompass multiple theoretical perspectives (Hanelt et al., 2021; Jedynak et al., 2021; Steiber et al., 2021). This way researchers will shed light on the effectiveness and efficiency of digital transformation (Steiber et al., 2021) and will enclose many more aspects (Jedynak et al., 2021). Following literature recommendations in this initial stage, the dissertation tries to answer more general questions about digital transformation stages, factors that influence each stage, and the required capabilities for every stage. To achieve this, the research sample includes well-established (incumbent) organizations from different industries with an exporting orientation that are in a digital transformation process. Exporting organizations are considered a good fit for this stage of the research as the competition in the foreign markets “compels” them to formulate a digital transformation strategy to remain competitive. To this end, we try to answer the following research questions:

- ✚ How do organizations try to become digitally mature?
 - What are the main stages of the digital transformation process?
 - What are the factors that influence each stage of this process?

On the other hand, for the second stage, we narrow the research scope, and we try to understand how organizations try to align existing processes, resources, and capabilities with the implementation of digital transformation strategy. As the success of digital transformation is defined by the implementation stage and employee participation, the dissertation explores how organizations align the existing structures and capabilities with the implementation initiatives to execute the digital transformation strategy. For incumbent organizations a parameter to be explored is how existing organizations influence the implementation plan and the outcomes of digital transformation (Cichosz et al., 2020), hence, it focuses on the way organizations exploit organization’s existing situation to formulate an implementation plan that encourages employee participation. Furthermore, we explore the role of employees, a contextual factor, in formulating the implementation plan because digital disruptions affect employee satisfaction and commitment (Hanelt et al., 2021). In the literature there is evidence of complementarity between implementation initiatives (structural changes-learning programs or communication initiatives), so the research will try to explore connections like this at a practical level.

For this part of the research, a multiple holistic case study design was chosen. In this stage, the researcher chooses to examine specific stages of the digital transformation process in 2 organizations. However, as 2 units of analysis are the lowest limit to consider a research design as a multiple case during the examination, recommendations and guidelines that apply to in-depth cases were adopted. In a recent editorial (Monteiro, E., Constantinides, P., Scott, S., Shaikh, M., & Burton-Jones, 2022) proposed researchers, reviewers, and editors adopt a wider approach when they contact qualitative research because the existing narrow qualitative approach resembles to quantitative approaches such as a factor-analytic approach. By exploiting the existing theoretical foundations and being open to carefully revising the way qualitative research is conducted, qualitative researchers could add more value to this research approach and enhance the power of qualitative research. To support this unorthodox research design,

the dissertation relied on theoretical foundations on both multiple and in-depth case study designs since both organizations in the sample represent unique cases that are worth examining.

The first organization (QWERT) is in a digital transformation process as it tries to automate and increase the quality of its internal processes. In addition, as it is a small medium-sized enterprise (30 employees) its resources (especially time) are limited so it tries to align its existing processes and utilize most of its existing resources during the digital transformation process. In addition, they try to involve as much as possible their employees in this process to eliminate obstacles during the implementation. On the other hand, the second organization (ZXCVB) is an organization with a digital transformation strategy focusing on processes. It is a retail organization specialized in healthcare technologies that implies multiple scenarios must be considered during the process transformation, and many of the employees are on the field forcing organization to streamline as much as possible the processes. The above presented reasons make both organizations the best choice for this research stage as they represent a unique case that tries to exploit their existing resources to achieve a successful digital transformation and create an opportunity to explore a digital transformation process of an organization that faces specific restrictions (Eisenhardt & Graebner, 2007; Yin, 2009). By examining the digital transformation process of this organization the research will capture and examine the effect that specific implementation practices have on small organizations with limited resources (Yin, 2009). To achieve this, we plan to conduct more in-depth interviews and use document data. This unfolds the following research questions:

- ✚ How does employee engagement affect the aligning process between the assessment-digital technology stage and the implementation stage?
 - Are there any implementation enablers that facilitate employee participation?

4.3 Research design

The purpose of this subsection is to present in detail the way the research was conducted, to enhance the qualitative rigor of the research (Gioia, Corley, & Hamilton, 2013), and to let other researchers use the proposed research methodology and procedures to generalize the results in other populations (Aguinis & Solarino, 2019). The choice to conduct a two-stage analysis forced the researcher to formulate various logical frames to secure the necessary links between the two-stage analysis and the links between the research questions, the collected data, and the analysis. Hence, to boost research accuracy this dissertation follows the same guidelines (Yin, 2016). To enhance the methodological procedures it relies on best practices and recommendations proposed by (Yin, 2009), (Eisenhardt, 1989), (Gioia et al., 2013), (Gibbert, Ruigrok, & Wicki, 2008), and (Aguinis & Solarino, 2019). Also, it regards the guidelines that are dictated by the chosen research design about data collection (open-ended questions, interview data, and document data), analysis (explanation building, cross-case analysis), and interpretation (relying on theoretical propositions) (Creswell, 2014).

To achieve a high-quality research design in both cases, four case study tactics measurements were adopted that have been recommended by (Yin, 2009) (Table 6). These four measurements ensure that validity and reliability concerns have been considered (Gibbert et al., 2008). The first measurement construct validity is focused on adopting a sufficient operational set of measures and having a “subjective” judgment during the data collection and composition process. This is achieved in 3 ways, using multiple sources of data, especially in the second case, establishing a chain of evidence, and asking experts to review the case study draft. As both stages of this research are interpretive, various case study tactics

were adopted that improve internal validity by choosing to analyze our data by applying an explanation-building technique and identifying causal links between constructs and decision processes (Yin, 2009). In addition, the dissertation tries to formulate a clear research framework that is based on causal relationships between constructs and will provide the foundation for a well-grounded theory formulation in the latter stages (Gibbert et al., 2008). External validity or generalizability was achieved by selecting a multiple case study research design that enhances analytical generalization efforts (Gibbert et al., 2008). Nevertheless, for the second stage as it only examined 2 organizations elements from the in-depth case study were adopted. Given that an in-depth case study is interpretive research implies that the generalizations can be seen as explanations of a particular phenomenon that may be useful for other organizations or other contexts in the future. To achieve this two different types of generalization were adopted. More specifically, the dissertation adopted the “drawing of specific implications” and “contribution of rich insights” (Walsham, 1995). Through these approaches, the research tries on one hand to present tendencies that may be useful to other organizations and list best practices by providing multiple insights regarding these two stages.

Finally, for the reliability measurements, this dissertation will focus only on the transparency parameter by formulating a research protocol that could be adopted by other researchers. For confidentiality reasons, data regarding the participating organizations cannot be presented. Hence, the dissertation presents a detailed research protocol to enhance external validity with exact replication. By presenting the research design/protocol the researcher shares the insights of these procedures with other researchers to improve and test them in other populations (Gibbert et al., 2008). Besides the reliability purposes, the research protocol will minimize the errors and biases in the study because it describes in detail the procedures and the general rules that have been followed during this research. By formulating this research protocol the research expects to increase the reliability and credibility and formulate some general, and guiding rules to be followed during the execution (Yin, 2009). The presented research protocol is based on the research protocol proposed by (Yin, 2009) but also includes elements from (Eisenhardt, 1989) theory. An overview of each case study research design is presented in Table 9. It is researcher’s hope that these research designs can be used as a guide for other researchers to replicate our research protocol for future research. In the following research designs, the links among research questions, the way data was collected, and the chosen strategies for the data analysis stage are presented (Yin, 2016).

	Research Phase	RD 1 - Research framework validation	RD 2 - Decisive practices
Construct Validity			
Use multiple sources of data	Data collection		x
Establish a chain of evidence	Data collection	x	x
Have informants review the draft case study	Compositions	x	
Internal Validity			
Explanation building	Data analysis	x	x

	Research Phase	RD 1 - Research framework validation	RD 2 - Decisive practices
External Validity			
Use replication logic in multiple case studies	Research design	x	
Use theory in single-case studies	Research design		x
Reliability			
Use case study protocol	Data collection	x	x

Table 6: Case studies tactics that have been selected to enhance the quality of the research design. Adopted by (Yin, 2009).

4.3.1 Overview of the case study project

The research setting for both stages of the proposed research methodology has been defined in the previous subsection. In brief, the main case objective of Research Design 1 (RD1) is to validate the proposed research framework that is based on the literature review analysis. On the contrary, the objective of Research Design 2 (RD2) is to explore the aligning process between existing organizational structures and capabilities and implementation initiatives. For the first part of the research, the dissertation chooses as a unit of analysis multiple incumbent organizations (8 organizations) that meet specific criteria. For the second one, the research is focused on two organizations that are in digital transformation process. However, each organization faces different restrictions that force them to assess existing resources and capabilities and involve employee to facilitate digital transformation implementation.

4.3.2 Data collection procedure

To source participants, for the first stage, the researcher collaborated with SEVE an association of exporting organizations. The selection criteria ensure that organizations are in a digital transformation process, have sufficient financial resources to support necessary investments, are part of digital mature industries, and have several years of experience in this industry (Table 7). These selection criteria have been selected to minimize the selection bias but the researcher is fully aware that selection bias is not entirely dismissed as organizations with specific characteristics were investigated to examine the research questions (Bennett & Elman, 2006). Based on participation criteria the association proposed a list of participants from 15 organizations that met the predefined criteria. From this list, an initial desk research was conducted to collect more information about each potential participant. Combining this information and after a series of discussions with experts in the local ecosystem the final sample was selected consisting of 8 organizations. The interviews were conducted with elite informants (mainly C-level executives) who have extensive knowledge of the organization, exclusive information, and their decisions define organizations outcomes and board decisions (Aguinis & Solarino, 2019). For the first stage, the interviews were conducted with executives (mainly CEO, or CDO) who actively participate in digital transformation formulation.

Selection Criteria	Description
A digital transformation strategy or plan	Organizations should not only have developed a digital transformation strategy but also, have to implement a part of it or have planned strategy implementation.
Revenue turnover of $\geq 500.000\text{€}$	As funding is a parameter that hinders digital transformation. This criterion secures that organizations have sufficient funds for this purpose and this parameter could not be an inhibitor.
Specific Industries	As digital transformation is in its infancy in Greece, we choose organizations in digital mature industries. These industries include Food products, beverages, and tobacco, Transportation and storage, Computer, electronic and optical products, IT and other information services, Mining and quarrying, and Machinery and equipment N.E.C.
≥ 6 Years of experience	Participants must be active in these specific industries for at least 6 years. This precondition secures that organizations have a complete picture of competition, customers, industry's technology evolution and possess sufficient key resources.

Table 7: Selection criteria that must be met by the participating organizations for the first stage of the research.

As the research objectives are narrowed in the second stage, only organizations that are in a digital transformation process, and for drafting the implementation plan they rely on existing resources and capabilities are selected. Previous selection criteria (revenue turnover, years of experience, and industry) are applied also in this stage. By following these selection criteria, it was secured that the organization will have sufficient financial resources, and will have a clear picture of their industry and sufficient resources and capabilities (Table 8). To find a representative example for this stage a list of 4 organizations was drafted. After an initial screening and lengthy discussions with dissertation's supervisor and consulting committee two organizations were chosen that are believed will help us to analyze the aligning process between these 3 stages.

QWERT is an organization that has been active in IT and other information services for 25 years and has sufficient financial resources to support multiple digital transformation strategies. In addition, it is an organization with branches in Qatar and customers in more than 10 countries. However, as it is an organization with only 30 employees, it faces some serious time restrictions. Hence, they try to align existing resources and capabilities with the organization's future to cause the minimum disruption in their work routine. During this stage, except for the CEO we requested to interview executives that are actively involved in digital transformation like (CTO, and other executives COO) and middle managers. As it is a small organization there is no HR department and these kinds of responsibilities are part of the CEO and middle manager's job description. The second organization (ZXCVB) is a retail organization in healthcare technologies with over 100 years of experience in this field. One of the main constraints that organization face during the digital transformation is employees' digital skills gap, and the complexity of existing processes between organizations multiple departments. To enhance the digital transformation process, organization has established a department that focuses on processes digital transformation. Interviews were conducted with the CEO, the operational manager, and middle manager. Even though the

organization has an HR department, it is not involved in the digital transformation process hence it was not included in the interview process.

Selection Criteria	Description
Have a defined objective during digital transformation	An organization that tries to cause the minimum disruption in its work routine because they face time restrictions.
Revenue turnover of $\geq 500.000\text{€}$	As funding is a parameter that hinders digital transformation. This criterion secures that organizations have sufficient funds for this purpose and this parameter could not be an inhibitor.
Specific Industries	As digital transformation is in its infancy in Greece, we choose organizations in digital mature industries. These industries include Food products, beverages, and tobacco, Transportation and storage, Computer, electronic and optical products, IT and other information services, Mining and quarrying, and Machinery and equipment N.E.C.
≥ 6 Years of experience	Participants must be active in these specific industries for at least 6 years. This precondition secures that organizations have a complete picture of competition, customers, industry's technology evolution and posse sufficient key resources.

Table 8: Selection criteria that must be met by the participating organizations for the second stage of the research.

In both cases, it was chosen to implement semi-structured interviews with open-ended questions and to interview each participant individually. Although it is a time-consuming process, it is the only way to collect valuable insights that will help researcher answer the research questions (Hancock & Algozzine, 2006). An effort to use different data sources like interviews, documentation data, archival records, and meeting minutes was made. To counterbalance the limited data sources that mainly were detected in the first stage of this research, different evaluators (investigator triangulation) and experts to evaluate the case study draft were used. Thus, the interviews were two-person interviews to follow Eisenhardt, (1989) recommendation for multiple investigators. In addition, to improve the construct validity for the first stage participants were asked to voluntarily fill out a form about digital transformation with a similar structure to the interview questions. However, the response rate was poor.

In the second research stage to achieve data triangulation multiple data were sourced. Much of the evidence like documentation, meeting minutes, and archival records was handed by the organizations without researcher's involvement. This way the researcher remained an outside observer and secured a distance from the personnel and the organization. The main advantage of this role is that the researcher is an outsider, and she has not had any direct personal stake in the interpretations and outcomes of the research. In addition, this makes the interviewees to be more open and relatively more honest as they express their views as the researchers are not associated with the examined organization. However, the main drawback of this approach is that the researcher may not have access to all the necessary data or be aware of the organization (Walsham, 1995). To eliminate this drawback the researcher tried to create a trustworthy relationship with the managing director to secure sufficient access to continental documents.

4.3.3 Data analysis procedure

The interviews in both cases will be recorded and transcribed. The recording process is necessary to ensure that the transcripts will not include misleading information/statements and will represent the most accurate way participant's perspective. Thus, before conducting the interviews, all the participants were informed via email about the recording and got their permission (Hancock & Algozzine, 2006). After the interview within a week, a transcript of the interview was sent to the participants attached to the video recording to approve the transcript and make sure that their views were fully represented. The video recording was stored for a limited time (approximately two weeks) until the transcript's verification and after that, it was deleted.

To analyze all the data a Computer Assisted Qualitative Data Analysis (CAQDAS) software was adopted. The software Dedoose which has been developed by academics from UCLA was chosen. The same protocol was used in both stages that follows the 5 phases of analysis that were recommended by Yin, (2016); creating a database with all the collected data, disassembling the data to formulate broader categories of concepts, reassembling the data to get insights, interpreting the findings by adding research's view and concluding. Firstly, all the collected data was uploaded to the qualitative analysis software and arranged accordingly to a useful and suitable to our research objective order. By creating this database, the collected qualitative data were systematically stored, and the "cleaning" process was started. In addition, this systematic storage process facilitates the analysis and enhances the qualitative results. Through the "cleaning" process the researcher becomes familiar with the dataset and constantly reviews the collected data. The revision process is essential to identify new insights, features, and connections with the research questions (Yin, 2016).

A process coding method was applied to both stages to disassemble the data. By using this method, the researcher was able to label actions and processes that were followed by the participants and were intertwined with other processes and/or influential factors. We do not use more effective methods that describe more subjective experiences as it is out of research's scope (Miles, M. B., Huberman, A. M., & Saldaña, 2020). For the phase of the research, the data was collectively analyzed to validate each stage of the research framework. However, for the second phase, it was chosen to analyze each organization's data separately exploiting the predefined coding schema. More specifically, for the first phase, a holistic coding process by applying a single code to a large unit of analysis was used (Miles, M. B., Huberman, A. M., & Saldaña, 2020). This way the researcher marked the different stages of the proposed research framework, and could easily validate the research framework. As the coding process evolved, child codes were added to each main code to examine the different aspects that were proposed in our research framework. On the contrary, for the second phase, a provisional coding process was selected. The researcher drafted a prior list of codes based on the literature and previous research findings (Miles, M. B., Huberman, A. M., & Saldaña, 2020).

The disassembling procedure was focused on coding the transcripts, and the additional data by applying first- and second-order codes (Yin, 2016). Regarding data processing, a pattern-matching analysis and a cross-case synthesis were used in the first case to enhance our efforts for a holistic picture of our examined research topic (Yin, 2009). On the other hand, for the holistic multiple case study the logic model analytic technique, and more specifically the organizational-level logic model. This technique presents a chain of events over an extended period. To achieve this, we followed analysis guidelines and tried to match empirically observed events to theoretically predicted events (Yin, 2009). In addition, a cross-case

analysis will be used at a variable-oriented level to shed light on best practices and different approaches (Miles, M. B., Huberman, A. M., & Saldaña, 2020).

To enhance the data analysis transparency criteria in each case study analysis chapter more details are presented showcasing in detail the procedure that has been followed for the coding and the first and second-order coding (Aguinis & Solarino, 2019). The first-order or open codes are closely related to the original data and are formulated with similar terms in small phrases. Thus, they mainly describe the interviewee's voice (Gioia et al., 2013; Yin, 2016). On the contrary, the second-order or category codes are related to broader conceptual categories and describe the stages and the key points, respectively of the proposed research model. In addition, they aim to present the researcher's voice and interpretation of the interviewees' terms (Gioia et al., 2013; Yin, 2016). For each case, to better explain the coding process schematic diagrams were designed to graphically present the conceptual process (Yin, 2016), and provide a graphic representation of the way we transformed the raw data into useful insights to develop our theory (Gioia et al., 2013).

Two stages of coding were conducted in both case studies. First, the researcher uses an explorative open coding process that allows us to identify the key stages and elements in our sample. A key characteristic of the first stage of coding is that shows the interviewee's voice and is formulated with similar terms in small phrases (Gioia et al., 2013). On the contrary, the second stage of coding describes a way of grouping the codes from the first stage into a smaller number of categories, themes, or concepts (Miles, M. B., Huberman, A. M., & Saldaña, 2020). This grouping process describes the stages and the key points, respectively of the proposed research model and aims to present the researcher's voice and interpretation of the interviewees' terms (Gioia et al., 2013). This way researchers during the data collection phase can start an initial analysis of their findings, identify connections between variables, and also sets the foundations for cross-case analysis (Miles, M. B., Huberman, A. M., & Saldaña, 2020). Consequently, it is necessary for the researcher to review multiple times the transcripts and do multiple experiments, delete some codes, create new ones, and group others (Gioia et al., 2013).

Relying on the previous phase the researcher tries to explain the findings by encompassing literature insights and fairly represent the data (Yin, 2016). Although an effort to give our own meaning was made, at the same time, the researcher tried to be accurate, credible, fair, and provide a complete and valuable explanation of the research questions. The interpretation efforts rely on theoretical propositions and are aligned with the analytic techniques of each stage. In the first stage, our efforts are focused on explaining the digital transformation process and the factors that influence each stage. However, in the second stage choosing a logic model analytic technique lets us create a chain of actions and processes that will help organizations to successfully align existing resources and capabilities with the new strategy. The presented interpretations are the foundations for the concluding phases. The dissertation comes to various conclusions by identifying new research avenues and generalizing a broader set of situations (Yin, 2016).

4.3.4 Interview Procedure

To gather data, semi-structured interviews with open-ended questions in both cases were employed. Semi-structured interviews are suitable for the chosen research design. In addition, as we examine an evolving phenomenon that develops during the interviews this type of interview offers some level of flexibility to participants to guide the conversation by asking pre-determined questions and answering follow-up questions when it is necessary (Hancock & Algozzine, 2006).

All interviews were conducted in Greek and a copy of the conversation transcript was sent to the interviewee for approval. For confidentiality reasons, acronyms have been used during the analysis to quote participants' opinions and points of view. Except for interviews, a desk search was applied to collect data from external sources in the first-stage case study, and various data sources were used in the second stage. More specifically, for the second-stage case study the interview data were complemented with Interviews, documentation, and archival records. The collected data in the first stage does not provide enough credibility for our research. So, the interviews were conducted by a team of researchers to secure investigator triangulation (Eisenhardt, 1989; Patton, 2002). On the contrary, in the next stage, we secured data triangulation by collecting multiple types of data interviews, internal presentations, minutes, etc. (Eisenhardt, 1989; Patton, 2002). In both cases, the interviews were conducted with C-level executives who had a clear picture of the organization's digital transformation plan and actively participated in strategy and implementation planning.

The purpose of the first stage of the research is to examine the way organizations try to achieve digital maturity. To this end, a set of questions has been developed that are related to every stage of the proposed research framework and will guide the conversation with interviewees. To answer the last research question of this research stage and uncover the factors that influence digital transformation, a set of questions has been added. In this stage, in total 19 questions have been developed that can be segmented into 7 groups. The questions try to collect data about organizations and interviewee's background, interviewee's perspective, organization orientation, organization's existing processes, digital skills, digital readiness, triggering factors, digital transformation strategy, implementation initiatives, and the outcomes of these efforts. The interview guide is presented in APPENDIX A - 1st Research stage interview questions.

On the other hand, the purpose of the second stage is to examine in depth the aligning process between the assessment stage and the implementation stage given the fact that organizations employ initiatives that will encourage employee participation. Hence, the interview guide for this stage (APPENDIX B – 2nd Research stage interview questions) includes questions that are focused on these two stages. However, in this stage, multiple interviews with different C-level executives are conducted and some of the questions do not apply to their responsibilities, thus, not all questions are asked in every interview. The questions are segmented into 5 groups: background information and personal view, assessment, implementation, the influence of middle managers on communication initiatives, and the influence of employee participation in implementation initiatives.

	RD 1 – Model Validation	RD 2 – Influence of employee factor on aligning process framework
Overview of the case study project		
Case study objective	Define key stages of a digital transformation process and the factors that mostly influence each stage	Aligning process of the assessment-digital technology stage and implementation stage
Unit of analysis	Incumbent organizations with specific characteristics Have designed a digital transformation plan and have implemented part of it	Incumbent organization with specific characteristics Have a defined assessment process of organizations existing situation

	RD 1 – Model Validation	RD 2 – Influence of employee factor on aligning process framework
Number of organizations participating	8	2
Data collection procedure		
Identify participants	Participants meet the selection criteria Pass the search screening process Different industries	The participants have been suggested by the CEO. Precondition to be involved in the DT process
Number of conducted interviews	1 interview per organization E-mail exchange threat to propose changes or to verify the transcript outcome	3 interviews 2 workshops (to validate our findings)
Interviewer	CEO	C-level executives (CEO, CTO) Executives participate in the digitalization Middle managers
Data sources	Interviews Desk search	Interviews Documentation Archival records Meeting Minutes
Type of interview	Semi-structured Interview Two-person interview	Semi-structured Interview One-person interview
Type of Questions	Open-ended questions	Open-ended questions
Preparation before interview	Information from the screening process will be used to guide the discussion	Based on previous interviews, a list with key findings will be used as a focal point Background information about the interviewer and the firm
Additional data collection	Information collected from the desk search process	Additional documentation material by the organization
Triangulation Principal	Investigator triangulation	Data triangulation
Data analysis Procedure		
Transcripts	After the interview, the participants will receive the transcript of the interview and are welcome to make necessary changes.	After the interview, the participants will receive the transcript of the interview and are welcome to make necessary changes.
Software tools	YES	YES
Video recording	YES	YES
Analytic Techniques	Explanation building Cross-case synthesis	Cross-case analysis Logic model analysis

	RD 1 – Model Validation	RD 2 – Influence of employee factor on aligning process framework
Context of the Questions	Background Questions (identification, brief description of the organization, position description) Interviewee perspective Organization orientation Triggering factors Digital transformation strategy (strategy scope, scale, and time horizon) Organization readiness Implementation initiatives Outcomes	Background Questions (identification, position description) Assessment process Implementation initiatives Factors affecting these two stages (focusing mainly on employee-related factors)
Interview Procedure		
Language	Greek	Greek
Length	60 minutes per interview	90 minutes per interview
Sharing questions beforehand?	YES	YES
Recording interviews?	YES	YES
Transcribing interviews?	YES	YES

Table 9: Proposed research protocol.

5. VALIDATING THE DIGITAL TRANSFORMATION STAGES

This multiple-case study is the first stage of the proposed research design. The exploratory research stage examines the stages that enable a successful digital transformation. The digital transformation process of 8 well-established organizations is investigated that are active in various industries. By analyzing the data and pattern matching this chapter tries to identify the key stages of the digital transformation, and the factors that affect processes. The concluding remarks of this research stage are hoped to reveal a path for the second stage of the research.

The structure of this chapter is as follows. The chapter starts by analyzing the case study design, and shedding light on data collection and data analysis process. The Section 6.2 presents the findings of the examined cases. In this section, each stage of the proposed research framework is described and the factors influencing the digital transformation are listed. The chapter closes with the concluding remarks (Section 5.3).

5.1 Case Study Design

The purpose of this research stage is to validate the proposed model, pinpoint the key stages of digital transformation process and shed light on the influence each contextual factor influence the whole digital transformation and each stage (Figure 7). This goal can be achieved by conducting a multiple-case study research design with an embedded unit of analysis (Yin, 2009). This stage sample includes various organizations from diverse industries with different starting points that have designed different implementation strategies. This diverse sample is in line with dissertation aims to examine different digital transformation efforts and identify initiatives and factors that have been proposed in our research framework. These case study tactics help us to test and secure internal validity (Yin, 2009) and develop a better grounded, more accurate, and more generalizable theory (Eisenhardt & Graebner, 2007). this analysis tries to answer the following research question and sub-questions:

- ✚ How do organizations enable a successful digital transformation?
 - What are the key stages of their digital transformation process?
 - What are the factors that influence each stage of this process?

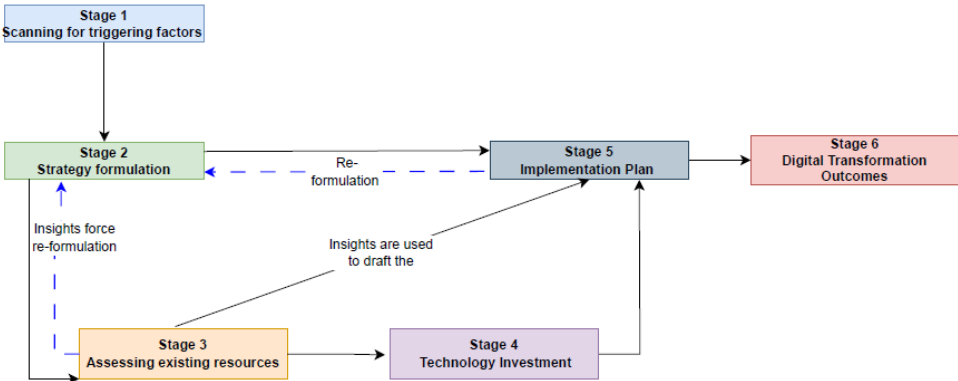


Figure 7: Digital transformation stages that will be examined in this research stage.

5.1.1 Data collection

To collect sufficient data to answer these research questions semi-structured interviews were conducted with high-level executives from multiple organizations. The interviewers were either the Chief Executive Officer or the head of digital transformation efforts (Chief Digital Officer or Head of Innovation Department). The purpose of the interview structure is to examine the 6 key constructs of the research framework, thus, each interviewee was asked to answer the same predefined questions about digital transformation triggers, digital transformation strategy, assessment, digital technologies investments, implementation, digital transformation outcomes, and factors that influence digital transformation (questions are presented in APPENDIX A - 1st Research stage interview questions). The interviews took place between 8/02/2021 and 2/03/2021 and each interview lasted 50-70 minutes. After the interview, a copy of the indexing conversation was sent to the interviewee for approval. The questionnaire was administered in Greek, following all the relevant sections of our methodological model. Due to confidentiality agreements, acronyms have been used during the analysis to quote participants' opinions and points of view.

The sample for this round of interviews was sourced from SEVE and encompasses organizations from different economic activities like food products, beverages and tobacco, transportation and storage, computer, electronic and optical products, IT and other information services, mining, and quarrying, and machinery and equipment N.E.C. Relying on the classification proposed by the OECD based on the R&D Intensity (Galindo-Rueda & Verger, 2016) we clustered the participating organizations in technology-intensive organizations (high or medium-high R&D activity) or labor-intensive organizations (medium-low or low R&D intensity). Analyzing Table 10 presents an overview of our sample, it is noticed that:

- Many participating organizations (5 out of 8) are labor-intensive organizations. More specifically, organizations that have been classified as Medium-Low or Low R&D Intensity have been categorized as labor-intensive. On the contrary, organizations that are in High or Medium-High R&D intensity have been categorized as Technology-intensive. Thus, IC9, IC10, and IC12 are technology-intensive, and the remaining organizations are labor-intensive.
- For the purposes of the research 4 clusters have created for the employee number variable. The clusters are 0-500, 500-1000, 1000-1500, >1500. Most of the organizations belong to the first cluster, meaning that they have less than 500 employees. Two organizations (IC1, IC12) belong to the third cluster with 1000-1500 employees, and only one (IC11) has over 1500 employees.

IC ⁵	Economic Activity ⁶	R&D Intensity ⁶					Technology or Labor-intensive ⁶		Employees Number ⁷	Interviewer
		High	Medium-High	Medium	Medium-Low	Low	Technology-Intensive	Labor-Intensive		
IC1	Food products, beverages, and tobacco				x			x	1000-1500	Deputy CEO
IC2	Food products, beverages, and tobacco				x			x	0-500	Managing Director
IC5	Transportation and storage					x		x	0-500	CDO
IC7	Transportation and storage					x		x	0-500	CIO
IC9	Computer, electronic and optical products	x					x		0-500	CEO
IC10	IT and other information services		x				x		0-500	CEO
IC11	Mining and quarrying				x			x	>1500	Group CEO
IC12	Machinery and equipment N.E.C.		x				x		1000-1500	Head of Innovation Department

Table 10: Sample demographics.

⁵ IC (acronym) stands for Incumbent Organizations.

⁶ This classification has been adopted by OECD report (Galindo-Rueda & Verger, 2016).

⁷ For this variable we develop 4 clusters to help us with the classification and the analysis. The clusters are 0-500, 500-1000, 1000-1500, >1500.

5.1.2 Data analysis

Regarding data processing, an explanation building analysis was used to better understand how digital transformation is executed in different organizations (Yin, 2009). To perform the analysis and code the collected data Dedoose software was used. For the coding process, an explorative open coding process was adopted that enabled the identification of key stages and elements. After multiple experimentation, some codes were deleted, new codes were created, and others were grouped. To ensure the quality of the encoding process, the data were coded twice with an interval of a few months to ensure the objectivity of the research. Moreover, to minimize bias, it was requested by another researcher to examine the data and provide hers/his opinion regarding the data analysis process, coding themes, and result interpretation.

The final coding scheme for the main stages of the examined research framework including first-order, and second-order concepts is presented in Table 11 and in Table 12. The first table presents the coding scheme of digital transformation stages and the second presents the contextual factors that influence the digital transformation process. More specifically, the second-order codes describe the stages and the key points, respectively, of the proposed research model. The second-order codes aim to present the researcher's voice and interpretation of the interviewees' terms. On the contrary, the first-order codes show the interviewee's voice and are formulated with similar terms in small phrases (Gioia et al., 2013).

1st order Concepts	2nd order Themes	Aggregate Dimensions
<ul style="list-style-type: none"> • Internal information recommending changes or new avenues 	Business Insights or business problems	TRIGGERS (TRIG)
<ul style="list-style-type: none"> • Technology partners • Organizations from other industries 	Collaborating organizations	
<ul style="list-style-type: none"> • Foreign competition • Domestic competition 	Competition	
<ul style="list-style-type: none"> • Wholesales customers (foreign & domestic) • Retail customers (foreign & domestic) 	Customers	
<ul style="list-style-type: none"> • Recruiting new executives • Suggestions from organization departments 	Executives & Employees	
<ul style="list-style-type: none"> • Financial and non-financial KPIs like productivity, market growth, etc. 	Performance Indicators	
<ul style="list-style-type: none"> • New sales channels • Offer new or better services 	Customer-oriented	DIGITAL TRANSFORMATION STRATEGY ORIENTATION (DTS)
<ul style="list-style-type: none"> • Data collection & exchange • Improve employees work life • Integration • Process automation/optimization • Process overview 	Process-oriented	
<ul style="list-style-type: none"> • Production line overview • Production process automation 	Production-oriented	
<ul style="list-style-type: none"> • New business model 	Value-oriented	
<ul style="list-style-type: none"> • Different digital skills in admin and production employees • (extremely) High-level of digital skills • Low-level of digital skills 	Employees digital capabilities	ASSESSING PROCESS (ASSES)
<ul style="list-style-type: none"> • Role in digital transformation • Mapping • Connection with other processes 	Existing structures	

1 st order Concepts	2 nd order Themes	Aggregate Dimensions
<ul style="list-style-type: none"> Existing technology investments 	Technology infrastructure	
<ul style="list-style-type: none"> Criteria for technology selection Technology choice 	Technology adoption	DIGITAL TECHNOLOGY INVESTMENTS
<ul style="list-style-type: none"> Exploit existing processes or departments Redesign organizational chart or processes 	Changes in the internal structure	IMPLEMENTATION INITIATIVES
<ul style="list-style-type: none"> Collaborating with a consultancy for DT Partnership characteristics Participation in research projects Partnerships with technology providers Problems with partners 	Collaborations and partnerships	
<ul style="list-style-type: none"> Advocate Digital communication technologies Reward system Ways to communicate the message 	Communication Initiatives	
<ul style="list-style-type: none"> Cross-functional team Department or Business unit Executives 	Governance structures	
<ul style="list-style-type: none"> Not well-defined process Well defined processes 	Monitoring initiatives	
<ul style="list-style-type: none"> Recruiting programs Training programs 	Training and/or recruiting programs	
<ul style="list-style-type: none"> Improvements in evaluation process Real-time information of the processes High-quality insights 	Monitoring	
<ul style="list-style-type: none"> Decision process improvements Reducing decision time Improving decisions Identifying new revenue sources 	Management	
<ul style="list-style-type: none"> Efficient processes Organization efficiency Minimize mistakes and risks in production Minimize mistakes and risks in administration Flexible and adaptable processes Productive processes Simplify work tasks Enhanced brand reputation & name 	Business improvements	
<ul style="list-style-type: none"> Enhance satisfaction Offering new services Improve products/services quality Enhance trust towards the business 	Customer experience	
<ul style="list-style-type: none"> Creation of an ecosystem 	Economies of scale	FINANCIAL OUTCOMES
<ul style="list-style-type: none"> Minimize operating cost (general) Minimize facilities expenses like electricity 	Cost reduction	

Table 11: Data structure of the digital transformation stages.

1 st order Concepts	2 nd order Themes	Aggregate Dimensions
<ul style="list-style-type: none"> Multi-level Adjustment periods Alignment between departments Gradual 	Scale	CONTEXTUAL FACTORS

1 st order Concepts	2 nd order Themes	Aggregate Dimensions
<ul style="list-style-type: none"> • Long-term planning (5-year plan) • 3-year roadmap (part of the 5-year plan but is a more detailed plan) • Adjustments every 6 months • No specific time plan 	Time horizon	
<ul style="list-style-type: none"> • Budget that is dedicated to digital transformation • Investments may be hinder by budget restrictions 	Financial resources	
<ul style="list-style-type: none"> • Participation • How employees adopt new technologies • Resistance • Involvement • Clustering (blue- and white-collar employees) 	Employees	
<ul style="list-style-type: none"> • Younger executives enter the Top Management Team 	Leadership change	
<ul style="list-style-type: none"> • Actions that show support towards digital transformation efforts 	Leadership support	
<ul style="list-style-type: none"> • Response to changes • Digital technologies adoption • Digital transformation involvement 	Middle manager	
<ul style="list-style-type: none"> • Values that dictate organization decision making process 	Organization beliefs	
<ul style="list-style-type: none"> • Customer-centric • DT part of business strategy • Improve brand reputation • Proactive • Retain existing customers 	Organization orientation	
<ul style="list-style-type: none"> • Problems caused by important factors from the external environment 	Stakeholders from external environment	
<ul style="list-style-type: none"> • Industry • Business model 	Unique characteristics or industry	

Table 12: Data structure of the contextual factors.

5.2 Multiple Case Study Findings

In this section, each digital transformation stage is separately analyzed to investigate if a real-transformation process aligns with the proposed research framework. Furthermore, the second subsection lists the factors that affect as a whole the digital transformation process or specific stages. These factors were mentioned either by the interviewees or have been highlighted by the analysis.

5.2.1 Digital Transformation Stages

Stage 1 - Triggering factors

Technological advancements have changed customers’ needs and behavior, making them more demanding as they want high-quality services (IC7, IC5 IC12) and request better communication channels with real-time information (IC11, IC7, IC5). Hence, customers are the main and most influential triggering factor in digital transformation process. Still, the analysis underlined two points related to customers. Firstly, outbound customers are more demanding; they drive organizations digital transformation efforts and force them to adopt a more customer-oriented strategy. Second, customers may hinder organizations

digitalization efforts because of their poor IT infrastructures and specialization (IC1, IC2, IC10). This is a major problem for organizations that offer IT services (IC10) because they rely on customer needs and insights to develop new services and improve their internal operations. To counterbalance this drawback, organizations either provide additional services like supporting consulting services (IC10) or design additional simpler processes to be adopted from less digital mature organizations (IC2). This is the only way for some organizations to continue and expand their digital transformation efforts.

“For example, customers increasingly want a communication platform as the traditional ways of making a phone call or sellers visiting are no longer enough. So, among companies’ purposes is to develop a platform where customers will be able to be informed about existing stock, order payments, and track the products during the delivery process” - IC11.

Another important external trigger is competition and especially the outbound competition which is more intense. In the examined case, the outbound competition is a significant trigger that is directly connected to financial performance indicators as a significant percent of their revenue is connected to outbound customers. Another stakeholder from the external environment with great influence is the collaborating organizations and especially technology providers. Low digital-literate organizations (like IC2) heavily rely on technology providers' suggestions that are regarded as valuable and trustworthy. However, in our sample we noticed that medium or high digital literate organizations rely on technology providers insights hence, they choose to formulate long-lasting and stable partnerships. Organizations gather insights from their collaborating organizations that may be in an entirely different industry. These collaborations are a triggering source that forces organizations to offer new services. Finally, some of the organizations collaborate with research centers and universities to extract knowledge (IC1) or to test new services (IC7) like improvements in last-mile delivery options.

“For the development of the (above) strategies, the company pays attention to market changes and trends that are an input for the Research and Development department that designs the products. Attention is also paid to competition and innovative solutions are developed accordingly. (...) Finally, entering new markets with new partnerships in the sea shipping and sea transportation industry motivates organizations as they are industries that require high-level technologies and innovative proposals-solutions” -IC9.

The intertwined of the external and internal environment is in line with literature suggestions. Data from the external environment is transformed into valuable insights that are exploited by the R&D department to propose new products and services (IC9). However, organization ability to allocate funding and infrastructure resources to collect more data (related to organization size) influence organizations ability to extract knowledge from data. For example, IC7, a multinational organization, by analyzing data about end-customers behavior changes and needs, forecasts market dynamics shifts. Furthermore, organizations constantly try to improve their financial (reduce operating cost, ROI) and non-financial KPIs (improve communication between departments and employees, increase efficiency and productivity, security issues), and thus they choose to digitally transform their processes.

Focusing on the “Suggestions from employees” variable, we notice that mainly they come either from the executives or the Head of specific departments (IC9) or workgroups (IC7). As many organizations want their employees to work more productively and efficiently, they rely on their recommendations for improvements and suggestions about new technologies (IC5). It should be pointed out that not all organizations have the same level of digital capabilities and digital literacy, so the trigger “suggestions

from the employees or executives” does not apply to all organizations. Another parameter that in the literature is considered as a trigger is the change in TMT. However, in our sample only an organization (IC1) had this type of change in their TMT and influenced the DT process.

Stage 2 - Formulating a Digital Transformation Strategy

Even in the literature, a customer-oriented digital transformation is the first choice for many organizations, it was found that many organizations begin their digital transformation journey by adopting a process or production-oriented transformation strategy. Improving back-office operations enhances the offered customer experience either by offering new or upgraded services, or by creating new sales channels. A production process-oriented digital transformation could decrease product costs which could, also, be translated into financial benefits for customers (IC1). By digitally transforming their administrative and production processes (including products, transport vehicles, warehouses, and customer accounts) organizations accelerate the customer experience digitalization as they offer additional services, exploit the opportunities of communication platforms to let customers make orders, communicate with head offices, and track order process (IC11).

This research framework proposes that process-oriented digital transformations can target either the administrative or the production processes. However, the analysis indicates that regardless of the focus of the processes the goal is to automate and/or optimize main processes. Part of the administrative process automation and optimization is to automate or even systematize the communication process with their customers. Furthermore, they try to eliminate the human factor from the data collection process to reduce mistakes. The main goal of process automation in both cases is to improve work-life either by adopting communication tools to enhance communication or by adopting technologies that will improve employee production. Even though the process overview is not significant in the administrative processes it is essential for production process-oriented digital transformation, and it focuses on monitoring every stage of the production process in real-time, facilities management, equipment maintenance activities, and quality control processes. Especially, the quality control process is vital to food production organizations (IC1, IC2) and Computer, electronic and optical products (IC9) organizations.

“However, to achieve this (a digital platform for customers to track order process) you need to digitize the products, the transportation truck, and the customer. This level of personalization and automation could not be achieved with traditional means like telephone communication. Therefore, entering a new world forces the company to change the form of communication inside the business by adopting a digital way” -IC11.

For organizations with multiple factories and several employees (over 1.000) (IC11, IC12) process-oriented digital transformation is a means to achieve a certain level of integration not only between administrative and production processes but also at group and/or facilities level. Firstly, they focus on the production process and the way it is planned. The goal of IC11’s digital transformation is for every factory to use the same machinery to better monitor maintenance activities and spare parts inventory. Secondly, the administrative process integration targets communication and process alignment to simplify the communication of the headquarters with the affiliated organizations. These outcomes signify organizations’ efforts to create an ecosystem that will create and deliver value. As it was indicated by the literature a value-oriented transformation is not the first option for organizations. In our sample, only 3 organizations (IC9, IC7, IC5) have specified that their ultimate goal is to transform their value proposition by shifting the focus of business model from being a manufacturing or transportation company to a service

provider that supports each customer by providing all the necessary software to easily track their transportations (IC7) or by providing their customers integrating solutions and services (IC9).

“Customer and process improvements are the main sources that direct the changes in the company but also cause continuous business model changes. This has as a result the company not being a simple transport company but evolving. That is why there is an ongoing debate about whether the company is a service provider or a construction company or a company that provides customers with the tools and equipment to have direct access”-IC7.

As far as the time horizon of the digital transformation process, mainly organizations formulate a 5-year digital transformation strategic plan, but they choose to formulate a detailed 3-year roadmap (IC12), or they revise their initial plan every 6 months (IC11). This indicates the organizational need to regularly review and redesign the transformation process based on their needs and feedback. Hence, both organizations (IC12, IC11) have established well designed monitoring processes. All organizations follow a multi-level digital transformation strategy (IC9, IC5, IC12, IC11). However, it is a gradual process meaning that they prioritize the digital transformation projects (IC5, IC11, IC1) and segment them into smaller projects to implement strategy more easily and help employees to adapt more easily (IC5). IC11 detailed described how they segment digital transformation strategy and how they design their implementation initiatives. Because of the organization size and characteristics (multiple factories), its strategy is segmented into digital transformation islets; meaning that they focus on specific digital transformation projects each time (IC11). Consequently, segmentation influences the way organizations deliver each project and the way organizations implement digital transformation.

“To develop the digital transformation strategy, the company designs a 5-year plan and then creates a 3-year roadmap, which is constantly reviewed and modified when conditions require”-IC12.

Stage 3 - Assessment stage

Only one organization (IC11) has clearly pointed out that they assess each process before they start to formulate the implementation plan. Their assessment process mainly consists of efforts to identify the main pieces and the key processes that are required for each strategy. Hence, before they digitalize key processes, they deconstruct each process, and list the related tasks and employee responsibilities. Through this reconstruction they identify risks and overlapping responsibilities. Organizations followed this path because they needed to find a starting point for the digital transformation project. Hence, the team decided to deconstruct processes to better understand organization processes and digital transformation needs. On the contrary, IC2 mentioned that they evaluate existing processes and employees digital capabilities because of previous experience. In the early digital transformation stage, the organization faced resistance when they tried to automate their warehouse. The source of this resistance was the lack of planning and support for middle managers and employees. Nowadays, the organization relies on existing structures and builds the implementation plan around them; by designing various supporting initiatives to encourage employee participation.

“The company soon realized that its main assets are the digitization of its key codes, and the digitization of products, customers, suppliers, spare parts and people are extremely important. So, it is very important to digitally define company’s necessary pixels as they help

organization accelerate digital transformation process and company can gain power from the data collected every day”- IC11.

It is expected that technology-intense organizations employ users with high-level digital skills. However, even these organizations (except for IC10) segment their employees into two categories; employees in administration processes and production processes (IC9, IC2, IC11). This segmentation is necessary when management teams design the implementation plan and dedicate more resources to training programs for production processes employees to make easier the transition and encourage participation. On the other hand, when an organization does not have sufficient digital capabilities (IC2), they heavily rely on their technology partners and their partnerships are long-lasting and stable. In addition, the implementation plan includes various training programs or recruiting new employees. However, when most of the workforce are blue-collar employees, for instance in IC11 case that they are over 1.500, the organization is called to systematize the training process and is forced to digitalize the HR department, too. Consequently, we notice a direct influence of employee digital capabilities on the implementation stage and more specifically in the initiative that focuses on training programs.

“About employee training actions, it should be taken in mind, employees’ different levels of digital maturity. (...) During past investments in 2010, problems arose in the adoption of WMS as the process was not properly designed and was not taken seriously. (...) The issue that emerged was a major problem and suggested that a better alignment of processes was needed for the adoption of technology and perhaps greater support from the administration”- IC2.

Consequently, the aim of this stage is for organizations to assess the internal environment by analyzing existing processes, technological resources, and capabilities. This input will simplify the investment and implementation stage. Furthermore, these insights may force organization to reformulate the DTS to fit better with the organization’s existing resources and capabilities.

Stage 4 – Investing in digital technologies

The formulated digital transformation strategy influences organization’s digital technology investments. Nevertheless, previous investments are considered technological backbones for organizations and are used as foundations for future investments. When organizations choose digital technologies that will be the foundation for their process digitalization, they must examine every choice and take into mind each technology's benefits and risks (IC11). Evaluating each option and choosing the right partner could simplify the implementation process. To avoid technology adoption problems, especially in foundational technologies, organizations should monitor the process and make the necessary adjustments (IC9).

During the interviews, participants underlined the technology investment selection criteria. Organizations adopt digital technologies that are mature and extensively used by inbound peers as they want to eliminate adoption problems and secure easy access to maintenance and support. Thus, even organizations that are capable and willing to invest in advanced digital technologies like robotics and automation have not proceeded with these investments (IC5) and choose technologies in the later stage of the Technology Life Cycle like the era of incremental change. This is the reason, that our sample mainly focuses on digital technologies like the Internet of Things (IoT), cloud computing, digital platforms like ERP and CRM, and Big Data, and we do not see more advanced digital technologies that we meet in the literature.

“Finally, it is very important for the company to have partners within the country who will be able to support us in case of maintenance. This is the reason, popular technologies in our sector such as robotics and automation have not been adopted yet by the organization but are in organization's plans when they will have developed in Greece. (...) Cloud Computing adoption has managed to reduce costs as it is very important for a business to be able to start with small infrastructure and increase resources according to our needs without having to invest in solutions within the business. In addition, it helped the company prepare for the changes that took place during the pandemic (...)”-IC5.

Stage 5 - Implementation initiatives

The proposed research framework suggests 6 implementation initiatives that enable a successful digital transformation. The analysis indicated that organizations choose to follow some of these initiatives or combine various initiatives based on their readiness level and the chosen strategy.

Governance Structures

Digital transformation is managed by a C-level executive only in two cases (IC5, IC9). In the first case is managed by the CDO as proposed in the literature and the other case it is managed by the CEO (IC9). Many organizations in our sample have chosen to formulate cross-functional teams (3 to 4 members) that consist of a C-level executive like the CEO, and executives with deep knowledge about existing technologies, organizations systems, and processes. When the CEO does not participate in this cross-functional team (IC2), then this effort is led by a senior executive with deep organizational knowledge who is part of the Top Management Team. Furthermore, the cross-functional team is supported by a totally digitally transformed IT department (IC11) or by external partners such as technology providers. On the other hand, IC7 and IC12 have chosen to create new departments or hubs that manage and coordinate transformation efforts. IC12 made internal organizational structures and created a new department, the Innovation Department that incorporates four other departments that are vital for organizations digital transformation process. On the other hand, the multinational digital mature IC7 has not only formulated multiple working groups each with a specific focus like investments, improvements, and changes but also a dedicated innovation center.

We can conclude that if digital transformation is not managed by a C-level executive then it is more likely to follow a hybrid management schema like in the IC7, IC12, IC11. Nevertheless, the responsibilities of every entity are similar and have the same purpose to coordinate and enable digital transformation. Some of the responsibilities of this management position are to coordinate transformation efforts and manage the multiple cross-functional teams (IC5), to promote digitalization efforts (IC2), to propose appropriate tools and technologies (IC12), to monitor technological developments and incorporate them in its business model and operations (IC7), to share strategic decisions and plans with the Head of each department and factories' managers (IC2), to propose directions for the annual planning and monitor technological developments that could be adopted in the next 3 years (IC7), and to develop training programs to improve employee's adaptability (IC7).

“There are working groups around the world, trying to identify areas that may be areas for investment, improvement, and change. In the beginning, the process was not structured, but in recent years we choose to follow a more structured approach where the company tries to create a strategy and identify areas that can change and keep pace with the (above) directions, i.e., the available technologies and how they can be used, employees' training

programs to improve skills and train them to be more adaptable to change. There is an innovation center that plays an important role in technology adoption. It is an independent unit that studies beyond the annual time horizon and foresees technologies for the next 3 years. In general, the selection of strategies is done in the following way: every year, specialized workers from different fields make suggestions to improve the respective area”- IC7.

Changes in the internal structures

Changes in the internal structure may be necessary and mandatory as organizations formulate new departments to manage digital transformation or specific departments are more involved in the management process (IC11, IC2). Even more important are structural changes during the adoption process of technology in key administrative or production processes as they support employees. IC1 and IC2 are key examples of these practices and proceed to new investments with structural changes and supporting operations to fully exploit the opportunities of the new investment or to encourage employee participation, respectively.

“A pre-condition for payment tracking and pay-to-order platforms is to digitize key processes as there is a link that connects those two parameters. Previously, the whole process was done in a way that was not always serial because there was no such need. During digital transformation the company has changed the whole process, the organization chart, and employees’ responsibilities. Due to organization chart changes, several risks were identified, and responsibilities overlap. It is important that first the process was changed, then the digitization took place. A key pre-condition was the digitization of customers, product codes, etc. to be able to achieve the digital transformation process”- IC11.

In the IC1 case, digital transformation strategy targets the production processes so the organization has invested in IoT digital technologies. However, to exploit this digital technology, and systematically collect and monitor the process they had to create a new department, the Industrial IT Department that is responsible for all the adopted IoT technologies in the production line. On the other hand, the implementation process followed by IC2 revealed the importance of adding supporting processes to help employees deal with the changes and transform their work life. Furthermore, the IC2 example showcases the connection between the previous stage and this stage in general. As the organization had not from the beginning assessed the existing processes and employees’ capabilities, during the adoption of digital platforms that would automate the warehouse processes they faced problems as employees were unable to handle the additional workload. To overcome this problem, they had to redesign the adoption process by adding supporting processes and creating new working positions.

A sub-category of the changes in the internal structures is cross-functional teams, which seemed to be a common practice that organizations in our sample utilize. Organizations try to exploit the capabilities of existing business units and promote collaboration between departments (IC1, IC5, IC10). This type of collaboration helps organizations to better understand each department’s needs and to develop solutions like software that fully covers their expectations (IC5). Also, cross-functional teams improve monitoring initiatives that are important for the organization (IC10) and involve key stakeholders like middle managers in this digital transformation process (IC2).

Collaborations or partnerships

Even organizations rely on technology partners recommendations and suggestions, they internally formulate their strategies and turn to technology partners in the investment and implementation stage. Only one organization (IC12) mentioned that they collaborate with a consultancy to sense, analyze, and target specific fields for digital transformation projects. Furthermore, some organizations (IC1, IC7) partner with research institutes and universities to obtain scientific or technological knowledge, and to access state of art technologies and services or recruit young talents. For example, IC7 participates in many academic research projects to test and improve services like last-mile delivery and unmanned delivery points. It should be underlined that technology partners may hinder implementation by creating problems as they may not have fully understood the way the organization works and its digital capabilities level (IC2), or the technology partner is not enough qualified for this type of project (IC9).

Focusing on technology partners and collaboration characteristics, the analysis indicated that mainly organizations develop long-term stable partnerships and consider the technology partner an extension of the organization or they formulate ad hoc partnerships that secure access to missing resources and obtain knowledge. Formulating collaborations with these characteristics is even more important for organizations with limited capabilities to rely fully on technology partners (IC2). Consequently, a parameter that regulates the way these collaborations will work is digital capabilities; organizations with high digital capabilities (IC5, IC7, IC10, IC7, IC9) collaborate with technology partners to gain access to missing resources or to enhance their resources. For example, organizations with sufficient digital capabilities are actively involved in the software development process to ensure that their needs will be covered and to develop fully-customized software. According to their point of view, this type of collaboration is a way to expand their workforce (IC5).

“For IT projects the company has strategic partnerships with IT companies and does not develop in-house the technology, even though the internal team is quite "strong". The company selects its partners very carefully and the collaboration is long-term and is evaluated every year. In recent years, the company strategically tried not to develop stand-alone IT projects and exploits its partnerships. For example, the Fleet Management Software (a customized software) has been developed by this type of partnership as the company contributes with the analysis and is actively involved in the development part”- IC5.

Acquisitions are a choice that is correlated with organizations financial resources. In the examined example, only one organization, the multinational logistics organization (IC7) has acquired smaller organizations or startups during digital transformation. Through acquisitions they gain new digital capabilities or invest in upcoming technologies. However, for the majority of the organizations acquisitions are not an option because they cannot afford to allocate this amount of financial resources to this purpose and also, they only invest in technologies that are mature enough (IC1, IC5). It is reasonable that digitally mature organizations that are pioneers in digital transformation and have created their own Innovation Center are able not only to acquire other organizations during digital transformation but also to partner with technology leaders. However, in this case, Innovation Center plays a key role in the technologies that organizations are going to adopt.

Training programs or recruiting programs

Especially organizations in labor-intense industries like IC1, IC2, IC5, IC11 implementation is hindered by employees that are against or unwilling to adopt new digital technology, and a digital capabilities gap

exists between the administrative and production employees. To eliminate this gap, organizations design training programs to familiarize employees with the technology and use them as a means to communicate the advantage of the new technology by presenting the benefits. Obviously, the way organizations respond to these problems is directly related to employee numbers and organization priorities. Smaller companies like IC2 apply simple solutions like intense training programs to eliminate this resistance or rely on the “unofficial” knowledge exchange between employees. Bigger organizations like IC11 (over 1.500 employees) systematize their training process by involving the HR department (which has been digitally transformed) and by creating new entities “the Industrial Excellence Team” to structure and coordinate the training program. On the other hand, in organizations where employees’ digital capabilities are considered advanced (IC5, IC9, IC10) the training initiatives are focused on maintaining or advancing the existing level of digital capabilities. Hence, a specific budget is allocated to these purposes and to training programs that are held internally or outsourced. Except for the training programs, organizations eliminate digital capabilities gaps by recruiting new employees with specific skills (IC7, IC9, IC12). These recruiting initiatives include code campus events that are held by the organization in collaboration with specific university departments and help the organization reach undergraduate students (IC12).

“Lately, digital education and training have been an important issue for the business and steps are being taken to improve it as it is part of company’s digital transformation scope. (...) The Industrial Excellence Team has created a “school” with various training stages that employees must attend and pass. This process had become part of business culture. This project started last year, and it is adopted gradually by all departments, so beyond successful digitization, this program secures that employees will have a similar level of skills regardless of their position or factor. Through digitization, the company has as a dream-vision and is the next step in production to introduce automation and robotics”- IC11.

Communication initiatives

Incumbent organizations promote digital transformation either through management team by naming an executive like the CDO (IC5), digital transformation team (IC11) or an executive (IC2) a digital transformation advocate, or by exploiting multiple communication platforms like email, Teams to disseminate the digital transformation message or they exploit both options. Regardless of who carries and communicates the message, it is important to communicate a clear and direct message that inspires employee participation and creates a trusting environment. For organizations with low digital skills capabilities (IC2, IC11) communication initiatives are even more significant because they eliminate implementation obstacles. Through various communication channels, they communicate the benefits of new technology to employees and encourage employee suggestions for new technologies. Furthermore, the top management team cultivates a culture that supports the change and makes employees feel secure by exploiting different ways to promote digital transformation. Some of them are to inform employees about digital transformation efforts (IC1), to present the expected benefits of digital transformation and digital technologies adoption (IC1), to let executives participate in meetings with advanced and bigger organizations to motivate them and prompt excellence and be part of the change (IC9) or to introduce a reward system with monetary, evolutionary, and ethical rewards (IC9).

“The company has managed to convey the message to employees about technology adoption. However, it is a process that has been done gradually over time. To achieve this, several factors met: the commitment from the management and that we find the right person who will undertake to “carry” the adoption, a champion. More specifically, the systems and

procedures manager, who oversees computerization, is very close to the employees and solves their problems. Therefore, she is considered the factor that helped organization during the adoption. Organization's experience has indicated that it needs a person who is close to the employees, listens to their concerns, solves problems, and overcomes obstacles that might be created from the adoption"- IC2.

Key enabler for communication initiatives is leadership support and commitment to digital transformation. Top-level executives set an example for the organization's employees, so their support and commitment have an undeniable influence on employee participation. However, employees and especially their digital capabilities influence the way organizations choose to communicate digital transformation efforts. When there is a digital capabilities gap, experience has shown that an advocate who has direct relationships with employees and knows every aspect of the organization is very useful (IC2). Other implementation initiatives like the creation of a new department could have a twofold influence. Not only does it coordinate better the implementation process but also it is a communication channel between the management team and employees.

Monitoring initiative

All organizations have established a system to monitor and make the necessary interventions during implementation by using various tools like KPIs, Gantt charts, etc. Nevertheless, the structure of these processes is from well-defined to not well-defined. Organizations with no well-defined monitoring processes rely on an informal process that is based mainly on the senior executive point of view and how this executive perceives the success of the implementation initiatives (IC2). On the other hand, organizations with a specific monitoring mechanism have regular meetings every 3 or 6 months where they examine the process of each digital transformation project. Organizations that have established a specific plan which encompasses specific actions, and milestones are capable of monitoring each of these parameters in detail as some actions/projects have different implementation rates (IC5, IC7, IC11). In this case, they review the implementation process twice a year and access every aspect of digital transformation. During this review process, they can set the budget for the next year and the next 5 years (IC11). In this long-term planning process organizations, most of the time follow the original plan and make minor adjustments if there are not any major disruptions in foundational planning elements.

"Digital transformation is at 2 levels in operational and R&D. These 2 agendas are monitored per month and there is a Gantt chart that compares the actual actions and the forecasting actions. In R&D, the evaluation was done and is done per month, at the level of the procedures before the adoption of SAP the evaluation was done every 3 months, but due to a problem that was created during technology adoption, now the evaluation takes place every month until the company secures that the system has been successfully adopted. Once this goal is achieved, the evaluation will be done every 2 months and then every 3 months (as was the case at the beginning)"- IC9.

Nevertheless, how often the organization evaluates digital transformation implementation depends on the level of investment, the industry, the production process, and the intertwined digital transformation strategy with organization strategy. When business and digital transformation strategies are intertwined the implementation process is continually monitored and adjustments are made based on the feedback (IC5). If a digital transformation strategy is focused on a vital department, organizations choose to access

it every month to secure successful implementation. A reevaluation of the assessment periods could be made if an organization faces problem during the adoption of a digital technology (IC9).

Stage 6 - Digital transformation outcomes

In our sample organizations cannot identify financial outcomes that come from digital transformation projects. Their main goal for implementing a digital transformation is to reduce operating costs (IC5), and/or eliminate extra expenses (IC2, IC12). Many of the examined organizations have not experienced digital transformation financial outcomes but they are confident that they will because the non-financial outcomes that have been identified have a direct influence on financial outcomes (IC1, IC11). According to this view, positive financial outcomes will come after they experience negative financial outcomes because of the capital intense digital technologies investments. Following these negative outcomes and as the implementation evolves organizations will start experiencing positive non-financial outcomes. The collective impact of the non-financial outcomes and the digital maturity levels that will be achieved will let organizations identify positive financial outcomes. This thought is according to literature conclusions that organizations can identify financial outcomes only when they are at high digital maturity levels. On the contrary, they consider different financial KPIs like ROI when they are investing in digital technologies.

“The results are clearly financial because it all starts and ends with it but in between, there are non-financial benefits. Initially, they are a negative financial result (as you pay for the investment, whether it is consultants, software, or more staff), then these investments are transformed into attributes (happier employees, customers, less risk in the markets, etc.). Finally, all these are converted (even the company has not experienced it) into financial revenues as it happens with any investment”- IC11.

The most mentioned non-financial outcome is work-life improvements including simplifying employees' tasks, reducing required time for tasks, enhancing collaboration and communication between departments and employees, and general improvements to employee satisfaction. Also, customer-oriented transformation strategies significantly affect customer experience by enhancing customer satisfaction and their trust in the organization, offering new services, and improving products/services quality. Changes in efficiency and productivity, improved flexibility, adjustment capabilities, and elevating brand name and reputation are some of the outcomes that many organizations face. As organizations offer new products and services, they create new revenue sources. The digital transformation of production and administrative processes improves the evaluation process and enables monitoring processes in real-time. This way they gain high-quality insights that facilitate faster and more accurate decision processes. As human intervention is minimized, mistakes related to human errors are eliminated and risk rates are decreased. Finally, organizations with integrated digital transformation strategies anticipate the creation of economies of scale.

5.2.2 Factors with significant influence on digital transformation process

This section analyzes the way contextual factors influence the success of digital transformation (Table 13). As described above, contextual factors list parameters that are related to the manager (leadership change, leadership support, middle manager), to the organization (organizational identity, organization orientation, industry or unique characteristics of the organization) and factors related to employees (digital capabilities, participation).

	Managerial Factors	Organization factors	Employees
Stage 1 Triggering factors			
Activates organizations scanning mechanism	Managerial perception Leadership support	Digital Orientation Organization identity Industry External stakeholders	Employees
Stage 2 Strategy formulation			
Formulating a DT strategy	Managerial perception Leadership support	Organization orientation Organization identity Organizations' unique characteristics Industry External stakeholders	Employee digital capabilities
Accelerates efforts for digital transformation	Personal experience	Brand reputation & brand name	
Stage 3 Assessment			
Assessing internal environment			Employee characteristics
Stage 4 Investments in digital technologies			
Accelerated investments in digital technologies	Personal experience	Organization identity Organization orientation Beliefs	Employee digital capabilities
Stage 5 Implementation			
Encouraging employee participation	Managerial perception (Leadership support)		
Promoting digital transformation activities	Managerial perception (Leadership support)		Employee willingness to participate
Affect the implementation plan		Organizations unique characteristics External stakeholders	Employee digital capabilities
Stage 6 Outcomes			
Performance indicators (financial or non-financial)		Industry	Employee characteristics

Table 13: How contextual factors influence digital transformation process.

Management factors

Personal experience and the weight that the executive board gives to digital technologies and digital transformation are keys to organizations efforts. As was expected and indicated by the literature, managers in technology-intense industries are keener on digital transformation and are more willing to

invest in digital technologies. In labor-intensive industries, the decision to follow a digital transformation strategy is clearly a top management decision. Managers consider the digital technologies adoption, part of their business so, they support transformation initiatives and have connected digital transformation strategy with business strategy (IC5, IC7, IC11). Nevertheless, this philosophy does not apply to all labor-intensive organizations in our sample. In IC1 the shift towards digital transformation and extensive digital technologies adoption began when younger executives entered the Top Management Team. In the second case (IC2) we see that adopting digital technologies is directly connected with organization identity and orientation. In fact, it is an attribute that was inherited by the founder and has been infused into top management team.

It is clear that the leadership support for digital transformation relates to organization beliefs, priorities, and orientation. Leadership support that in practice is mirrored in the managerial perception regarding digital transformation and digital technologies investments are important parameters that encourage participation and accelerated implementation. It is mandatory in early transformation stages when organizations try to understand the importance of this strategy to scan the internal and external environment and seize opportunities. In the examined cases, leadership support appeared with CEO's active involvement in digital transformation strategy formulation stage and promoting activities. However, the analysis highlights the influence of the middle manager in the adoption process and the potential problems that top management will face during implementation (IC2).

“Management team strongly supports the adoption of technologies and digital transformation is closely intertwined with company's strategy as it is our view that it could not be a 3rd party logistics company that serves a large number of customers with different needs without considering technology part of its operations. We consider that digital transformation is an important part of this sector and without it, we cannot work as it affects all parts of the company like sales, marketing, supply chain, storage, etc. So, the strategy of digital transformation and business strategy are two strategies that run in parallel”-IC5.

Organization factors

An orientation towards technological solutions and a continual effort to improve existing infrastructures are enablers for digital transformation efforts (IC2, IC10, IC9, IC12, IC7). This orientation becomes part of organization identity triggers digital transformation efforts and lets organizations become proactive and cultivate an adjustive and efficient culture. Therefore, these types of organizations are more willing to invest in digital technologies and transform their processes. In addition, organizations that pay attention to brand name and reputation start a digital transformation project and exploit it as a promoting mechanism (IC2, IC1). Equally important is organization scope as many organizations in our sample are characterized as customer-centric organizations (IC5, IC10, IC12). Consequently, to fulfill customer needs and remain competitive they must implement a digital transformation and try to offer new services and products and enter new markets. Finally, organization beliefs that are mirrored in organization identity can shape digital technology investments and/or digital transformation strategy formulation, and this is a reason why IC2 is willing to make all the necessary digital technologies investments.

The analysis pointed out the influence that industry and organizations unique characteristics have on digital transformation efforts. For example, IC5 an organization in Transportation & Storage industry mentioned that digital technology is considered a foundational part of their industry and hence digital transformation is directly connected to organization survival and success. Industry shapes the first two

stages of the proposed research framework, meaning the triggering, and strategy formulation stage. In addition, digital transformation strategy formulation stage and implementation stage is shaped by the organization's unique characteristics. IC1 has its delivery system which must be part of digital transformation efforts or IC2 considers that they cannot calculate many of their raw material. Nevertheless, external stakeholders may hinder the strategy formulation stage and the implementation stage. More specifically, wholesale customers, public entities (customs), or suppliers influence the implementation process as may not have the necessary digital maturity level to adopt the proposed systems. In these cases, organizations develop additional systems to partly automate the process (IC1) or establish internal processes to eliminate obstacles created by public entities (IC5). But wholesale customers (especially the non-domestic customers) can be a trigger for digital transformation as they demand new ways to communicate with their suppliers (IC11) or have advanced needs (IC2, IC1).

“Digital transformation is very important for the company as it cooperates with important companies worldwide and it is important for us to be familiar and possess cooperation and communication tools and have a specific structure. The necessity of digital technologies and monitoring technological developments comes from the founder of the company, who had the maturity and was introduced to the company technologies at an unsuspecting time. Thus, it is the main reason that the company from the early days started adopting technologies and taking such initiatives”-IC2.

Employees

The code application analysis underlines the significance and the great influence that employees have on every stage of the digital transformation framework. Especially in the implementation stage as many organizations segment employees according to their digital capabilities and design implementation initiatives, accordingly. Employee digital capabilities impact not only the implementation stage and the initiatives that organizations will choose but also the strategy and the digital technologies that the organization is going to choose. Thus, one of the labor-intense organizations with employee numbers over 1.500 (IC7) has completed the digital transformation of the HR department and has systematized the training program. In addition, organizations must consider the employee factor when they formulate the message that want to communicate. They must consider how willing employees are to participate, and their point of view about the way their tasks must be performed.

Financial resources

Even the selection criteria secured that all the participating organizations have sufficient financial resources and can dedicate enough funds to digital transformation, the analysis shows a direct influence between budget and DT as it affects scale, technology investments, and implementation. Even though digital transformation is funded mainly by internal sources, external funding (bank loans or governmental subsidies) is an option that is used by many organizations. However, there is a connection between funding and organizational identity, and orientation. Organizations consider digital technologies investment important for their organization so if a technology investment must be made, they do not consider its cost (IC2). In other cases, digital transformation is part of the business strategy, so they allocate sufficient financial resources for this purpose (IC5). As far as budget allocation, digitally mature organizations (like IC7) break down each implementation action and set individual budgets for each action/project. Furthermore, there is a difference in the expenses that organizations include in the digital transformation budget. For example, IC5 does not consider the equipment budget as part of digital

transformation expenses, on the contrary IC1 considers equipment as part of the budget. Finally, in organizations like IC10 the human factor is an important parameter and organizational priority, so they allocate a significant part of their budget to employees' wages.

"Many investments are funded by equity as it is the way business operates. It is our "motto" that if an investment is needed it should be made. If there is a funding problem, the company tries to take advantage of subsidies and programs. It is possible at some point for subsidies funding to have allowed the implementation of investments. During our history, only 30% of the investments made by the company in the last 10 years have been subsidized by programs"-IC2.

5.3 Concluding remarks

Digital transformation process starts with the CEO or Top Management Team after deciding that digital transformation applies and fits organization's strategy. Thus, managers' perception towards digital transformation and digitalization's affiliation to business model are parameters that trigger digital efforts. However, manager's perception is directly influenced by industry standards and their will to follow or challenge these standards. Therefore, as it was recommended in the literature, a change in the TMT composition may be mandatory before starting a digital transformation process. Furthermore, internal factors like organization need to improve, organization priorities to maintain or improve their brand name, and being proactive stimulate sensing abilities and facilitate digital transformation efforts. Consequently, the management and organization factors holistically impact digital transformation as they are needed to kick-start this process.

The main and most influential triggering factor in the examined sample is customers. Organizations segment customers into inbound and outbound and set outbound customers as the key drivers of digital efforts. The inbound customers, even though they are not so demanding, hinder digital efforts as they lack the necessary digital capabilities. Insights from customers' needs, behavior, and requests are analyzed and are inputted for specific departments like the R&D department to propose new products and services to the Top Management Team. Especially for organizations that are defined as customer-centric, customer insights are extremely important and influence the digital transformation strategy formulation process. A similar clustering process is followed for the outbound competition which is more intense and forces them to respond. Finally, another important triggering factor is collaborating organizations, especially technology providers, consultancies, and partnerships with organizations from unrelated industries.

Relying on the triggering factors, organizations mainly choose to digitally transform administrative and production processes. It was concluded that digitally transforming processes will accelerate customer-oriented transformation because organizations will be in a position to offer better services and high-quality products. This is in line with the literature findings that propose that organizations should first focus on processes and then focus on customer experience because operations and back-office processes are the backbones of customer experience digital transformation. In the examined cases, process-oriented transformation efforts mainly focus on process automation and optimization, systematizing the communication process with customers, and continually monitoring the production or administrative processes. As administrative or production process automation evolves, and organizations reach specific automation levels it leads to some level of integration among the factories and the subsidiaries. In this sample, a value-oriented digital transformation strategy applies only to two organizations. In the first case

(IC7) organization has achieved a high digital mature level that has totally disrupted organizations value proposition. Hence, the organization tries to understand if they are a transporting or service provider organization (IC7). In the other case (IC9), industry advancements dictate this path to advance existing products by adding services and following a service-oriented business model. The analysis clarified that this stage is influenced by manager's final decision as it is a strategic decision, and that industry sets some directions and best strategies that organizations could adopt after adjusting them according to their capabilities. As far as the scale and time horizon, organizations prefer a multi-level approach as the main strategy to be segmented into smaller projects and tasks, and they formulate a 5-year plan and a detailed 3-year roadmap, respectively.

The assessment and technology investment stage is very important because it affects the implementation stage and may dictate organizations to reformulate the selected digitalization strategy. Hence, for the assessment stage, the dissertation tries to examine 3 parameters; the existing structures, digital capabilities, and technology infrastructure. However, not all organizations mentioned that they systematically assess their existing processes and structures or that they follow a rather constructive way to evaluate the processes and responsibilities of each task. Previous experiences of failed attempts to adopt a new technology force organizations to focus more on the assessment stage and start formulating a better and more detailed implementation plan. As there is a digital capabilities gap, organizations segment employees based on digital capabilities levels and create two clusters the administration and production employees. This clustering is necessary for the implementation as they are obligated to dedicate more resources to training programs or restructure processes to support implementation. In addition, digital capabilities affect the way an organization collaborates with technology providers and their exposure to them. Although previous investments are used as technological backbones organizations thoroughly examine new options before proceeding to new investments, and closely monitor the adoption stage when it comes to key technologies for the business model. Technology investments are dictated by the chosen digital transformation strategy, and managerial perception. Organizations adopt different technologies based on their needs and previous investments like digital platforms (CRM, ERP, WMS, etc.), Internet of Things, Cloud Computing. Finally, the choice of technology depends on the Technology Life Cycle in the inbound market as organizations want easy access to maintenance and support services, technology cost, and scalability.

The digital transformation and the assessment stage let organizations design a detailed implementation plan. Our analysis suggested that leadership support including high-level managers and middle-level managers, employee participation, and stakeholders like customers or public authorities force organizations to reformulate the implementation plan. It is important for organizations to choose the right governance structure to manage transformation. The analysis does not propose a specific management type, but we have identified that many organizations include departments or executives with deep knowledge of existing systems and infrastructure. Changes in the organizational scheme are necessary when new departments are created, new technologies are adopted, or when external stakeholders use new digital technologies. However, how extensive the reorganization process will be and how intense the support towards employees relates to the existing level of digital capabilities. An aspect of restructuring processes is cross-functional teams that are used for software development or to implement digital transformation projects. Alongside, they enhance promoting initiatives as they include multiple influential stakeholders of specific departments and are a monitoring mechanism as they evaluate the process from different views.

Organizations rely on their collaborations and partnerships to sense disruptive changes. Thus, they choose to create long-lasting stable collaborations with their technology partners. Nevertheless, the way that this collaboration is going to be formulated is defined by digital capabilities, too. Organizations with low digital capabilities depend more on technology partners in contrast with highly skilled organizations. Another initiative that is affected by the level of digital capabilities is training and recruiting programs. In highly skilled organizations, the purpose of the training programs is to trigger employee interest and in low-skilled organizations, the main aim is to familiarize employees with the technology and communicate the technology benefits. Nevertheless, the intensity and the number of training initiatives are related to organizations' priorities and the number of employees. Training programs might be considered as promoting initiatives that inform employees about the changes inside the organization. However, organizations use multiple means to communicate transformation efforts like using multiple communication channels, reward systems, or encouraging employees to participate in meetings. Organizations must consider the digital capabilities level and choose the appropriate way to communicate a clear and direct message and cultivate a supporting culture. Finally, organizations apply monitoring mechanisms to evaluate the progress of the implementation according to the level of investment, the industry, the production process, and how connected the two strategies are.

The last stage of our proposed framework describes the outcomes of digital transformation. Organizations that were willing to share during the interview the financial outcomes were unable to identify financial outcomes because they had not experienced them yet. However, they strongly support the idea that financial outcomes will be visible in the next stage as they have already seen non-financial outcomes. Mainly organizations try to improve work life, enhance customer experience as many are customer centric, and make investments that will positively affect efficiency and productivity. A final notice is about financial resources. Even though the selection criteria secured that all organizations have sufficient financial resources, during the interviews it was mentioned that organizations face budget restrictions that influence the scale, investments, and implementation. But we also notice that budget allocation is directly connected with organizational beliefs and orientation.

6. INFLUENCE OF EMPLOYEE FACTOR IN THE ALIGNMENT PROCESS

This chapter unveils the findings obtained from the comprehensive analysis of our selected case studies. The case study analysis results presented here represent the core of the research efforts, providing a deeper understanding of the complex real-world scenarios it explored. The dissertation aims to shed light on the assessment process of existing resources, the way organizations invest in new technologies, and the implementation of digital transformation. These stages will be examined under the prism of employee influence and the middle manager role. Therefore, throughout this chapter, the researcher will present the key findings, patterns, and trends emerging from our case study analysis. It will analyze the data, highlight the significance of each case, and draw connections between them where relevant.

The structure of this chapter is as follows. The first section of this chapter (Section 6.1) is dedicated to the case study design by shedding light on the data collection and data analysis process. Section 6.2 presents the findings of the two examined cases, followed by the conclusion section (Section 6.3) where the conclusions are drawn for each case and cross-case conclusions.

6.1 Case study design

The literature indicates that the success of any strategic change is directly related to implementation. The conclusions of the previous research stage show that organizations rely on existing processes or utilize previous experience to compel a holistic implementation plan. In addition, it identifies employees as a construct that influences implementation, but it is only recognized by a few participants. Therefore, in this stage of the research, the dissertation will try to explore how organizations align existing structures and capabilities with strategy implementation. Cichosz et al., (2020) recommend as future research avenues the exploitation of the influence that existing organizations have on the implementation plan. In addition, the dissertation would explore various employee-related variables as digital disruptions affect mainly employees (Hanelt et al., 2021) and their participation is essential. Consequently, this stage of the analysis answers the following research questions:

- ✚ How does employee engagement affect the aligning process between the assessment-digital technology stage and the implementation stage?
 - How can employees actively participate in this aligning process?

6.1.1 Data collection

A one-person semi-structured interview was conducted in this stage of the research. For each organization, a 90-minute interview was conducted with high-level executives and employees who are actively involved in the digital transformation process. The purpose of the interview was to examine from various aspects the way organizations try to align existing resources to implement their digital transformation vision and employee participation. A list of predefined questions emailed to participants that examined the same topics. However, according to the position and the input that the researcher wanted to collect in each case the interview was focused on different aspects. For example, the interview with the QWERT's middle manager who is actively involved in every technological investment inside the organization was focused on assessing existing resources and investments in digital technologies. The questions were clustered into 6 broad categories assessing existing resources, investments in digital technologies, implementation process, employee participation, and middle manager involvement. The

questions are presented in APPENDIX B – 2nd Research stage interview questions. After the interview, a copy of the indexing conversation was sent to the interviewee for approval. The questionnaire was administered in Greek, following all the relevant sections of our methodological model.

This stage of the research took approximately 4 months (Figure 8). In the first two months, the research team conducted interviews with all the involved parties. Following the interviews organization provided the supporting documentation to needed to be analyzed. The additional data sources or supporting documentation were focused on interviews, documentation, archival records, and meeting minutes. Firstly, the research team analyzed the interview input, and the first workshop was conducted. The purpose of the first workshop was to present the key findings of the interview analysis and to validate our findings. In addition, in this workshop, the involved parties had the opportunity to provide more information as they had a better understanding of the research scope. Finally, they were encouraged to provide additional supporting documentation if they believed that was necessary. Relying on the existing analysis, the research team started to analyze the additional data sources and incorporate insights. This research stage lasted approximately 1 month. The conclusions, more detailed analysis, and presentation of the existing processes were presented to organization participants. The objective of this last session was to present the final organizational-level conclusions and recommend initiatives that can improve their digital transformation process.

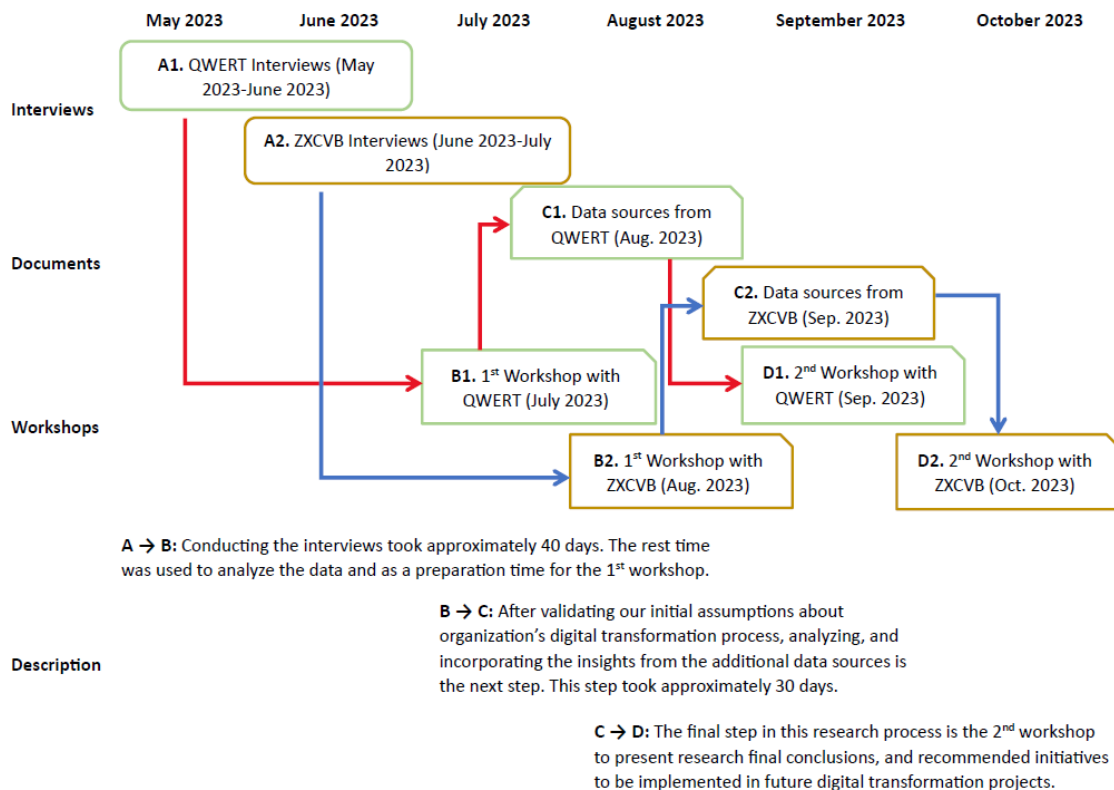


Figure 8: Research process.

In this stage of the research, the dissertation is focused on 2 organizations; one is considered an IT and other information services organization and the other is a wholesale and retail trade organization (Table

14). Both of them are in a digital transformation process to improve internal operations and offered services. Key characteristics of their digital transformation process are that they try to align existing processes and utilize most of the existing resources. Also, employee involvement is a precondition in both digital transformation processes because it is considered either a training process or a way to eliminate obstacles during the implementation. Due to confidentiality agreements, acronyms have been used during the analysis to quote participants' opinions and points of view.

QWERT is an IT and other information services organization that employs 30 people and produces two software products. As it is a technology-intensive organization most of the employees are highly digital skilled and they are Electrical Mechanical Engineers or Computer Science Engineers. For the last 6 months, QWERT has been a digital transformation process focusing on reengineering internal processes. Part of this project is a disruptive change of one of the flagship products the QAS (a pseudonym). This disruptive change will not affect the product's business aspects, only the infrastructure and the related processes. Digital efforts and implementation plan are hindered by human resources limitations as the QAS team consists of 6 team members who must migrate the system and at the same time support existing customers. On the other hand, ZXCVB is a labor-intensive organization with more than 150 employees and most of them have medium or low digital skills. The organization is in a digital transformation process as it wants to streamline internal processes and minimize resource waste. As a retail organization, the process of digital transformation needs to incorporate multiple scenarios that represent real-life situations. This incorporation will help organizations to communicate easier the digital transformation process.

	QWERT	ZXCVB
Economic activity	IT and other information services	Wholesale and retail trade
Technology or Labor-intensive	Technology-intensive	Labor-intensive
Employees number	30 employees	>150 employees
Revenue turnover	>500.000€	>500.000€
Total Number of interviews	3	3
Follow-ups	2 non-recorded meetings Emails	2 non-recorded meetings Emails
Interviewer	CEO CTO/QAS Team Leader Marketing Manager & responsible for technologies	CEO Operational Manager Middle manager
Documents	Internal communications Project documentations Archival records Meeting Minutes	Internal communications Project documentations Archival records Meeting Minutes
Workshops	2	2
Data collection duration	May 2023-Sep 2023	June 2023-Oct 2023

Table 14: Sample information.

6.1.2 Data analysis

For this phase of the research, a provisional coding process was adopted (Miles, M. B., Huberman, A. M., & Saldaña, 2020). Because the objective is to focus on specific aspects of the digital transformation process and understand the influence that employees have on the aligning process, we generate a list of coding following literature recommendations and insights from the previous phase. Furthermore, the predefined codes will enable researcher to create a logic model as some predefined stages have been named. Finally, to enhance the generalizability and transferability of the conclusions a cross-case analysis will be conducted that will be on a variable level (Miles, M. B., Huberman, A. M., & Saldaña, 2020). This way the dissertation will explore and analyze each stage of the digital transformation process and each contextual factor. Through the analysis, the researcher tries to propose a logic model that will describe an aligning process that is highly influenced by employees (Yin, 2009).

More specifically, the provisional codes are 11 codes that will be used as the aggregate dimension for the coding process (Table 15), and are about the assessment stage, the digital technology investment stage, and the implementation stage. In addition, the list includes some codes about employees, examining the involvement of middle manager, employees, top management, IT and HR department in the transformation process, organizational factors, and who participates in the examined stages. During the coding process new codes are created to assist us better understand the digital transformation process and list the factors that influence or hinder the examined stages (Table 16).

1st Order Concepts	2nd Order Themes	Aggregate Dimensions
Evaluating employees digital capabilities level	Employees capabilities	ASSESSMENT (ASSESSM)
Blueprinting or mapping of existing processes	Processes	
Examining existing technological infrastructure	Technological infrastructure	
Utilizing existing technological infrastructure by updating or improving it	Build up	DIGITAL TECHNOLOGIES INVESTMENTS (TECH INVES)
Factor that affects digital technologies investments	Cost	
Factor that affects digital technologies investments	Scalability	
Investments that improve everyday work life	Work life improvements	
Ways that organization utilize to overcome resources shortages	Collaboration	IMPLEMENTATION (IMPL)
Efforts to communicate digital transformation strategy	Communication	
New teams either with members with diverse background or with different level of digital capabilities	Cross-functional teams	
Changes on organizational chart	Governance	
Operational processes changes	Process restructuring	
<i>Factor that affects the process restructuring</i>	<i>Resource allocation</i>	
<i>Factor that affects the process restructuring</i>	<i>Task allocation</i>	
Recruiting programs to improve existing manpower	Recruit	
Training programs to improve employee digital capabilities	Training	
Factors like age, mindset, culture, behavioral characteristics, etc.	Demographics& characteristics	
Considering employee needs	Employee needs	
How changes affect employees	Impact on employees	
Recommendations and suggestions to improve everyday tasks or solve problems	Proposals	

1st Order Concepts	2nd Order Themes	Aggregate Dimensions
Conflicts arose by digital transformation that may hinder employee participation	Team conflict	
Factors related to work environment, and repetitive everyday tasks	Workstyle & Environment	
Segmenting employees based on digital capabilities level	Employee clustering	
Active participation in the assessment stage	Assessment stage	EMPLOYEE INVOLVEMENT (EMPL INVOL)
Active participation in the digital technology investment stage	Digital technologies investment	
Active participation in the implementation stage	Implementation	
The department does not exist	NO	HR DEPARTMENT (HR DPT)
The department exists but is not involved	Not involved	
The department exists	YES	
The department does not exist	NO	IT DEPARTMENT (IT DEPT)
The department exists but is not involved	Not involved	
The department exists	YES	
Active participation in the assessment stage	Assessment stage	MIDDEL MANAGER (MID MANAGER)
Active participation in the digital technology investment stage	Digital technologies investment	
Active participation in the implementation stage	Implementation	
Factor that affects implementation initiatives	Organization belief/principals	ORGANIZATIONAL FACTORS (ORGAN FACT)
Organizations has created a dedicated team or department for digital transformation	DT team	PARTICIPANTS
Coordinates or is responsible for digital transformation	CTO	
Actively participates in digital transformation decisions	CEO	
Actively participates in digital transformation decisions	Board	
Actively participates in digital transformation decisions	Middle managers	
Actively participates in digital transformation decisions	Department	
Active participation in the assessment stage	Assessment process	TOP MANAGEMENT (TOP MGMT)
Active participation in the digital technology investment stage	Digital technologies investment	
Active participation in the implementation stage	Implementation	

Table 15: Provisional coding data structure.

1t order Concepts	2nd order Themes	Aggregate Dimensions
Outcomes of the assessment process that are used for next stages	Assessment outcomes	ADDITIONAL FACTORS
Different assessment process depends on the department	Assessment process	
Complementarity between implementation initiatives	Complementarity	
Pilot testing, etc.	Gradual implementation	
Utilizing previous experience to enable implementation	Previous experience	

1 st order Concepts	2 nd order Themes	Aggregate Dimensions
<i>Previous used initiatives are utilized to implement DT strategy</i>	<i>Strict rules</i>	
<i>Techniques that describe how organization is going to tackle implementation</i>	<i>Project Allocation</i>	
Hinders that affect implementation stage	Problems arising from implementation initiatives	
Department or employees that begin the implementation	Starting point	
Limited human resources hinder implementation	Human resources	HINDERING FACTORS (HINDERING FAC)
Implementation duration	Time	

Table 16: Additional codes created during the coding process.

6.2 Case study findings

This section will separately analyze the digital transformation process of QWERT and ZXCVB. This way readers will clearly understand the digital transformation process and the challenges that each organization faces during the implementation. A common analysis approach is considered inappropriate because, this research stage examines in depth these 3 stages of the digital transformation process. By understanding each organization’s digital transformation process the research will gain insights that would be utilized for a generalized conclusion.

6.2.1 QWERT

QWERT is an organization focusing on organizing the maintenance of facilities and assets by developing software products to manage technical departments and predict faults. It has been an organization active for over 25 years and has a presence in 10 countries and more than 150 customers, offering two software solutions that are organizations’ flagship products. The organization has 6 departments, and each department is managed by a middle manager; 2 out of the 6 departments are related to the flagship products. It is an SME with only 30 employees, but most of the employees are highly digitally skilled as they are Electrical Mechanical Engineers or Computer Science Engineers. Furthermore, being an SME means that some departments do not exist and that employees may have multiple roles. In QWERT there is no HR department, middle managers have undertaken HR responsibilities as they have a thorough picture of teams’ digital skills. Certain middle managers are C-level executives, too. The middle managers of the two flagship products are also C-level executives. For example, the QAS middle manager is also the organization’s CTO and the middle manager of the second product is also the CIO.

QWERT’s strategy has remained relatively the same because as a software company, their “original” product (QAS) has evolved and further developed over the years following the technological trends. Also, the organization launched a new product 6-7 years ago. These two products enable organizations’ development and reach more customers. Obviously, the organization over the years has adopted new tools that forced some changes in the processes. However, at this moment, the rate of this change is unsatisfactory and unacceptable from the top management. Therefore, for the last 6 months, QWERT has been in a digital transformation process by reengineering processes to achieve an internal integration of common sub-systems that are used by the two main products. The integration strategy relates to the significance that the organization gives to management issues. An aspect of this strategy is the transformation of QAS product, achieving further automation, improving internal processes, and updating

the product's architecture. Specific factors like human resources and time prescribe digital transformation strategy and the implementation plan.

"The company's strategy remains pretty much constant. The products that have been developed over the years let the company evolve by upgrading the "traditional" products and introducing new products that have been developed in the last 6-7 years. (.....) Obviously, the change is constant, you change tools, and you necessarily change processes, but the pace should be faster, and speed is related to the availability of resources and company sales because they represent the financial resources that the company is able to spend without immediate benefit but to be more organized" – CEO.

The changes in QAS are not only prescribed by organization's intention to start a reengineering process. A radical change is required because QAS's existing technological infrastructure has reached its limits. During the past years, the QAS team has made several improvements (adding new features and tools) by utilizing all the opportunities provided by the existing infrastructure. A common element of all the improvements so far was that were made by the team with the minimum effort, but had the maximum impact on the product. However, now a radical change is necessary because the existing infrastructure has reached its limits, and the required changes cannot be achieved with minimum effort and cost. In addition, the team conducted a clean implementation benchmarking efficiency test and noticed a slow response rate that is unacceptable for organizations' standards. These factors force QWERT to search for radical solutions that require architecture redesign from the beginning. In this specific case, following a clean version will make the transition process more efficient in terms of workload and cost. The organization plans to not change the business aspects of the application; the existing code will be transferred and only the utilized technologies will be changed.

Before analyzing the assessment, investment, and implementation processes that are followed, the factors that influence the decision process of this stage should be listed. Organizational size is related to its ability to allocate resources to projects that do not have a direct financial impact on the organization. Limited human resources do not let QWERT allocate resources to process reengineering. To respond to this limitation QWERT recruited 3 employees that will be exploited to enable implementation. However, this limitation is related to financial resources as improved financial resources will enable organization to hire new employees. Another limitation is that the same team during the disruptive change must continue to serve customers and respond to their requests. This limitation hinders the time horizon of the implementation and the way resources will be allocated. The final limitation is that the organization tries to retain unchangeable some aspects of the work routine. Hence, major process restructuring initiatives are not chosen for the implementation plan.

Assessment process

To define QAS's new technological backend, the middle manager and the team members have conducted consecutive meetings to analyze the pros and cons of this radical change. QAS team members were directly involved in the assessment process by participating in most of the meetings with the technology provider when the requirement list was drafted. As employees were able to state their needs, wants, and concerns, the organization created a detailed requirement list that presents their wants, needs, software requirements, and key features. The involvement of all team members is not a practice that is followed in every digital transformation inside the project. However, because this is a unique case that directly affects team members' work life it was decided to participate in the assessment process. In addition, team

members triggered to some extent the transformation process because they were eager to work with up-to-date digital tools and digital technologies. From a top management perspective, the involvement of all team members is considered a learning experience, and a way to blunt resistance.

Through this change, the organization wants to have direct and indirect benefits. The main direct benefit will be the change in architecture that covers the user interface, services, and backend. However, the top management expects that these changes will improve or offer additional features and trigger some changes to the internal processes (it was stated that this is an organizational aspect that must be improved). The technological backend is expected to cover all organizations' needs and wants. Hence, the technology provider will be utilized, and a transition plan will be proposed. As the organization is lacking in organizational issues, it has assigned the process mapping to the technology provider to systematize and automate the internal processes.

However, for non-disruptive changes like a new module or feature the participating bodies are the CEO, CTO, and middle manager as it is unproductive for the team to participate in each assessment meeting. The meetings are open to employees represented by 2 or 3 team members when the new feature or subproduct standards are set. As mentioned earlier, QWERT has 6 departments, and some of these functions are considered primary and others secondary. In secondary functions, a different approach is applied that is dictated by organization orientation. According to this orientation, changes should require little effort and have a huge impact. In addition, for secondary activities, the organization tries to build on existing infrastructure and make as few changes as possible. Therefore, the assessment process starts by examining existing infrastructure and what it offers. In some cases, the organization does not utilize all the opportunities provided by the technology, so they try to exploit every feature or module that already exists inside the technology or tool. Then, examines if these features can be utilized and add real value. If the existing technological infrastructure doesn't cover organizational needs, then a similar process described above begins.

“Until recently, the company and the team were identifying the problems and then they are trying to make improvements. But now it has reached a point where bold change is needed and it needs to be developed from scratch because changes that can improve architecture have been completed, with little effort by the team. Implementing this type of change requires a major effort by the team on the existing architecture to transition to new modules and libraries. But it would probably be more advantageous and cost-effective to make this radical change. The transition to a clean process i.e., starting from scratch, moving from zero, migrating the code to new technologies may be more efficient” – CTO/Middle manager.

Investments in digital technologies

As a technology company, technologies are key resources of the business model, so investing in technology infrastructure is part of organization's identity meaning that top management supports them, and employees are familiar with them. Top management has defined principles that should be followed throughout the organization and affect investments. These principles are about the programming language (.Net, and C#) which defines the programming language that will be used for the two main products. This is an executive decision that applies at an organizational level. Another orientation that has a great influence on the investment process is the effect that will have on employee's direct communication and how it will enable organizations efforts to collect and store all the information. The scalability element is important. From the assessment process it is noticed, firstly, the organization

evaluates the unused features and models of existing technological infrastructure, and then they proceed to a new investment. These principles prescribe the selection criteria that are used for investments in core and secondary activities. The criteria in core activities are key features, cost, prospects, development time, ease of use, and prestige. In secondary activities, the selection criteria are a little different and focus on the support they can receive, how easy the collaboration will be with the technology provider, and the cost of this investment.

“(.....) The most important criterion for the selection of new tools is to enable the fastest and easiest execution of the tasks of the employees. Also, it should help to organize the company so that all the information is centralized and organized in specific places. Finally, the directness of communication between employees is an important criterion (.....)” – Middle manager.

Top management is not involved in decisions related to smaller changes like the adoption of a new tool. Given the fact that the decision to adopt a new tool concerns the team, the decision is made by the team, it is adopted by the team and internal testing (a practice that is followed in any adoption) is conducted. The team is the most appropriate testers because they have defined tool requirements according to their needs and wants. If the internal testing is successful, then the digital tool is presented and adopted at organizational level. However, the top management has an active role in technology investment decisions that define the way the organization operates and its brand name. In these cases, a selection team is created that examines the technology options according to a set of predefined criteria. In this team participate, the CEO, General Manager, CTO, and Middle manager are responsible for technologies, and employees of the specific team.

Implementation

An organization principle that is followed in any implementation plan is to not disturb employees' work life, and stop offering services and support to customers. Hence, process restructuring is an option only when existing processes are ineffective and inefficient, and the restructuring process would be a highly impact change. Mainly, implementation initiatives are selected by the CTO. For more demanding products the organization relies on external partners' proposals and recommendations that map the processes that enable implementation. For disruptive change like the one mentioned above, the organization is collaborating with a technology provider. Gradual implementation eliminates problems that may affect organizations operations and does not affect work life. In addition, it boosts employee interest in the new adoption because they are eager to check out the new digital tool. In line with the gradual implementation is internal testing which is used in every technology adoption process from the simplest ones like a project management tool to the most complicated ones. The internal testing will be conducted by the team or the unit that needs the digital tool. This team will be the early adopters and the ones that will evaluate the new technology. This way the organization ensures that all needs and wants will be covered and the digital tool will be thoroughly evaluated. After the completion of the evaluation, the report will be submitted to the middle manager and will be forwarded to the CTO.

Creating a cross-functional team is a practice that organization is willing to exploit and utilize. However, there are some limitations related to the products' nature so may be adapted to more technical aspects like user interface that is the same for both products. Another limitation is the organization's hierarchical structure and the barriers that exist between the two teams. One main problem in the creation of the cross-functional team is the small number of members that each team has. If 1 or 2 members of each

team are used for a cross-functional project this means that the team will have to work even for 1 day per week with limited resources that will affect outcomes. Also, there is the fear that employees will be confused because they will miss the hierarchy structure. Even though the organization is reluctant to follow this practice, will be utilized because they want to achieve some level of integration between the two products, and achieve some common goals. However, inside the organization, there is the feeling that this practice could accelerate implementation and improve the quality of the final product as more resources will be allocated.

“The cross-functional team practice cannot be easily adopted in this case (QAS disruptive change). This practice can only be adopted for front-end development because the other team has experience on which the QAS can rely. To borrow C# resources (C# programmers) from the other team is very difficult as they have several commitments and projects” – CTO/Middle manager.

“It is a practice that the company is trying to implement. This practice could be used on more technical pieces like UI because it is common to both teams. It is a practice that is on the team's agenda to be shared across the 2 teams. However, this practice is not one of the easiest because there are organizational constraints between the 2 teams. Each team has its Function Leader (i.e., middle manager), and their supervisor, and it is not the easiest to say you take 1 or 2 people from each team and create a new one. (...) Borrowing resources creates problems for the company as the organizational chart is lost. The employee will not know which team she/he belongs to and will create problems. However, now that there is an effort for some joint projects related to the integration of the 2 products the direction of cross-functional teams will be followed as there is the intention to have some common things and a common axis. (...).” – CEO.

So far, we examined implementation initiatives that apply to the organizational level. From this point on we will focus on implementation initiatives that are followed or are planned for the implementation of the disruptive change. The implementation plan for QAS is going to be drafted in a way that will secure the agility of the delivery process. Furthermore, the implementation plan is prescribed by the organizational decision that customers should have access to both systems and receive the new features as soon as they are developed and operational. To achieve all this the implementation plan for the QAS team will encompass a team restructuring process and will utilize previously successfully used implementation initiatives like the “Development Projects”. This implies that the team is familiar with this practice, so they know how it works and the expected outcomes.

CTO/middle manager plans to restructure the QAS team and introduce a new working process by splitting the 6 team members into two independent teams (“The guardians” and “The features”) with different responsibilities and goals. “The guardians” will work on bugs or small enhancements to the existing software and the other team will work on 1 or 2 major features depending on the size of the sub-team. This way the middle manager will split resources between the new product and the existing one. Each team will be led by a team leader who will be responsible for the implementation of the assigned tasks. The team leaders will be selected based on seniority, so each team will have a member with a deep knowledge of the existing application, support customers, and manage the allocated resources. The members of each team will work in rotation so every team member will feel involved, creative, and trained

in the new system. The rotation will occur only when a feature is delivered. Only then some members of the features will be moved to “The guardians” team.

The HR resource allocation is a problem that concerns the QAS middle manager because it affects the implementation plan and secondly influences the dynamics inside the team. Before proceeding to this change the CTO/middle manager noticed that there are many concerns in the team about which members will be involved in the new project and how they will achieve a seamless transition. These concerns further support the rotational working process that will let every member be involved in the development of the new software, and be trained at the same time. However, how resources will be allocated depends on top management decisions regarding the team size, the intended disruption that will cause to customers, and the transition duration. This is a threshold that would be set by top management and shape the implementation stage. Relying on this decision, the middle manager will decide how they want to split the resources and if more resources will be allocated to the QAS. This decision will affect both products by increasing the production rate of new features, and affecting the response time to customers as resources will be devoted to solving bugs or preparing reports. This way the organization will retain the existing customers.

“(…) Obviously, this plan depends on how many team members will be on the team, because there is a possibility to increase our human resources to be a 7 or even 8-member team when the transition starts. Obviously, if the team member number is increased, there will be a change in the dynamics of the team. However, this decision cannot be taken by me (CTO/middle manager). It is a decision that will be taken by the CEO and the company in general about the launch speed of the new architecture. The allocation of resources will be different if the goal is to launch in 3 years and the company prioritizes to be close to the customer and another if there is the will to come out in 6 months” – CTO/Middle manager.

An initiative that has previously been adopted by the QAS team and is planned to be utilized during the disruptive change is “Development Projects”. They are innovative projects that are assigned to employees and are about product improvements (new features, new services, etc.) that were requested either from customers or organizations’ insights. A “Development Project” enables employee participation in innovative projects and is assigned to one or two team members according to the needed resources. This approach allows employees to be creative, propose solutions, and be involved in more innovation-oriented tasks. To assign projects to team members, the middle manager presents a list with all the available projects, and employees according to their interests express their intention to participate in specific projects. Even though the projects are well-structured (specific objectives, and tasks) by the middle manager and have a time limit, employees are free to exploit system opportunities and propose solutions that are outside of the organizations norms. Furthermore, coding strategies like agile and sprint coding that have been used in previous “development projects” will be utilized in this case to help the team deliver key features and/or build the new architecture. The main role in this initiative has the middle manager, who sets the sprint and defines the tasks. Relying on previous experience, the team knows that when the sprint is rigorous (well-structured tasks, time limitations) the involved employees are more efficient and productive.

The majority of organization’s workforce are highly skilled employees, so training activities are considered a complementary initiative for QAS’s implementation plan because employees already have the necessary skills. In the two core teams (working on the flagship products) neither a C-level executive nor a middle

manager is involved in employees training program. Over the years the organization has developed a course database that can be utilized by employees to improve their knowledge. Also, employees are free to choose any training program they find interesting, and the organization welcomes training program recommendations. Training initiatives are supported by allocating to each employee a yearly budget that should be spent either on training programs, or equipment. However, most of this budget (more than 50%) should be spent on training programs. Furthermore, employees participate in internal hackathons, and other activities to advance their programming capabilities and improve peer communication. As far as the knowledge management inside the highly skilled teams usually two employees enroll in a specific course and the other team members contribute with their experience and recommend directions. For the secondary functions, the training programs are drafted in collaboration with the middle manager, and employees.

Middle manager's role

If there are no exceptional circumstances, the middle manager will be involved in various processes inside the organization but mainly in the implementation that requires their involvement, and participation. Middle managers propose new technologies and necessary investments. However, because the organization is in a restructuring process, 5 out of the 7 middle managers actively participate in the board meetings. Their participation is essential because they have an overview of everyday activities, and work routines and are the most qualified to translate boards' strategic orientations to organizations' needs and functions. Hence, they are involved in implementation, offer input during the strategy formulation process, are the owners of many digital transformation products, manage digital transformation projects, and are communication means for the organization as they are involved in decision-making processes. Furthermore, they are the receivers of various suggestions about improvements, whether they are about everyday tasks or ideas for new features. These ideas are communicated to middle managers during team meetings, one-to-one meetings, and suggestions during the workday.

"As far as strategic planning is concerned, apart from the founders, there are 5 other people who are members of the Board of Directors and our shareholders, too. There is a more participatory dimension in company's strategic planning. (This period) The company is in an intense process of redesigning strategies and 5 out of the 7 Function Leaders (middle managers) are involved. These 5 Function Leaders participate in the Board of Directors and have an active role in the process of redesign as they have more expertise than the Board members. At the same time, they can translate the strategic directions set by the Board into company's reality because they know the day-to-day operations and needs of the company. (.....) The business part is defined at a more high level (Board of Directors) and then the implementation which requires the digital component as well as the employees needs the active involvement of the function leader" – CEO.

They participate in the assessment process that is focused on digital capabilities as they play the role of the HR manager as well. Middle managers have a deep knowledge of employee's digital capabilities, so they provide valuable input and are responsible for employees' digital readiness. They are involved in the implementation stage, how the new technology will be utilized by the organization, and will be part of the team to be trained, so they can evaluate if the new technology will be adopted or not. This way the middle manager will be qualified to decide and choose other employees to be trained. Consequently, this role is involved in these two stages. During the implementation, middle managers present the new technology

to team members and moderate the internal testing. They will receive all the feedback from the initial evaluation, and a report will be drafted to be submitted to the CTO for the final decision. The CTO is responsible, oversees the whole process, and receives all this information. We should underline that in the QAS case, a different approach was followed because of the disruptive characteristics of this change.

Employees

It is a technology-oriented organization so employees' digital capabilities are quite high. Especially employees (12 in total) who are working on core aspects of the organization like the two offered products. Hence, a systematized training program is not planned to be implemented during QAS's architecture change. Employees in supportive operations have basic digital capabilities. Organization does not face extreme cases of resistance because employees young age (they are up to 35) and in many cases trigger or request the change. Nevertheless, the organization faces some resistance regarding the (more or less) responsibilities that will be assigned to employees, and there is the fear that they will not be useful to the organization as some processes will be automated. These concerns indicate that management should intervene to resolve the conflicts between the various teams that arise because of potential responsibilities change. Finally, resistance because of the work effort may be raised. Especially in transitioning periods employees may need to take on more responsibilities.

"In the company, it is unlikely that a change or modernization will be proposed and there will be a reaction as most of the employees are in the 25-30 age group, they are looking for change, they want to learn and evolve" – CEO.

Top management believes that it's their responsibility to create a participating and positive environment that eliminates resistance. QWERT encourages employees to participate in the implementation stage through internal testing. The internal testing is structured in a way that enables employees to state their opinions and communicate their experiences to other employees. The communication between employees is a parameter that boosts the adaptation rate. A key initiative to eliminate resistance is by involving employees or a representative (in most cases middle manager) in the decision-making process. When they are involved, it is a top management decision, on one hand, it is considered a learning process, and on the other hand, eliminates resistance. Attention is paid also to the way the organization communicates the change. Therefore, QWERT always states the reason why the change is being made, the impact it will have, the time it will take, the way the workload will be simplified, and how it could be used in other projects. Employees are encouraged to express their opinions if they believe that something must be done differently or in a more efficient way. Finally, gradual implementation is a way for organizations to eliminate resistance and reduce the effect that change would have on work life and offering services.

6.2.2 ZXCVB

ZXCVB is a wholesale and retail trade organization specializing in healthcare equipment. Additionally, it provides after-sales support like maintenance services, and training programs. The after-sales support service is considered one of organizations' main competitive advantages. The organization employees over 150 employees both in technical and administrative activities. During the domestic financial crisis organization strategic efforts were focused on securing sufficient revenue funds and thus operational improvement strategies were neglected. Following the financial crisis, a new strategic orientation was adopted where they started focusing on initiatives like restructuring operations, digitalization projects, etc. At this moment, the organization is trying to implement two big projects that involve many employees

as they focus on after-sales services (this project is in full implementation stage), and presales (project in pilot stage). By digitally transforming operations, organization wants to digitally capture the process chain to collect and store all the data about workload, activities, monitor financial and non-financial KPIs like employee productivity, monitoring supplier's performance. These insights are planned to be used for evaluation, monitoring, improvement projects, and future collaborations.

Preparing for digital transformation, the organization implemented two initiatives. The first initiative was the creation of the Optimization & Digitalization Department (Optim. & Digiz. Dept.) The department's objective is to assess and question existing processes, hence they focus on processes where they notice resources waste. The Optim. & Digiz. Dept. team participates in all three examined stages and is mainly responsible for communicating digital transformation projects. For the second initiative ZXCVB offered a mandatory training program to selected executives and employees. Through this mandatory training program, top management was trying to introduce new meanings like resource waste, optimization, etc. that even if they are not directly related to digital transformation can trigger a wave of change. One important outcome of this training was that enhanced participants perception about process interdependence and the importance of digital tools.

The transformation projects are fully supported by top management as they try to reduce resources waste, improve efficiency, and transparency. However, the organization and especially the Optim. & Digiz. Dept. face challenges related to employee incapacity towards digital technologies and unwillingness to improve everyday tasks. Of course, this does not apply to all employees, but many employees do not have the right mindset, so they are unable to recommend changes that are aligned with organizations digital transformation goals. This means that the Optim. & Digiz. Dept. is missing valuable input that would trigger a digital transformation process. On the contrary, the employees that have an innovative mindset provide valuable insights to organization by suggesting process improvements. Therefore, in this process middle managers are called to recommend employees who meet the predefined criteria.

"The biggest challenge faced by our department is that there are employees (who have been working in the company for many years) who, either due to unfamiliarity or lack of stimuli, cannot imagine and propose tools that would facilitate their daily life. This situation forces this department to identify the problem, understand the process and look for ways to reduce waste. (...) Our work would be much easier if they were familiar with the technology and could suggest tools that would make their daily lives easier" - OM.

Focusing on process digital transformation, we notice that they are proposed either by the top management or by Optim. & Digiz. Dept. when they find a problem and they choose processes or segments of a specific process that by digitally transforming them, they will greatly influence and enable objectives fulfillment. A key characteristic of organizations processes is that they are cross-functional meaning that the processes of one department are connected to other department processes. Collaboration between departments is mandatory in some cases, thus, middle managers are actively involved in the decision-making process even if their department is not directly influenced. However, their involvement is defined by the effect that the change would have on the department. In any case, top management follows a transparent process by involving middle managers either as audience to be informed of imminent changes or by choosing the change course.

ZXCVB focuses on processes that are well-structured and well-defined. Choosing well-structured processes means that employees have deep knowledge of processes' tasks and can describe various

scenarios or cases that should be included in system design. Usually, the processes that are going to be transformed are very complicated, not systematized and require intervention. By intervening the Optim. & Digiz. Dept. tries to organize the processes by connecting tasks or activities, to correctly collect all the necessary input, and to store it. Furthermore, they choose to start the digital transformation from departments or teams that have employees who are IT literate and are more familiar with digital systems, and tools. Usually, these employees are younger, and they are utilized for the pilot testing phase.

Assessment process

ZXCVB assessment process is mainly focused on processes and employees. The steps that are followed in this assessment process are streamlined and include mapping of existing processes, identifying potential technological solutions, and conducting interviews with key stakeholders. After these three crucial steps the Optim. & Digiz. Dept. designs and proposes a solution, hierarchical communicates and presents the solution. The assessment process is structured in a way that lets the team collect all the necessary information and list possible cases, an insight that will be input for the system design step. For the organization it is very important, especially for communication reasons, to design a system that will incorporate many cases or scenarios because it will require minimum changes during pilot testing and organizational level adoption. Consequently, in this stage are involved employees from Optim. & Digiz. Dept. mainly 2 or 3 employees who map the processes and provide input. Also, executives or department heads are involved because they can provide some general insights into the workflow. It should be underlined that executives or heads of departments may not participate in pilots as pilot's objective is to identify bugs related to everyday work activities. Usually, participating employees who have an innovation-oriented mindset are open to changes. Hence, no hierarchical barriers apply.

In the first step of this process, only the employees of Optim. & Digiz. Dept. are involved as they try to understand the processes, and key tasks involved. They focus on specific processes or workflows, but they adopt a holistic approach as organizational processes are cross-functional and are connected with previous and future processes. A holistic approach is mandatory and helps the digitalization team understand better the process and each department needs. Even though the mapping is holistic, the team usually focuses on specific segments of the workflow to be redesigned, thus, employees from previous or next stages are not involved in the redesign process or training. Each process is approached as a unique case because it is related to specific change's objective and employee's willingness to participate, familiarity with digital technologies and digital tools, flexibility and mindset.

"We have a good overview of all company processes, and we can talk directly with some employees, something that reduces the preparation time considerably (to reach 70%). (...) (we) face delays in the collection of tools because other companies are involved such as technological providers, our IT department that needs to purchase some tools and some equipment. These are the areas where significant delays are identified. If the interviewee has the goal, the knowledge and the tools, they can very quickly reach 70% and complete the preparation. Major delays are in the remaining 30% because we need to conduct interviews, communicate the proposed solution, receive feedback, run some demos (if the feedback is positive), and then pilot testing" – OM.

The next step, in ZXCVB assessment process, is about sourcing the necessary digital tools and digital technologies that could support the transformation. Organization tries to build up the existing infrastructure as in 2019 invested in digital system that was adopted at organizational level. This and the

following stage could be time consuming as the Optim. & Digiz. Dept. must source digital tools and collaborate with the IT department or an external technology provider. The final step is focused on employees who are interviewed to share their experiences, insights, scenarios, or cases that face as they are working. As mentioned above, this stage is very important because ZXCVB wants to develop a solution that will be very close to the digitalization outcome as it is directly related to how the organization communicates digital transformation and process redesign.

In this step of the assessment process can be involved 3 different employee roles; users from where the organization takes the insights, and collects information for potential scenarios, opinion leaders that are employees who can influence their colleagues, and department heads (middle managers). The last two roles may be embodied in the same person. An opinion leader is someone who has gained the colleagues respect and trust. Therefore, it could be a middle manager as employees are following her/him according to hierarchy or an employee who has worked for several years in the organization and has gained employee trust and respect. Heads of department or middle managers' involvement is very important because the team values administrative perspective's feedback, too. Even employees are an important part of the assessment process HR department is not involved in any of the presented stages either by proposing the right employees to participate in the interview or finding the most suitable employees for the pilot testing. Main HR responsibilities have been shouldered by the Head of Optim. & Digiz. Dept. as she/he has a deep understanding and knowledge of the organization.

Technology investments

ZXCVB always assesses if the existing technology can be utilized or upgraded. Technology investments are an option only when the existing infrastructure has reached its limit. The IT department's role is to source all the digital tools, systems, and technological infrastructure to support the restructuring process. A close collaboration between the IT department and Optim. & Digiz. Dept. is necessary. The investment stage is highly influenced by the assessment stage because it defines employees' needs and digital technologies investments. ZXCVB digital transformation strategies target to reduce required time, minimize resources waste and reduce human errors delineate technological investments. In addition, this digital transformation strategy requires new investments that will automate and regulate the chosen process. One last parameter that should be considered in this stage is the employee's work environment as many employees are on the go because they are salesperson or technicians who do not have a stable working environment. This means that the organization needs to invest in mobile digital technologies and design accordingly the digital systems.

"(...) Conversely, for salespeople, or technicians who do not have a fixed workplace and are always with the customer are given special consideration as to how and where they will work (use mobile solution like a tablet). We are assessing whether it can actually be implemented, whether they have the time and whether the company can make it so easy and streamlined that they don't need to "get into" the office as their workplace is outside. For this category of employees, "time in the office" for data entry is considered wasted time as the physical workspace is out of the office. This is a piece of checking and investigating before they proceed" - CSO.

Implementation

Following the assessment, the organization implements the solution according to the process they are dealing with, meaning that if the new solution is disruptive then the organization will implement the solution in two times. When the change is urgent, the previously mentioned process is not followed, and a temporary solution is designed utilizing existing infrastructure. In a secondary time, the organization will start the pre-defined assessment process that was described above. If the selected solution is totally different from the existing one, the organization chooses to implement pilot testing. For the pilot testing ZXCVB carefully selects who will participate and usually are employees that have been utilized in the assessment stage. During the pilot testing their task is to identify bugs, gaps, and problems, thus, the software updates may be weekly or even daily. This valuable feedback will help Optim. & Digiz. Dept. to fine tune the digital solution and cover every potential case that an employee might face in their work life.

ZXCVB digital transformation is process-oriented meaning that restructuring processes is a key implementation initiative. As the organization streamlines the processes the overlapping responsibilities are addressed first. However, this phenomenon was very common before the creation of this department as processes were not well-structured and employees were willing to shoulder responsibilities that were not part of their job description. A principle that applies to every process change case is that it should be logical and sufficiently justified to enable the communication initiative. During process restructuring, the organization considers various parameters that directly affect the new proposed solution. A decisive parameter is employees. During process restructuring an effort to operationally mapping employee's involvement is made, and other general employee parameters like the structure of their workday, everyday tasks, working environment, digital skills level, how much time they could allocate to insert data or information to the system, etc. are considered. In addition, they pay attention to the quality of the collected data as it will be utilized for future strategic decisions and as monitoring mechanisms. A final parameter that is considered is task allocation as many employees are not familiar with digital tools but have high level technical skills which is a mandatory skillset for their job. In this case, the team allocates the digital tasks to younger members inside the team who are familiar with digital tools. This allocation does not trigger employee objections as it is justified on team complementarity.

Usually, the laggards (aka employees with low digital capabilities) are the mentors of the younger employee (aka employee familiar with digital tools) and the one who shared the know-how and experience. So, there is no reaction to the extra workload. There is a feeling of paying back. (...) Also, the department will be organized in this way where the younger colleague will be responsible for the tasks that require digital tools. It's teamwork and there are no completely shared tasks (at least in the technical part) so there is no extra work. (...)"
– CSO.

"Younger workers who have more familiarity will fill the gap that these professionals may have. In a team there is complementarity. (...) Utilize the professional to the best of his ability"
- OM.

Organization may face many employee obstacles as the digital capabilities are rated as middle to low level. However, they don't choose to restructure teams or departments composition to boost digital transformation efforts due to organization characteristics. Employees in departments or sub-departments have very specific expertise, especially in sales and after-sales support departments, which prohibits this

implementation initiative. Their expertise and level of digital skills are highly defined by the way each department is structured and employee prerequisites. This initiative was chosen only ones when the digital transformation process began. During this time, the CSO made some disruptive for organizations standards restructuring changes that enable the creation of two departments that are vital for organizations existence because they are related to organizations ability to source new projects (Tendering Department), and logistics.

“The business part of the company is quite complex because it's very specialized. A technician from radiology can't go to another department, for example, surgery. Nor can an employee from marketing move to accounting or someone from accounting to distribution. From time to time there have been some such changes and they have actually been quite radical for the standards of the company. These restructurings were done by the CSO and in doing so created the tendering department and the logistics department, which were crucial and absolutely necessary. Of course, this could not be done easily in the company and was really an achievement. Therefore, this is not something that happens all the time. (...) Also, such important changes cannot be made frequently because the subjects of the departments are very specialized, so technicians cannot be transferred from one department to another. The same applies to salesmen. Some minor changes and "minor-transfers" are made but within a similar field because the subject matter is quite specialized”- OM.

Very important for ZXCVB is to support employees either during the pilot testing or the full implementation. Hence, they recruit new employees to provide IT support and assist employees during the implementation. Having a system expert who can jump in every time a problem arises is received by employees as an important support mean. This initiative is utilized as a communication strategy, too, that encourages employee's participation and positive attitude towards the change. Even though this solution is costly, it ensures that all employees will feel technological safe and will be provided the support they need during the implementation. We should underline that this initiative is complementary to the customized training programs that are developed by the organization. Furthermore, the recruiting program is utilized to improve organization's digital capabilities level. Organization tries the new recruits to have sufficient digital skills and an innovative mindset to be aligned with organization's future. Administration protects and supports them in order to not adopt existing mindset and be able to spread a new mindset. This protection, an indication that organization values them, is achieved by involving them in assessment process, setting them as an example, promote/recommend them in top management, and rewarding them.

Training programs have a two-fold role in this implementation process. Firstly, they used to broaden employees' mindset, considering the organization as an entity with interrelated activities. Even though this training program was not related to digital transformation, it was a “Lean Management” training program, it created the foundations for employees to start thinking about innovation, resources waste, efficiency, etc. In this training program were participating specific executives, and employees that had an innovative mindset and could be change advocates. Judging by the outcome, the organization believes that the “Lean Management” training program was very successful, was disseminated inside the organization by the participants, and increased employee interest towards any change. Following the success of the program, the top management continued the initiative by focusing on specific departments like logistics, warehouse, etc. In addition, organization has developed quick training programs (max. 40 minutes) that are developed internally to improve employees' digital skills. As many of the software is

customized to cover organization needs, they develop training programs that focus on software aspects that apply to each department and meet their needs. The training programs are announced at organizational level and are not mandatory. An outcome of the various training programs was that employees started to develop their technological solutions to improve everyday tasks. However, top management had to intervene and tame this wave. These solutions were used as an input for the new system design process and employees became consultants of the assessment team and pilot testers.

Communication initiatives play an important role as many of the previously presented implementation initiatives are used to promote digital transformation efforts. It is noticed that the organization creates various sales points to onboard employees to digital transformation projects. The sales points are related to digital transformation objectives regarding transparency, productivity, efficiency, and resources waste. An approach that is used by organization only in extreme cases is to encourage the competition between departments or subunits inside the same department. This initiative motivates departments Heads and middle managers to participate in digital transformation projects and adopt digital tools. Furthermore, organization exploits persuasion techniques to encourage participation, and communicates the success stories to positive influence employee's perception towards digital transformation. Very important for every communication initiative is that every digital transformation project or change is based on logic, and simplifying employees workday. Finally, they utilize various communications channels like Viber to have real-time communication. More specifically, they utilize Viber chat to support employees who face problems with the application, and systematically collect complains regarding the new technology. This way they can be supported in real time and the team can respond to their requests in real time.

Middle manager's role

Middle managers have an important role given the high correlation between various departments because the processes from the technical department is connected with processes from sales, logistic, or other departments. Therefore, top management follows a transparent approach during the digital transformation decision making process by involving middle managers in every digital transformation meeting. This means that middle managers are present as audience in digital transformation meetings that do not directly affect their department. When the change affects in any way their department then they actively participate either by shaping the final decision by providing valuable input for their departments internal processes and workstyle or by making sure that the digitalization process in another department is in line with their processes.

"When a change is made that does not directly concern my department but another department, that we work closely, then the proposed change must get my "OK", before top management makes the final decision, the possible changes should be accepted by the interviewee as he has seen whether it is something that will affect his department directly and sufficiently or it can be "scratched through". (...) These meetings are attended by top management and decisions are made "in front of everyone". For example, if a decision is to be made in the sales department, the heads of the service department, i.e. the technical department, participate mainly as observers and do not intervene unless the decision will affect the technical department. Therefore, they have from the beginning a picture of how the whole process will move. (...) This way of participation is very important because the interaction between the departments of the company is very big and the technical department can do an installation of a medical machine, but the sales department is involved,

the logistics department where the order is placed, the warehouse that will transport the machine is involved. Because everyone is involved in a potential or impending sale the processes should be split up so that each department knows their responsibilities so that each department knows what needs to be done on their side and the process runs smoothly” - Middle Manager.

Except for the decision-making process, middle managers are involved in assessment stage aspects like selecting employees who will participate in the process and listing software features and requirements according to processes. For the interview and pilot testing phase, middle managers try to involve employees either with sufficient skills or willing to adopt new changes. The interviewed middle manager mentioned that it is very important for his department to include employees who are open to change and may not have sufficient skills because it is more important for the organization to collect valuable input from employees that have the right mindset to foresee necessary changes. They closely collaborate with the IT department as they seek their support during the implementation and is an additional communication mean. However, the middle managers have shoulder the responsibility to communicate digital transformation to their employees as the HR department is not involved in this process, too.

Employees

Employees' overall level of digital capabilities is considered as middle level given the fact that the organization is active in wholesale and retail industry. Mainly there are two employees segments administrative and production employees. As production employees are considered employees in sales and after sales departments as these departments are organizations profit centers. In these two departments, digital skills are not a necessity as more weight is given to technical or communication skills, respectively. Furthermore, as a family-owned business there are many employees who have been employed for over 25 years in the organization, meaning that their familiarity with digital technologies and their mindset may hinder digital transformation efforts. These conditions influence the implementation plan and the assessment process. However, ZXCVB tries with new recruits to advance the employees digital capabilities level and attract employees who fit organization's future vision. Therefore, the new employees have an educational background in digital tools and solutions.

It is clear from the analysis that employees play an important role in assessment and implementation stage, especially front-end employees (technicians, salesperson). In the assessment stage, they are interviewed to describe workflow, or cases that must be included in the new digital tool. In the next stage, they are actively involved in the pilot testing stage where they provide valuable insights and highlight problems that may arise during real-time use. Therefore, front-end employees' participation is mandatory and valuable because they shed light on aspects, and processes that are unknown to the middle managers. Their involvement secures that before the new systems it will be organizational wide adopted it will encompass key processes, bugs will be eliminated, and multiple real-time scenarios will be considered. Paying attention to these aspects, even before the pilot testing phase, is vital for communication initiatives by enabling employee's positive attitude towards change, and participation.

“The employees involved (in the assessment stage) are not considered middle managers but are employees from any hierarchical level. Many times, front line employees are involved because we know that they are very good at their job and can potentially provide valuable information. They are not utilized to design the solution but to provide all the information or at least share it in a way that will help us design the new digital solution and optimize the

process. These employees are chosen simply because even a middle manager does not know some of the details. However, it happens that an employee with deep knowledge to be a middle manager. The company is looking for a person who knows the process well and has a feeling for the changes that can be made. The main characteristic of this employee in terms of implementing a new system is that he can describe all possible scenarios. This is important because a system is based on scenarios. When you design a digital system most of the time you are trying to limit the flexibility to do other things as this is the streamline rule of no sub-case" - CSO.

The varying digital capabilities level implies that top management should carefully select which departments or sub-departments will adopt first the new digital technology. Hence, they choose to start the digital transformation from processes that involve IT literate employees or employees who are familiar with digital tools and systems. These employees have a specific profile, are familiar with digital technologies, have an innovative mindset, seek change, etc. Usually, this type of profile matches to younger employees you participate in the assessment and pilot testing and become the carriers and advocate for a digital transformation project. An important element that should be considered every time is the employee's culture and mindset towards digital technologies. This applies for every employee regardless of their hierarchical level. When the employee has this mindset then convincing them to participate is simple and can be achieved very ease. However, it is important that the organization tries to implement changes that are logical, simple and are implemented gradually.

A list of parameters related to employees are considered during the 3 examined stages. One of the first parameters that is regarded is the different digital capabilities level that affects process redesign. Digitally oriented tasks are allocated to younger employees or more advanced digitally skilled employees. Organization tries to communicate this task allocation as part of working in a team and complement colleagues. This way employees are not against it. Another parameter that is considered is employee work related constructs like work style, environment, and needs. These parameters influence the technology investment stage but also the implementation stage as process restructuring must meet employees' expectations and be aligned with their working environment. For example, for employees in sales or technical department they must consider mobile, and scanning technological solutions, and simplify the processes to be completed after a few clicks. On the other hand, for the administrative employees who are in a totally different working environment the organization chooses to provide them with the necessary databases, design systems to receive notifications, etc. A common point in all these cases is that organizations try to design and implement solutions that will increase work efficiency and reduce resources waste.

Finally, employee participation is boosted by the planned supporting initiatives. This support is embodied in different forms like providing sufficient IT support by recruiting an IT manager, utilizing communication channels to solve problems or answer questions in real-time or finding creative ways to collect input and feedback. Employees work schedule in profit center positions does not give them the luxury to participate in meetings to provide sufficient input or feedback to Optim. & Digiz. Dept. team. However, the department to be able to collect this information assigns as an account a specific department or pilot testing projects to department employees that become the designated information receivers for the respective project. This creates a sense of security in employees as they know that they can refer to a specific person who can record any concerns, complaints, etc.

6.3 Concluding remarks

6.3.1 QWERT Conclusions

QWERT's digital transformation efforts are focusing on process restructuring as organization processes have not been systematized. Furthermore, the preconditions set by the organization influence the way the organization handles digital transformation and shapes the assessment approach, investment decisions, and implementation. These preconditions relate to organization's revenue stream, employees' work life, and organization size. Being a small organization means that they do not have the luxury to allocate huge resources to changes. Thus, organizations follow the principle that changes should require little effort and have a huge impact. On the other hand, as a small-medium-sized organization with highly skilled and young employees who are open to changes and in some cases advocate for the change, the organization has the chance to implement easier changes and disruptions if they are necessary. Furthermore, because of the size top management chooses to involve in disruptive changes all team members as it is a learning experience.

Even though the organization does not have an HR department (because of the organization's size) human resources remain an important parameter of the digital transformation plan and steer the way the organization approaches change. As a general construct, employees participate in almost every of the examined stages (assessment, investment, and implementation), and they are represented either by middle managers' participation or employee's direct participation in different transformation stages. Middle managers participate in the assessment, investment, and implementation stages. On the other hand, employees participate mainly in the implementation stage if the change is not a disruptive one. In this case, they participate in the internal testing and provide valuable feedback to the middle manager. If the change is considered disruptive, then employees participate in the assessment stage during the brainstorming sessions, and meetings with the technology provider.

All the proposed aspects of the assessment process are examined by the organization. Nevertheless, we notice that QWERT mainly focuses on the existing infrastructure and employees' digital capabilities. Considering that an organization is in a restructuring digital transformation process, it is reasonable for the assessment of existing processes to be less weighted. However, this does not mean that the organization is willing to make radical structural changes as top management wants the minimum disruption to the work life. Examining the available technological opportunities from the existing infrastructure is the first step of the assessment process since technological features and sub-modules might be unexploited. This step applies both to core and secondary activities. However, in core activities technological infrastructures remain up to date as employees continually try to improve the technological backend.

The second step of the assessment process is mapping employees' digital capabilities. This step is under middle manager's responsibility as they have shouldered the HR department's responsibilities. The mapping includes an individual evaluation, a listing of possible deficiencies, and planning training programs to eliminate potential gaps. However, as a technology-oriented organization, many employees' digital capabilities are high because they are programmers. For the rest of the employees, their digital capabilities level follows their position and department. The assessment results of this stage influence the intensity of the training initiatives that will be exploited in the implementation stage. Furthermore, it is vital for QWERT to assess employee resources because of the small workforce number, and they are trying to find ways to allocate workload. This limitation confines implementation options and initiatives that can

be utilized by the organization. For example, the organization is not keen on cross-functional teams because it will affect each team's working process. The last step of this process is the assessment of existing processes. As mentioned earlier, this step is not core to their assessment process as the organization wants to restructure processes and achieve a certain integration level in specific organizational aspects.

Assessment Process Step		Description
Step 1	Technological infrastructure	<ul style="list-style-type: none"> • Examine the offered opportunities by existing technological infrastructure • Assess if the new features can be utilized by the organization and offer additional value • Analyze the pros and cons of disruptive change • Applies for secondary and core activities • Middle manager involvement is always involved but employees are only involved in disruptive changes
Step 2	Employees digital capabilities	<ul style="list-style-type: none"> • Mapping digital capabilities • Individual evaluation of employees' digital capabilities • Listing possible deficiencies in planning a training program • The evaluation is performed by the middle manager
Step 3	Existing processes	<ul style="list-style-type: none"> • It does not have the same weight as the other two aspects

Table 17: Assessment process followed by QWERT.

The organization proceeds to infrastructure investments only when technological limits have been reached and when the results of benchmarking tests are unsatisfactory. Initially, it tries to build up existing infrastructures. Relying on employee digital capabilities, the organization improves existing infrastructure on core activities by following the principle of “minimum effort but high impact”. When a highly impactful change cannot be reached then QWERT is willing to implement a disruptive change if it is about a core activity as happened in QAS case. Reaching technological limits is very important because not every technological opportunity provided by existing infrastructure is exploited. Core technological investments are decided by C-level executives, but middle managers are free to choose digital tools that will enhance work efficiency. As far as the technology investment criteria they vary and are related to activities type. For core activities, more weight is given to parameters like key features, prospects, and development time, on the contrary, for secondary activities attention is paid to the support that the organization will receive, and how easily they can collaborate with the technology provider. The cost parameter is an extremely important parameter in both cases.

The final examined stage in our research is implementation which has been drafted by the CTO. Implementation planning is very important for the organization because as the change is implemented, supporting and offering the same level of services to customers is a prerequisite. In addition, the small employees' number is a parameter that hinders implementation options like the creation of cross-functional teams or allocating one department's responsibilities to another department to accelerate change execution time. Another problem that arose with the cross-functional team initiative is hierarchical obstacles. However, QWERT will be forced to use this practice as the objective is to achieve some level of integration. An organizational principle that is followed because it eliminates problems in

organizations operations is gradual implementation which boosts employee interest for the change, too. Another initiative is the internal testing which is conducted by the team that mostly needs the digital tools. These preconditions force CTO/middle manager to draft a detailed implementation plan that will include mainly initiatives that are familiar to employees because they have been used in previous changes.

Focusing on QAS implementation plan we notice that CTO/middle manager has chosen to utilize a novice, for QWERT standards, initiative like the governance restructure of its team by creating two independent teams that will work in rotation on the new architecture and will support the existing customers. Rotation is important to make all employees feel involved. The leader of each sub-team will be chosen based on their seniority and their deep knowledge of the existing system. A previously exploited initiative that will be utilized is project allocation which is expected to facilitate changes and trigger employee interest and innovativeness. Training is a complementary activity as organization employs a highly skilled workforce. However, QWERT organizes hackathons, etc. to improve collaboration, and communication, and enhance their skills. We should underline that limited HR resources influence the planning process of the implementation process as it may facilitate or hinder the execution time of the change. However, the resource allocation and the time horizon of the change is a top management decision.

Implementation Initiative	Description
Collaboration	<ul style="list-style-type: none"> • It is a strategic choice that secures access to top-quality and up-to-date technological services. • Mainly with technology providers to secure up-to-date technological services, in some cases with consultancies to gain more expertise in operational aspects.
Communication	<ul style="list-style-type: none"> • Organizations choice to participate in the assessment process (especially in the disruptive change) is a communication practice to onboard employees to various changes. • Organization principle of not causing major disruptions in work life helps top management to disseminate the change message.
Governance restructure	<ul style="list-style-type: none"> • For the organization to work in two parallel modes the middle manager has decided the team to split in two. • This governance restructure would enable the team to implement the necessary changes that will accompany the new architecture and support existing customers.
Project Allocation	<ul style="list-style-type: none"> • An initiative that has been previously adopted by the organization. • It triggers employee’s innovativeness and creativity. • Enable employee participation as it is an open call process where the middle manager lists potential projects and employees express their interest.
Training	<ul style="list-style-type: none"> • Because it is a highly skilled organization training activities for the core activities are complementary and are used to improve existing digital capabilities. • For secondary activities, organization creates training programs and provides all the necessary support when a technological change is necessary.

Table 18: Overview of QWERT implementation initiatives.

6.3.2 ZXCVB Conclusions

ZXCVB digital transformation is process-oriented to digitally capture every aspect of the workflow. This way the processes will be transparent and top management will monitor easily various KPIs related to organization and collaborating organizations (mainly medical equipment suppliers). Before starting digital transformation journey organization created a new department the Optimization and Digitalization and provided a mandatory training program to selected employees to trigger their mindset. The Optim. & Digiz. Dept. is digital transformation advocate and manages the digital transformation projects. The digital transformation projects reflect employee needs and top management priorities. Hence, digital transformation efforts combine the needs and priorities of these two stakeholders as employee needs should not be overlooked. To eliminate resistance, digital transformation changes are based on logic and are sufficiently justified. These two organizational principles are applied in minor or major changes as it enables the organization to proceed with digital transformation projects.

A challenge that organization faces is employee unfamiliarity with digital technologies and digital tools and unwillingness to improve everyday tasks as they are used to existing processes. Because of this challenge, Optim. & Digiz. Dept. or top management choose to start digital transformation with processes that involve IT literate employees. Even though employee digital capabilities level is considered middle they are highly involved in digital transformation process especially in the assessment and implementation stage. A contrast that we notice in this digital transformation process is that the HR department does not participate in digital transformation as the Head of Optim. & Digiz. Dept. could identify employees who can participate in the process because of organizational deep knowledge. The Head of Optim. & Digiz. Dept. is the key advocate for digital transformation and enjoys CSO's support and trust as they have very similar mindset.

Focusing on the assessment stage, it is mainly focused on existing processes and employees are highly involved (Table 19). Assessing existing technological infrastructure has a secondary role as new investments are based on existing enterprise software systems. This software system was adopted in 2019, was a huge technological investment and is considered the technological backbone of the organization. Also, we notice that the organization focuses on front-end processes that as it was concluded from the interviews until this point are mainly paper-based processes implying that no technological infrastructure exists in these processes. However, ZXCVB pays attention to mapping existing processes to holistically understand the workflow and the involved parties as many processes are cross-department. They focus on well-structured and well-defined processes in order to be very impactful in employee everyday work life. In this step only the Optim. & Digiz. Dept. is highly involved. The next step of the process is focused on collecting valuable input for employees. Furthermore, employee digital capabilities are assessed during this step and are considered during the restructuring progress. However, organization mainly chooses to utilize in this stage employees who are familiar with digital technologies and digital tools and have an innovative mindset. As it many wholesale/retail organizations many front-end employees have valuable insights about the processes, or situations that may not be covered by existing processes. This step may be time-consuming and, as was underlined may delay the assessment process. Hence, ZXCVB interview front-end employees or assign employees from the department to monitor employee workflow to collect valuable information in cases where employees do not have the time to conduct interviews.

Assessment steps	Involved parties	Details
Step 1: Mapping existing processes	Department of Optimization & Digitalization	Understanding workflow and tasks Cross-functional processes Processes that will have great influence or will help ZXCVB achieve its objective. Takes in consideration a list of requirements that influence process redesign
Step 2: Conducting interviews	Employees	Collecting necessary information for scenarios, cases, etc. 3 broad categories: users, opinion leaders, Head of Departments Time consuming step

** Following this assessment stages, ZXCVB source digital technologies and digital tools, designs the solution, hierarchical communicates and presents it.*

Table 19: ZXCVB assessment process.

Following the assessment process, the organization has a detailed list of technological requirements and a complete overview of employee technological needs during their workday. These requirements directly influence technology investment stage. Following Optim. & Digiz. Dept. recommendations the IT department source the digital technologies. In the examined two digital transformation projects organization invests or plans to invest in mobile technological solutions to better fit employee workflow and working environment. Consequently, the digital transformation strategy influence investments. However, the role of IT department is not limited to source digital technologies but also provides support during the implementation. ZXCVB collaborates with technology providers to cover their technological needs. As 3-rd party organizations are involved this step is time consuming, too, and may delay the implementation. As the last two steps in the “preparation process” as it called by the organization are time consuming in implementation may be implemented in two-times. If the change is urgent then they draft a solution by relying on existing digital tools. This gives them time to source new digital tools and run a pilot test. For the pilot testing, the Optim. & Digiz. Dept. selects who will participate based on specific characteristics. Usually, they are the same employees that participated in the assessment stage.

Restructuring processes are key implementation initiative in ZXCVB digital transformation process as they try to reduce resources waste by streamlining and automating existing processes. During restructuring, Optim. & Digiz. Dept. considers constructs like employees, data collection, and task allocation to enable a smooth transformation and communicate more easily the change. A problem that organizations face that force the process restructuring it that many employees do not have sufficient digital capabilities to adopt digital technologies. Hence, many digitally oriented tasks are assigned to younger and digitally oriented employees. An expected option that could enable implementation is team restructuring. However, it is not an option because of organizations’ specific characteristics. Each department or sub-department has specific expertise, especially in productive processes (sales and after-sales departments). In organizational governing changes happened only in the beginning of digital transformation when the CSO created two new departments (Tendering Department, Distribution Department) that are vital for organizations operations as they are the core of the organization.

Recruiting program has a two-fold role in ZXCVB implementation plan. On the one hand, is used as a means to create supporting processes to enable implementation, and to make employees feel safe during the technology adoption process. More specifically, they recruit employees to support employees during

the adoption of new digital tools. This initiative does not replace the training program but is used as complementary. On the other hand, new recruits are used to enhance the digital capabilities level of the organization. They are used as a good example and are utilized in the assessment process. To be able to disseminate their mindset and kind transform the organization they are “protected” by the head of Optim. & Digiz. Dept. and top management. Complementary to the recruiting program is the training program that improve employee digital capabilities. However, they are volunteering (as the organization does not want to impose training on their employees) and custom made to each departments’ needs. Both of these programs are considered initiatives to improve employees’ digital capabilities and advance workforce.

Communication initiative is an important parameter on the implementation plan as organization communicates the change from the assessment stage by involving employees to the process or exploiting pilot testing to disseminate the upcoming change. ZXCVB creates various sale points to onboard employees and uses persuasion and marketing techniques. Of course, the sales points are related to digital transformation objectives like transparency, productivity, efficiency, and resource waste. Also, the recruiting and training programs are used as a communication mean to showcase that organization creates all the necessary supporting processes to enable implementation and to create a safe technological environment for all the employees regardless of their digital capabilities level. Top management support enables the digital transformation message and helps Optim. & Digiz. Dept. disseminate and secure employee participation. Specific employees are set as an example and become advocates of digital transformation projects. Another communication initiative that is used only in extreme cases is encouraging the competition between departments or sub-departments to trigger the adoption of a digital solution. Finally, they utilize communication technologies to interact with employees in real-time. Organization pays attention to communication and hence task allocation to digitally familiar employees does not cause problem during the implementation. They are communicated as part of the way team works.

In ZXCVB digital transformation process, middle managers or Head of Departments are not highly involved during the assessment as organization tries to collect as many insights during the first stage and try to find potential bugs and problems during the pilot testing phase in the implementation stage. Their involvement begins in the implementation phase as they need to accept and support the digital transformation project. As far as the employees who are a key construct, organization faces a few negative reactions because the Optim. & Digiz. Dept. and the organization consider a list of parameters during the assessment, investment and implementation stage that foster the creation of a positive environment towards the change. Furthermore, employee IT literate level, employee culture and mindset affect management decisions for the adoption, and who will participate both in the assessment and pilot testing implementation stage. Hence, the organization profiles employees and only employees with a specific profile can participate as they become digital transformation advocates, too. They must be familiar with digital tools and digital technologies, have an innovative mindset, and seek change. Usually, employees who meet these characteristics are younger employees, so we add in the employee profile the age.

6.3.3 Cross-case conclusions

For this part of the research, we examined two organizations that implement a digital transformation process and face different challenges according to their characteristics and size. QWERT is a highly digitally skilled organization in a technology-intensive industry, and a small organization with only 30 employees. On the contrary, ZXCVB is a moderated digitally skilled organization in a labor-intensive industry and has up to 150 employees. Each organization faces different challenges according to their business model,

organization orientation and size. This diversity gives us the opportunity to examine organizations that focus on different aspects and initiatives during the digital transformation process. By combining these diverse insights, we try to structure an assessment stage that encompasses various elements and propose ways for organizations to align existing situations with the envisioned situation.

	QWERT	ZXCVB
Economic activity	IT and other information services	Wholesale and retail trade
Technology or Labor-intensive	Technology-intensive	Labor-intensive
Employees number	30 employees	>150 employees
Organizational challenges	<ul style="list-style-type: none"> ▪ Ability to allocate resources to projects that do not have direct financial impact. ▪ Limited human resources hinder digital transformation projects. ▪ Organization needs to serve customers during the transition period. ▪ Specific aspects need to remain unchangeable. 	<ul style="list-style-type: none"> ▪ Employees digital capabilities can be characterized as moderate. ▪ Most of the processes are cross-functional. ▪ Processes are well-established and well-structured.
Digital transformation strategy	Process-oriented	Process-oriented

Table 20: Key information about organizations digital transformation projects.

Assessment process is very important in both cases however, organizations pay attention to aspects that fit them best. QWERT is a technology driven organization with no well-established processes and flexible employees as they are highly skilled. Therefore, they focus mainly on technology requirements. On the other hand, ZXCVB a well-established organization with well-determined processes and employees with moderated digital skills pays attention to assessing existing processes. In both cases, employees are considered an important parameter and influence directly or indirectly the whole process. Employees' indirect influence happens when they share their insights about cases or existing processes as happens in ZXCVB. The key source of information about the employee digital capabilities are top management and middle managers as they are familiar with and have sufficient knowledge of employee digital capabilities. The HR department has not an active role as many of their responsibilities are shouldered to middle managers.

If we merge the assessment processes of the two examined organizations we will get a holistic assessment stage encompassing the three elements proposed by the research framework (Figure 9). Starting with assessing existing processes organizations are requested to map existing processes to understand the workflow and tasks, processes cross-functionality, identify key processes that could enable future digital transformation projects, and consider all the requirements that influence process redesign. When organizations have well-established processes and front-end employees are exposed to additional cases and have additional valuable insights is mandatory to conduct interviews to collect and encompass all this information. This way organizations will have a representative blueprint of the existing processes and overlapping responsibilities; insight that will be used for the implementation stage. Following is the

assessment of existing technology infrastructure. As the analysis underlines many organizations rely on previous investments and their first choice is to advance them. Hence, organizations are asked to examine the offered opportunities, and assess if the new features can be utilized by the organization and offer additional value. Last but not least, organizations should assess existing digital capabilities. As it was recommended by QWERT in this phase is necessary to map digital capabilities, individually evaluating employees' digital capabilities and listing possible deficiencies in planning a training program.

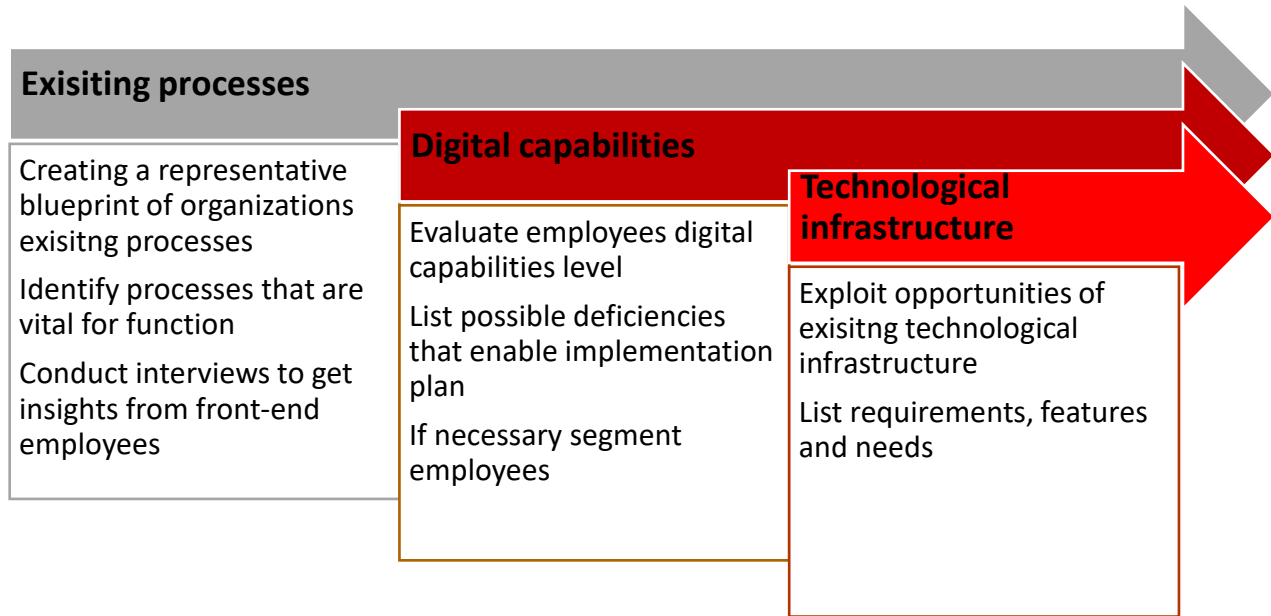


Figure 9: Proposed actions during the assessment stage.

Digital technologies investments are necessary for digital transformation however, the weight organization gives to this stage is in accordance with business model and type of activity. When technological resources are part of business model resources then organizations are obliged to heavily invest in digital technologies to implement a digital transformation, as happened in QWERT case. However, if they are for secondary activities organizations are more conservative and try to advance existing ones. As we speak for SMEs, we notice that organizations collaborate with technology providers to access high-end technological infrastructures but also to gain some financial benefits. Regardless of how heavily organizations invest in digital technologies this stage is the breaking point where they must decide if they are opting for a disruptive change or not. As we notice organizations tend to follow different implementation plans when it comes to disruptive changes. On the contrary, the assessment process is the same and the only variation is noticed in the involved parties, and on the weight that organization gives to each elements. Finally, we see that workstyle and work environment are considered in this stage and form technology investment decisions.

The implementation stage is shifted by organization orientation and beliefs and changes disruptive characteristics. Furthermore, we see that relying on previous experience is a valuable insight that enables organizations to implement changes more easily. On the one hand, employees are familiar with the initiative so feel less stress to implement the change so the resistance levels are lower, and on the other hand, the executives know how to manage this change so they can be more proactive and foresee

problems. Extremely important for a successful implementation is the communication and organization invest time and resources to draft a clearly defined transformation message. As communication initiatives can be perceived including employees in assessment meetings or meetings with technology providers or investing in digital technologies to enable communication between middle managers and employees to feel supported and safe during the transition. As a communication initiative may be exploited organization beliefs that are strictly followed and make employees feel secure that no changes that are not related to organizational beliefs will be selected. Finally, training activities can be exploited as a communication mechanism. In this case, the initiative has two-fold role; by advancing digital capabilities skills and promoting the digital transformation process.

Implementation initiatives are influenced by digital transformation strategies and business models. Even organizations are not keen on restructuring processes or make governance changes, sometimes are obligated to proceed because of the digital transformation strategy. As it happened in QWERT case that are forced to restructure some process to adopt the new architecture and in ZXCVB that in the beginning of digital transformation they need to make some governance changes and create new departments to enable transformative changes. Business model elements like technological infrastructure (like QWERT) that are considered key resources force an organization to pay attention more to collaboration initiative and to explore different interrelation relationships to source all the necessary resources. On the contrary, when business model key resources are human resources (like ZXCVB) then organizations focus on training and recruiting programs to support in any way the implementation of the digital transformation process.

A popular initiative that is presented in many research papers and enables digital transformation is cross-functional teams or business units. However, in our sample we notice that this initiative is not selected by organizations for different reasons in each case. In QWERT cross-functional teams are not an option as human resources are limited and moving an employee even for one day to another team or project may affect team performance and productivity. ZXCVB an organization that has many cross-functional processes this initiative is not an option because each department has specific responsibilities and skillsets, especially the technical and sales departments. Hence, moving an employee to other departments is not a viable option. However, the organization pays attention to cross-functional processes during the assessment process when all the middle managers from various departments are present during the decision process or must approve a change if it affects their processes.

Consequently, we see the employee factor has a crucial role in the assessment and implementation stage, hence, the involvement of the HR department is considered critical. In the assessment stage, HR is necessary to select the right employees along with middle managers, that will participate in processes related to this and to provide a detailed overview of the existing digital skills level. HR contribution in the implementation stage is vital as it can facilitate the execution of implementation initiatives like training and/or recruiting programs and communicate the transformation message. Undoubtedly, organization beliefs, orientation and business model elements shift digital transformation focus in all the three examined stages.

7. RESEARCH CONTRIBUTION AND CONCLUSIONS

This chapter summarizes the main outcomes of this Ph.D. dissertation. Firstly, a brief overview of research theoretical background and research approach is presented, followed by a discussion focusing on the theoretical and practical implications of this dissertation. The chapter concludes by presenting research limitations and future research avenues.

7.1 Research overview

Digital transformation as defined by Vial, (2019) is a process that tries to improve an organization by causing significant changes. The source of these changes is digital technologies that are combined to enable digital transformation efforts. Adopting this definition implies that to better investigate this process the researcher needs to segment it into stages not only to gain a holistic understanding of the process but also to discuss theoretical and practical implications. Therefore, the aim of this dissertation is to enhance the current understanding of digital transformation and to examine the alignment between the current situation with the planned digitally transformed future. One of the main remarks of this dissertation is that by aligning the present and future business situations, organizations can eliminate or reduce employee resistance.

The theoretical part of this dissertation builds on more than 150 published papers in Q1 and Q2 rated journals under the “Business, Management & Accounting” subject and subject categories related to business. Except for the theoretical papers, the research tries to incorporate practice-oriented journals like MIS Quarterly Executive Journal that combine academic and practical aspects to gain more insights into the digital transformation process. The result of this theoretical part is the creation of a 6-stage digital transformation research framework. The framework starts by proposing potential triggers, strategy orientations, elements that need to be assessed, implementation initiatives, and potential positive financial or non-financial outcomes. Furthermore, the identification of 6 contextual factors like organization, top management, employees, middle managers, financial resources, strategy scale, and execution speed that according to the literature influence digital transformation process.

This dissertation thesis follows a qualitative research approach. Firstly, it examines the digital transformation process of 8 exporting organizations, many of them (5 out of 8) active in labor-intensive industries. This initial research phase enhances digital transformation understanding by validating the proposed research framework. The dissertation does not focus on a specific industry, and a specific organization size, providing the opportunity to explore and list the contextual factors that affect this process by integrating diverse viewpoints and backgrounds. The second phase of the research is narrower and in detail investigates specific digital transformation stages. More specifically, it focuses on exploring how organizations design their implementation plan to encourage employee engagement. By leveraging existing structures, technology infrastructure, and digital capabilities organizations can align organizations present and future situations and possibly eliminate employee resistance.

The conclusions of this two-stage research will enable the creation of a digital transformation framework, a logical model, that facilitates employee participation and enables organizations to design an aligned transition. Also, it will provide insights into the contextual factors and the influence that they have on each digital transformation stage.

7.2 Research contribution

This dissertation has many implications for researchers, and scholars who explore digital transformation research and want to gain more insights on how organizations can design their implementation plan by encouraging employee engagement and leveraging the existing resources. Furthermore, the proposed research framework analyzes in detail the digital transformation process and highlights factors that should be taken into consideration by top management executives and/or digital transformation executives. The practical implications it is believed will be valuable for practitioners that implement a digital transformation and face resource restrictions.

7.2.1 Theoretical implications

Defining the main stages of digital transformation.

The conducted analysis verified the proposed by the literature digital transformation stages. These stages mainly are focused on scanning the environment for triggering factors, formulating a transformation strategy focusing on customers, processes, and value propositions. Another stage that this dissertation verified was the implementation stage and all the proposed initiatives. It was noticed that organizations exploit all the offered opportunities to perform a successful digital transformation and communicate the transformation message. Finally, in line with the literature digital transformation has financial outcomes that are not visible to every organization only to mature ones, and non-financial outcomes that are visible to everyone.

However, the main contribution of this research is the third stage of the proposed framework “assessing existing resources”. That stage was partially suggested by the examined literature review aims to propose an assessment process that will collect valuable information. This information would be utilized in investment and implementation. Assessing constructs like employee digital capabilities, existing processes, and technology infrastructures defines organizations existing standards. Having a clear and objective picture of organization capabilities means that organizations can exploit this insight for digital technology investments and implementation. Especially, for the implementation stage this is very important because this stage defines the success of the digital transformation strategy.

Shedding light on assessing process during digital transformation.

Even though the literature review suggested that organizations and more specifically top management should pay attention to mapping the gap between the current and future situation, the research referring to this stage was limited. The theoretical foundation of the proposed research framework, the dynamic capabilities theory, further supported this underexplored stage. More specifically, the seizing dynamic capabilities underlying the importance of assessing existing resources as they are related to organizations ability to quickly respond to changes. The first stage of the research showed that it is not considered a vital stage in digital transformation as only two organizations execute it. These two organizations pay attention to this stage for different reasons. The first organization pays attention to this stage because of previous failed digital transformation efforts. The second one focuses on this stage because top management spent significant time defining what they want to achieve with digital transformation. However, the most important reason is that the organization has more than 1000 employees and many of them have low levels of digital capabilities. This reality forces organizations to systematize training processes and involve the HR department in the digital transformation process. Both cases pinpoint the

importance of assessing existing processes and resources to be able to formulate a more detailed implementation plan that will enhance employee participation and acceptance and eliminate resistance.

Business model defines which elements should be thoroughly investigated during the assessment stage.

According to research, organizations assess the elements that are most important and have a greater influence on their business model. This means that organizations value differently the proposed elements of this stage and focus on business model elements that are more important. For example, the technology-driven QWERT paid more attention to technology infrastructure and employee digital capabilities. They pay less attention to processes because processes have secondary importance to the existing business model as they have not been systematized. On the other hand, the process-oriented ZXCVB (a labor-intensive organization) focuses mainly on understanding and mapping existing processes as the processes are cross-functional. To determine technological requirements and incorporate various scenarios the organization conducts interviews with various front-end employees.

Listing the factors that influence digital transformation process.

Examining a diverse sample of organizations in both research stages meant that our conclusions and the whole process were exposed to different influential factors. However, this is an opportunity to list some of the factors that might have an impact on digital transformation. The dissertation highlights managerial factors (top management composition, commitment, and perception) affecting the whole digital transformation process from the beginning to the end. On the other hand, organizational factors like organization size, orientation, identity, stakeholders, and industry characteristics activate organizations scanning mechanisms, shape digital transformation strategy, digital technologies investments, affect implementation plan and outcomes. Finally, employees play an important role in digital transformation as they can trigger the process but also influence the implementation stage. Organizations according to employee digital capabilities are called to design an implementation plan that will encourage participation and reduce employee resistance.

Employees are facilitators of a successful digital transformation process.

The recent literature has underlined that employee involvement or engagement in digital transformation influences the digital transformation process. Employees either actively participate in the assessment or implementation stage or are represented by middle managers. However, employee engagement is dictated by digital capabilities level. When an organization has employees with low digital capabilities, then they are represented by middle managers. Middle managers are directly involved only in cases when the organization wants to thoroughly collect information about specific processes. Usually, organizations with advanced digital capabilities are more flexible, employees actively participate in the assessment process along with their middle managers. Hence, they participate in meetings that assess technology infrastructures or even processes that are going to be digitally transformed.

Additionally, the employee factor influences the implementation plan and the chosen initiatives. According to employee demographic or behavioral characteristics, background, and culture a C-level or a digital transformation executive customizes the implementation plan. As the literature has indicated, the low-level digital capabilities indicate that employees will need additional support to adopt new digital technologies. This means that organizations should focus on supporting initiatives like designing processes to enable adoption, recruiting, or training programs, invest and utilize communication technologies to

enable communication. For a successful implementation, it is vital to establish a communication plan and name digital transformation advocates to promote digital transformation messages. Furthermore, in these cases, it was noticed that many implementation initiatives are complementary. This means that training or recruiting programs except for the educational or supporting objective, respectively, are exploited to promote and communicate digital transformation efforts inside the organization.

The fact that employee factor influences the digital transformation process indicates that HR departments will be highly involved. However, in the second research stage, only one organization has an HR department, but it is not involved in digital transformation. This is unexpected because ZXCVB heavily relies on employees to collect valuable input and employees are a factor that is highly considered during the implementation. The department responsible for digital transformation has shouldered the HR responsibilities to propose employees to participate or recommend implementation initiatives that are in line with employee digital capabilities level. It should be underlined that the first organization does not have an HR department mainly because of the small organization size, and the HR responsibilities have been shouldered to middle managers.

7.2.2 Practical Implications

Describing an approach to navigate practitioners through the digital transformation process.

With the proposed digital transformation process and the detailed description that accompanies each stage, the dissertation aims to be a tool that will be used by organizations to complete a successful digital transformation. The validated research framework recommends elements and initiatives that practitioners could exploit or follow before and during the digital transformation process.

To start a digital transformation, a detailed investigation of business insights, performance indicators, employee proposals, customer behavior or needs deviations, competition, and considering proposals from collaborating organizations like technology partners is a prerequisite. These triggers should be evaluated and the most influential will be utilized for formulating a digital transformation strategy. The research results revealed that organizations may need to start a process-oriented digital transformation to automate and systematize processes. This will be a foundation for executing other digital transformation strategies in the future. The second research stage proposed that organizations need to assess existing resources and capabilities according to their business model. The assessment results may force organizations to reformulate digital transformation strategies to be aligned with organization status. Nevertheless, the insights will assist executives select the appropriate digital technologies investments and design an implementation plan that will tackle organization shortcomings. In the digital technology investment stage practitioners need to consider a few points that are worthy of consideration. Digital technology investments are highly influenced by the available financial resources, acquisition cost, technology characteristics like scalability, and strategic orientation. Another important point is that organizations should invest in digital technologies that have sufficient inbound support and maintenance services to ensure a seamless support process that will not disrupt their operation. The implementation plan is formulated according to assessment stage outcomes to guarantee that possible obstacles will be addressed. By selecting and combining the appropriate initiatives practitioners can design a plan that responds to current needs and shortcomings. Finally, the research proposed a list of positive non-financial outcomes in processes, management, products/services, and customers that define digital transformation success.

By utilizing the digital transformation framework, and the recommended assessment process practitioners will be able to list their weaknesses and try to draft an implementation plan with specific initiatives that will let them overcome any restrictions. Therefore, the presented case studies in Chapter 6, and Chapter 7 may serve as examples showcasing ways for organizations to exploit their limitations and perform a successful digital transformation.

Highlighting the factors that affect each digital transformation stage.

One of the initial conclusions is that digital transformation is a process that is influenced by various factors. The proposed list highlights the factors that should be considered in each digital transformation stage to successfully complete the digital transformation process. In practice, the list highlights the factors that affect digital transformation and may restrict digital transformation. Top management composition and organization orientation/beliefs highly influence and trigger the transformation process, even for organizations that are not technology-driven. Additionally, the business model and particularly key resources influence the assessment process. The second research stage underlined this remark as each organization assesses key resources of their business model. QWERT assesses technology infrastructure and employee digital capabilities as a technology-driven organization and ZXCVB focuses on existing processes because they are highly cross-functional. The implementation stage is highly influenced by employees as digital transformation teams need to address shortcomings (digital capabilities gaps, supporting processes) to ensure a smooth transition with minimum employee resistance. Furthermore, external stakeholders like customers may hinder successful implementation when they have a crucial role in the implementation process, for instance adopting a new digital technology (IC1). Therefore, organizations before starting a digital transformation process are called to examine these factors and make the necessary changes. These changes will facilitate digital transformation and ensure that no resources will be wasted.

Encouraging employee engagement regarding their hierarchical position.

By shedding light on employee factors, the dissertation wants to encourage practitioners to involve employees and middle managers in different digital transformation stages. As both research stages showed, employees and middle managers are valuable sources of information that can trigger digital transformation and determine digital transformation success. The research urges practitioners to involve middle managers or a curated employee team in decision-making processes like in the assessment stage or selecting the implementation initiatives to gain valuable insights. Furthermore, middle manager involvement will blunt resistance as they are in a position to translate top management strategic directions to everyday tasks and to present a representative overview of the existing processes, resources, and capabilities.

Their engagement could be achieved in various ways according to employee digital capabilities, organization size, and top management perception. Being directly involved like in the QWERT case where all the team members were engaged in the assessment process, involving the middle manager or an executive with deep organizational knowledge (IC2), conducting interviews to gain insights to develop a technology solution that will include multiple scenarios and propose solutions to everyday problems (ZXCVB), or involving the HR department to design an implementation plan that considers employees digital capabilities shortcomings (IC10). Consequently, practitioners, namely top management executives need to decide beforehand which avenue is more suitable and appropriate for their organization.

7.3 Research limitations and Future research

Limitations are an essential aspect of any research, as they highlight the constraints or the boundaries within which the research was conducted. This dissertation has several limitations originating from the qualitative approach or by the context. However, these limitations serve as fruitful grounds for future research.

Qualitative research is influenced by specific historical, cultural, or social factors. This means that the influence of these factors can be visible in research samples and findings, as happened in this case. In Greece, digital transformation was valued as a significant strategy in 2020 when the COVID-19 pandemic started. During this period and because of the restrictions many organizations started to systematically invest in digital technologies and understand the value of digital transformation. The interviews for the first research stage were conducted in the spring of 2021, a year after the pandemic broke out. This means that not all organizations were at the same digital transformation level, and only 1 organization can be considered digitally mature. Furthermore, the low digital transformation level of the inbound organizations forced the research to focus on multiple industries, and not on a specific industry as is commonly seen in the literature. To create the sample, the researcher focused on industries that in the literature are considered digitally mature or are more likely to have reached digital maturity like logistics, electronics, etc.

However, this bizarre sample choice in the researcher's view is supported by dissertation literature review, as well. Digital transformation is a multilevel phenomenon, thus, the literature review does not need to focus on a specific industry as it would narrow its scope, and it is not research's aim. Having a wider focus in both research stages, and not focusing on a specific industry gave the freedom to source relatively more easily participants as it would be challenging to find several local organizations in the same industry that would meet the predetermined selection criteria. For the aims of this research, this choice served our objectives to explore the digital transformation process and detail investigate specific stages like the assessment stage. However, as research conclusions showed, industry and business model are two factors that highly affect the assessment and the implementation stage. In addition, they influence other factors like employee participation, employee demographics behavioral characteristics, and mindset. Therefore, future research should focus on specific industries and try to explore the factors that influence the digital transformation process and specific industries assess their resources and implement accordingly their implementation plan.

Chapter 4, subsection 4.3 presents a detailed research design that not only enhances the quality rigor of this research but also creates a future research avenue. The subsection in detail describes the case study tactics that enhance the quality of the research and breaks down the research protocol analyzing the data collection and data analysis procedure, the interview process, and the interview questions. The proposed research design could be utilized or advanced to investigate the digital transformation process in a larger data sample as the existing sample is limited. Furthermore, a further examination is required to further generalize the proposed guidelines and theory of this research and shed further light on the contextual identified factors that influence the digital transformation process.

Additionally, to the research limitations light should be shed as well as to the future research opportunities that were generated from this research. Even though the proposed research framework includes a result stage, this stage is significantly underexplored and needs further investigation. During

the research, it was noticed that many organizations expect to experience positive financial outcomes from digital transformation, but they are in an early digital transformation process, so these types of results are not visible yet. A highly proposed research avenues that has previously been recommended in the literature, future research should explore mainly the financial digital transformation outcomes. Nevertheless, this avenue requires researchers to carefully select the sample of their research as financial outcomes are only visible to digitally mature organizations and ensure organization willingness to share with the research team confidential financial indicators, data, and information.

Clearly, employees are a factor that defines digital transformation success and needs to be further explored. The dissertation explored how digital transformation executives engage employees in the assessment and implementation to blunt resistance by creating a bridge between current and future positions. The qualitative research indicated that employee digital capabilities level, demographics, characteristics, and mindset are moderators of employee engagement. Therefore, future research should explore employee point of view, and quantify which elements cause employee resistance and influence these stages. This way practitioners could effectively and efficiently address obstacles by selecting the appropriate implementation initiatives that would eliminate their resistance.

Middle manager is the mediating factor between employees and top management. They translate and communicate employee concerns to executives and on the other hand, translate strategic orientation to employees. The case studies in this dissertation marked their significant role, and showcased ways to actively engage middle managers in the decision-making process. More specifically, they are involved in the assessment stage by stating organization current stage and in the implementation stage as they choose participants for the pilot testing, communicate, and monitor the transformation process. Future research needs to shed more light on middle manager roles by investigating a bigger middle manager sample and focusing on their engagement and impact on digital transformation. Mapping the interactions between employees and middle managers could be another avenue as they become digital transformation advocates in their team and are accountable for digital transformation success.

Human resources are an underexplored contextual factor in digital transformation literature. This creates research opportunities that could explore the multilevel role of the HR department in the digital transformation process. In the last 10 years, the role of human resources has been upgraded and is not limited to hiring resources, communicating expectations, and employee orientation. On the contrary, they are actively involved in training and development programs, talent acquisitions, and work proactively to eliminate human resource problems. This dissertation clearly showed that HR department needs to be highly involved in the digital transformation process and to be transformed. To this end, future research needs to explore how HR departments can be digitally transformed and which processes and responsibilities are required.

The second research stage investigated in more detail the implementation stage and revealed that pilot testing is a common initiative regardless of organization size as it helps organizations to be sufficiently prepared for full implementation. Even though this initiative is an indicator of future obstacles it is not systematized, relies on organization previous experience, and middle manager's point of view. This creates a perfect opportunity for future research to explore the pilot testing initiative and define the diversity of the elements, and actors that will be included to be a representative example of organization's current state and highlight potential resistance.

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APPENDIX A- 1st Research stage interview questions

Below are presented the questions that were used for the interviews with the executives.

Background questions

- Identification (name, title, profession, Nr of years working in the current position, description of work responsibilities).
- Brief description of the organization (number of employees, industry, years of activity in the industry, annual turnover).

Triggering Factors

- Which factors have (customers, competition, internal environment, external partners, etc.) influenced your decision?

Formulating a Digital Transformation Strategy

- What is the scope of the digital transformation strategy?
- Is there a specific time planning and scale for each digital transformation strategy?

Assessment of organizations digital readiness

- How do you assess organizations digital readiness?
- Do your employees have sufficient digital capabilities?

Digital technologies investments

- List the digital technologies that your organization has invested in as part of digital transformation. In which organizational aspects (production process, administrative work, customer relations, export activity) have they been integrated?
- Describe the digital technologies that organizations choose to implement digital transformation strategy. Did you need to work with external partners?

Implementation Initiatives

- Is the formulation and execution of the implementation plan internally developed by your executives? If it is outsourced, did they undertake it entirely or in collaboration with company executives?
- What practices/initiatives have you utilized/exploited to smoothly implement the digital transformation strategy?
- Have you developed training programs to improve employees' digital skills? If so, what was their purpose?
- Do you hold meetings to monitor digital transformation strategy implementation? If so, how often?

Outcomes

- Describe the (financial and non-financial) outcomes of the digital transformation.

Contextual factors

- What is your personal view on digital transformation?
- Do you believe that digital technologies will affect your business?
- Do you consider digital initiatives an important part of business strategy? Why has your business adopted this attitude?
- What other factors do you consider that influence digital transformation?

APPENDIX B – 2nd Research stage interview questions

Below are presented the questions that were used for the interviews with executives and middle managers involved in digital transformation.

Background questions

- Identification (name, title, profession, Nr of years working in the current position, description of work responsibilities).
- Brief description of the organization (digital transformation strategy, number of employees, industry, years of activity in the industry).

Assessment of digital readiness

- Do you assess the company's readiness before the design of the implementation plan begins? If so, what parameters are considered? If not, what do you base the implementation plan on?
- How do you map the processes necessary for digital transformation?
- What is the level of digital competencies of employees? Is segregation between employees carried out?
- How are existing technologies used to implement digital transformation?
- Which executives are involved in the assessment process?
- How are the processes used to develop the implementation plan selected?
- Which factors (employees, middle managers, technologies, existing processes, digital capabilities) have the most influence on the design of the implementation plan?

Digital technologies investments

- In which way does the organization exploit the existing technologies?
- How do the organizations select the new technologies?

Implementation plan (who is involved, what practices are used)

- How does the existing situation in the company affect the implementation process?
- Which managers are involved in the development of the implementation plan? Is the HR department involved in the development of the implementation plan?
- What are the practices adopted by the company to implement the digital transformation? How have they adapted to the existing situation of the enterprise?
- How do you select the implementation initiatives that will be utilized?
- Are the practices selected to develop the implementation plan related to the digital competency level of the employees? If so, how?

Middle manager

- What is the role of middle managers in the process of developing the implementation plan? How is their involvement ensured?
- Are they involved in the development of the implementation plan? If so, how?
- How do they motivate employees to participate?
- How do they influence the implementation process?

- How do they motivate employees to participate?
- How are they involved in the process of developing the implementation plan?
- How do they motivate employees to participate in the implementation plan? Are there any implementation practices that have the main objective of motivating employees?

Motivating employees to participate in digital transformation and adopt digital technologies

- How does the company communicate digital transformation to employees? Has it adopted specific technologies? Does communication between employees enhance their participation?
- How do the recruiting programs affect employee participation?
- Have training programs been developed to increase their digital competencies? If so, how are they structured?
- Does the redesign of processes and the creation of working groups enhance employee participation?
- How does the company communicate digital transformation to employees? Has it adopted specific technologies? Does communication between employees enhance their participation?
- What are the main problems faced by the company during the implementation of the digital transformation, mainly concerning employees?