Master of Science in Business & Management
Stockholm School of Economics
1351 Thesis in Business Management, Spring 2022

Conquering the Knowledge Gaps in Hyperautomation

An exploratory case study of why and how knowledge gaps arise in a particular type of digital transformation

Authors:
Annie Dahlemar, 41865
Karin Ericsson, 41832

Supervisor:
Claire Ingram Bogusz

Word count: 19904

Abstract

Digital transformation (DT) has evolved rapidly during the last decade, and now businesses are about to face a new type of DT, namely hyperautomation. Hyperautomation differs from regular DT in that it combines several existing complex technologies to automate extensive processes that stretch cross-functional, resulting in a complex and agile type of DT. Hyperautomation shows excellent potential for businesses to make their processes more efficient and less costly and has become a buzzword amongst practitioners. However, there are no best practices for managing hyperautomation, and as a niche and nascent field, it is almost absent in scientific research. This study takes an exploratory, inductive approach to investigating the phenomenon of hyperautomation through a single-case study at a multinational telecommunications company, referred to as "Telecomms." This study also adopts a process perspective to investigate how the Automation unit in Telecomms is implementing automation and AI solutions in the Finance unit, one of the first units in Telecomms to start with automation. Interviews highlighted how three types of knowledge gaps occurred throughout the implementation process, namely: 1) Missing knowledge, 2) Knowledge misalignment, and 3) Knowledge Silos. Since the identified challenges were related to knowledge, literature on knowledge management (KM) is used to understand how and why knowledge gaps arise in the DT phenomenon of hyperautomation and how they could be managed. The study thereby aims to make two main theoretical contributions. Firstly, using KM literature in the context of a DT implementation process shows how investigating hyperautomation as a knowledge phenomenon enriches the DT phenomenon further. Secondly, the study contributes to an increased understanding of hyperautomation. It places it in a theoretical domain by discussing it through the lens of established concepts, such as agile methodologies and KM. This also brings practical relevance to managers by making them better equipped to manage the complexities of hyperautomation, stressing the need to understand how and why knowledge gaps arise and how agile methods and KM strategies can support them in managing this.

Key words: Digital transformation, Hyperautomation, Agile methodologies, Knowledge management.

Acknowledgement

There are several people who have supported us in writing this thesis to whom we wish to express our greatest gratitude.

First of all, we would like to thank our excellent supervisor Clarie Ingram Bogusz who has been a great support throughout the process. Her passion for the subject truly shines through and inspires us to push ourselves even more. It has been incredibly rewarding to discuss our thesis topic with her throughout this process.

Secondly, we would like to thank the case company for participating in this study. We would especially like to thank our contact person from the Automation unit for the support in conducting this thesis and for gaining access to all respondents from both the Automation and the Finance unit.

Finally, we would like to express our gratitude to all interviewees who have engagedly participated in this study. It has been very insightful to gain all these perspectives on the phenomenon studied.

A big thank you to everyone involved!

Annie & Karin

Abbreviations

AI	Artificial Intelligence
BPA	Business Process Automation
CAGR	Compound Annual Growth Rate
DT	Digital Transformation
ERP	Enterprise Resource Planning
IoT	Internet of Things
IT	Information Technology
ITOT	IT-enabled Organizational Transformation
KM	Knowledge Management
ML	Machine Learning
MVP	Minimum Viable Product
NLP	Natural Language Processing
OCR	Optical Character Recognition
POC	Proof of Concept
ROI	Return on Investment
RPA	Robotic Process Automation

Table of Content

1. Introduction

1.1 Background

Digital transformation (DT) has evolved rapidly during the last decade, and now businesses are about to face a new type of DT, namely hyperautomation. "*Hyperautomation, to put it simply, is a combination of automation technologies and artificial intelligence that, when combined, boost humans' capabilities, allowing them to execute activities faster, more efficiently, and with fewer errors"* (Haleem, Javaid, Singh, Rab, and Suman, 2021, p.2). As hyperautomation is not a new technology but instead a combination of several technologies, it allows organizations to automate beyond specific tasks and target practically any time-consuming operation, thereby reaching greater digital agility (Haleem et al. 2021). Combining existing technologies allows for the optimization of end-to-end business processes enabling innovative business proposals (Stoudt-Hansen, Karamouzis & Guttridge, 2021). All in all, hyperautomation contributes to increased efficiency, productivity, and moral standards by reducing human interventions in repetitive and time-consuming tasks (Haleem et al. 2021). Moreover, hyperautomation was recently placed on Gartner's list of top strategic technology trends for 2022 that will shape the future of digital business. It was stated that over 80% of organizations are reporting increased and continued investment in hyperautomation (Stoudt-Hansen, Karamouzis & Guttridge, 2021). In other words, hyperautomation differs from regular DT in that it *combines* several existing technologies to automate large processes that stretch cross-functional, resulting in a complex and more agile type of DT. While it is a top priority for many companies, the phenomenon of hyperautomation has not been studied much in academic literature. Hence, this new type of DT raised the interest in conducting an exploratory study to unfold the phenomenon of hyperautomation.

One could argue that the background to hyperautomation resembles the industrial revolution in the 1800s and early 1900s, which led to a shift towards more efficient manufacturing processes. From previously producing by hand, the new processes used machines and increased the utilization of steam and waterpower (Wikipedia, n.d). Today, about a hundred years later, a new revolution is taking place due to all the new technologies that have emerged during the past decade. The new technologies include Robotic Process Automation (RPA), Artificial Intelligence (AI), Machine Learning (ML), Blockchain, Cloud computing, and the Internet of Things (IoT) which all have had a large transformational impact on organizational processes (Lasso & Winkler, 2020). Some refer to this ongoing transformation as the fourth industrial revolution (or Industry 4.0), which leads to rapid changes in the business environment and enables more efficient and flexible business processes (Chih-Yi & Bou-Wen, 2021). In contrast to the first industrial revolution, this revolution revolves around business process automation (BPA), where one of the most prominent technologies is RPA. RPA is a software technology that mimics human behavior in computer systems and thereby replaces our standardized and repetitive tasks (Gartner, n.d.a). According to a study by IDC, the RPA market grew rapidly from 2016 to 2020, at a CAGR of 70%, to an estimated market value of $1.7B worldwide. The study forecasts continued growth, expecting RPA to grow at a

39% CAGR and reach $9.0 billion by 2025 (Feliming, Gantz & Hamel, 2021). In other words, a majority of companies worldwide are starting to adopt this technology. In recent years, the usage of RPA has progressed into being combined with other technologies such as AI, and together they allow for the automation of more complex tasks and processes, previously only possible to be performed by humans (Siderska, 2020). This combination of automation tools and other intelligent technologies is currently a hot topic that has been given many names, including Intelligent Automation, Hyperautomation, Integrated Automation Platform, and Cognitive Automation (Bornet, Barkin & Wirtz, 2020). Throughout this study, it is referred to as hyperautomation.

Even though hyperautomation promises great things, organizations need to understand how these digital technologies integrate into existing workflows and business processes. Implementing automation to a business process without understanding and preparing for its effects can have significant ramifications at the organizational level (Haleem et al. 2021). Adding *hyper* to automation, meaning more technologies, involving more stakeholders, and more extensive end-to-end processes demands significant organizational efforts. Gotthardt, Koivulaakso, Paksoy, Saramo, Martikainen, and Lehner (2020) state that combining RPA with AI can be costly and stress the importance of finding the proper use case. Finding the correct use case, in turn, requires deep knowledge of business processes while also having expertise in the many technologies available in hyperautomation (Gotthardt et al. 2020). Josyula, Suresh, and Raghu Raman (2021) further highlight how the leadership's vision, organizational structure, and program methodology are key factors contributing to implementing hyperautomation, demanding agile methodologies to meet customer expectations. This is much in line with Shani and Sinha (2020), suggesting that organizations should manage DT by adopting an agile methodology, looking out for the right talents, engaging key stakeholders, and integrating and collaborating across business functions (Shani & Sinha, 2020). However, collaborating across business functions and bridging between tech and business has proven to be difficult (Chandrasekaran & Linderman, 2015).

1.2 Empirical introduction

This study takes an exploratory, inductive approach (Bell, Bryman & Harley, 2019). It investigates the phenomenon of hyperautomation through a single-case study (Eisenhardt & Graebner, 2007) at a multinational telecommunications company, referred to as "Telecomms." Telecomms has over 100 thousand employees worldwide and operates in over 160 countries. The company is at the forefront of digitalization and has a clear strategy to become the market leader in AI within its industry. To achieve this, they have established an Automation unit that works with other business units in Telecomms to drive DT throughout the company by using automation and AI technologies. This study investigates how the Automation unit is implementing automation and AI solutions in the Finance unit, one of the first units in Telecomms to start with automation. The Finance unit has adopted many automation and AI solutions, whereby a few are hyperautomation solutions. This study takes a process perspective, investigating the implementation process of automation and AI

solutions at Telecomms to unfold the complexities of hyperautomation. As this is an exploratory, inductive study, there has been a constant iteration between data and theory (Bell, Bryman & Harley, 2019). A series of interviews with representatives from both units were conducted, which is further explained in 3.3 Data collection. The data clearly showed how the challenges explained were related to knowledge and knowledge management (KM). Hence, research from this theoretical domain is included in the literature review. In particular, the interviews highlighted how three types of knowledge gaps occurred throughout the implementation process, namely: 1) Missing knowledge, 2) Knowledge misalignment and 3) Knowledge Silos. Therefore, the thesis focuses on exploring the knowledge gaps that occur when implementing hyperautomation and how to conquer them.

1.3 Research gap

Hyperautomation shows excellent potential for businesses to make their processes more efficient and less costly (Haleem et al. 2021). It has become a buzzword amongst practitioners but considering its novelty, there are no best practices for managing hyperautomation, and few companies have managed or even initiated such efforts. Hence, it is interesting to explore the challenges that arise when the complexity and need for agility increase with this new type of DT. Moreover, hyperautomation as a niche and nascent field is almost absent in scientific research. Features and benefits of hyperautomation have been documented in whitepapers and case studies, but a theoretical analysis of the phenomenon is lacking. The empirical studies that exist are new, and most have not gone through the long peer-review process. Hence, a benefit of this study is that it builds upon both practical research and the few theoretical studies made and then brings hyperautomation into a theoretical domain, making it not just relevant for practitioners but also for academics interested in DT. In addition, many definitions define DT as a transformative process (Vial, 2019; Schneider & Kokshagina, 2021; Bordeleau, Santa-Eulalia & Mosconi, 2021; Gong, Ribiere, 2021). However, limited research has focused on revealing the actual process and the potential obstacles. One could argue that the key to unpacking DT is a process question for both scholars and practitioners (Chanias, Myers & Hess, 2019; Wessel, Baiyere, Ologeanu-Taddei, Cha, Blegind-Jensen, 2021). Hence, motivating a process perspective to help unpack the phenomenon of hyperautomation.

Furthermore, as hyperautomation combines several complicated technologies, one could argue that combining these will increase the need for deep technical expertise while also combining expertise across several technical areas. In addition, as hyperautomation aims to automate end-to-end business processes that stretch across functions, it also arguably increases the need to simultaneously combine expertise in technologies and business processes. Taking an exploratory approach to this problematization, the empirical findings showed how hyperautomation places particular challenges on knowledge. The need for expertise and collaboration across several areas risks unclear ownership of knowledge and a missing chain of command for how knowledge is supposed to move. This raises the complexity of establishing structures to handle the heavy need for knowledge throughout the

process. Finding these challenges made it interesting to study the phenomenon through the theoretical lens of KM literature.

Among previous KM literature, many articles have studied the integration of KM and DT. Alvarenga, Matos, Godina and Co Matias (2020) found that KM is a critical success factor when implementing DT. Although they studied KM in the implementation of DT, the majority of the literature instead emphasizes how DT tools can improve access to information and thereby increase the knowledge in an organization. Hence, these articles are not focusing on KM in the actual implementation process.

To summarize, researchers call for process studies of DT. Meanwhile, hyperautomation as a particular kind of DT is almost absent in academic literature. In addition, there is limited research in KM literature investigating KM in the DT implementation process. Altogether this constitutes a research gap in current literature that is highly interesting to investigate considering that many organizations are investing in hyperautomation and are likely to encounter this new phenomenon and its challenges.

1.4 Purpose, aim and contribution

This study aims to address the research gap by taking a process perspective on hyperautomation to explore the challenges that arise throughout the DT implementation process. Further, since the identified challenges were related to knowledge, literature on KM is used to understand why knowledge gaps arise and how they could be managed. The study thereby aims to make two main theoretical contributions. Firstly, using KM literature in the context of a DT implementation process to create an understanding of how KM models can help manage a DT implementation process. Secondly, it also aims to unfold hyperautomation as a phenomenon and place it in a theoretical domain. This also brings practical relevance to managers by making them better equipped to manage the complexities of hyperautomation.

To fulfill this purpose the study aims to answer the following research question:

- *How and why do knowledge gaps arise in the digital transformation phenomenon of hyperautomation?*

2. Literature review

In the following chapter, the literature review will be presented. First, in 2.1 the DT phenomenon will be unfolded, showcasing the need to take a process perspective when studying DT. Second, in 2.2, hyperautomation and its components are explained as it is the focus of this study. Third, the process of moving between theory and data in this inductive study resulted in the need for KM literature, particularly in the process of DT, to help unfold the process of hyperautomation in Telecomms. Therefore, in 2.3 the relevant literature on Knowledge and KM in DT will be presented.

2.1 Digital transformation

The phenomenon of digital transformation

Lately, much research has been interested in the phenomenon of DT. Recent literature reviews, that present the current understanding of DT, have reached similar conclusions that there is a scattered view and varying definitions of the phenomenon (Vial, 2019; Schneider & Kokshagina, 2021). Nevertheless, many articles emphasize similar elements essential to managing the DT, such as business models, performance management, workplace, mindset and skills, and IT function (Schneider & Kokshagina, 2021). The previous literature reviews have created combined definitions of DT, and all agree that DT is a large transformative process (Vial, 2019; Schneider & Kokshagina, 2021; Bordeleau, Santa-Eulalia & Mosconi, 2021; Gong & Ribiere, 2021). Most of these articles also emphasize that the objective of DT in an organization is to innovate business processes such as internal operations or customer experience and relations (Bordeleau, Santa-Eulalia & Mosconi, 2021). Other objectives are how Vial (2019) states that it aims to improve an entity. Bordeleau, Santa-Eulalia and Mosconi (2021) say that it drives digital value creation, while Gong and Ribiere (2021) argue that DT improves an entity and redefines the entity's value for customers.

Furthermore, some argue that more narrow distinctions of the DT definition are necessary. In an article by Wessel et al. (2021), they propose distinguishing between DT and IT-enabled organizational transformation (ITOT). The main difference is that DT transforms the business propositions and offerings, while ITOT refers to using technologies to make processes more efficient (Wessel et al., 2021). Baiyere, Salmela and Tapanainen (2020) describes the difference between DT and ITOT with the following analogy:

> *While IT-enabled organizational transformation (such as implementing an ERP) can be likened to "a cub transforming into a lion" – that is into a faster and more efficient version – digital transformation, on the other hand, can be likened to "the metamorphosis of a larva into a butterfly".*
> (Baiyere, Salmela & Tapanainen, 2020, p.253).

To make sense of DT in organizations and to theorize it, previous literature has taken various perspectives to describe the phenomenon. Some articles describe that DT leads to new types of challenges and threats. Brunetti, Matt, Bonfanti, De Longhi, Pedrini and Orzes (2020)

divided the challenges related to DT into the four categories: 1) market challenges that refer to the transformation of the business model, 2) organizational challenges including knowledge management, 3) economic challenges that capture the shift in labor demand and 4) social challenges which primarily are related to environmental sustainability. Similar to these, Shahi and Sinha (2020) identify seven challenges organizations face when handling DT. These are: a lack of vision and clear strategy with the DT initiative, culture and employees digitalization mindset, finding the right talents with the right skillset, lacking digital infrastructure, limited budget, teams working in silos resulting in low information sharing between different functions, and data security and data management. In other words, the literature on DT describes several challenges with DT, including strategy, culture, and technical challenges.

To be prepared for this change, organizations should pursue a digital business strategy (Sia, Soh & Weil, 2016; Sebastian, Ross, Beath, Mocker, Moloney & Fonstad, 2017), sometimes also referred to as DT strategy (Chanias, Myers & Hess, 2019). Through a case study of how a bank pursues a digital business strategy, Sia, Soh and Weil (2016) identified the importance of guiding top management leadership that envisions the digital business strategy and enables the resources needed. Another study by Sebastian et al. (2017) investigated how 25 big old companies initiated their DT efforts. Their study found that among the leaders who saw opportunities with new digital technologies, all had adopted a DT strategy focusing on either customer engagement or digitized solutions. Hence, both studies emphasize the importance of envisioning leadership that is willing to invest and support the digital business strategy. Chanias, Myers and Hess (2019) agree that to develop a DT strategy, the organization needs to utilize top-down strategizing, but it should be accompanied by bottom-down strategizing. Similar to the case studies, Chanias, Myers and Hess (2019) argue that to drive DT in an organization, top management should envision the DT while encouraging employees to work towards DT bottom-up.

Except for the importance of leadership, Sebastian et al. (2017) argue for the importance of technology-enabled assets to manage DT. One such asset is the operational backbone, which they define "*as the technology and business capabilities that ensure the efficiency, scalability, reliability, quality and predictability of core operations*" (Sebastian et al. 2017, p.203). Similarly, Sia, Soh and Weil (2016) also found that new capabilities are necessary within operations, customer needs and innovation. They argue that since customers are becoming used to digital solutions, the company needs to flexibly respond to emerging customer demands by working efficiently across functional silos. They further argue that it is necessary to have a holistic perspective to respond to new threats and opportunities created by DT (Sia, Soh & Weill, 2016).

Another perspective when researching DT focuses on managing the people. Kane (2019) argues if companies start their DT efforts focusing on technology, they may not succeed. Instead, they should aim to shift the mindset within the company at several levels ranging from the employee through the leadership to the organizational level. In order to leverage the full potential of DT, organizations must create a culture that enables agility, accept an

appropriate level of risk, be experimental, collaborative, and organized around cross-functional teams (Kane, 2019). Similarly, Westerman, Soule and Eswaran (2019) stress the importance of the word "transformation" in DT and argue that to succeed, organizations must build a culture where innovation is the norm. Driving this cultural change should be an executive responsibility, although it is a highly complex process.

Call for process studies of digital transformation

Although DT is defined as a transformative process, limited research has focused on revealing such processes. A process perspective creates a more dynamic understanding of organizational phenomenon by incorporating fluidity, emergence, flow, and temporal and spatial interconnections (Langley & Tsoukas, 2017). Kipping and Lamberg (2017) emphasize that process studies focus on the how rather than the what. Moreover, Hernes and Maitlis (2010) state that process studies are essential to practice since many well-established variance theories that relate practices or organizational characteristics to performance are not easily actionable as they assume static equilibrium and ignore temporal dynamics.

With the recent suggestion of distinguishing ITOT and DT, Vial (2019, p.119) argues that *"the scale, the scope, as well as the speed associated with the DT phenomenon call for research to consider DT as an evolution of the IT-enabled transformation phenomenon"*. Therefore, one could argue that researchers are looking at a new type of transformation compared to older research on DT. In the article, Vial (2019) creates a DT framework of building blocks based on extant literature to map the current understanding of the DT process. This illustrates how previous literature has studied specific steps in the process but not a holistic view of it. Furthermore, the article describes how the emergence of DT can create both opportunities and threats. Depending on how the organization chooses to respond, it can gain or maintain its competitive advantage (Vial, 2019).

Although there seems to be a strong call for more process studies to explain DT, one article addressing this is Leonardi (2020). It argues that even though extensive rollout plans for DT are essential, just as critical are the six phases constituting what he refers to as the work digitization process. The phases are: 1) leaders sell the DT, 2) employees decide whether to use the new technology, 3) employees decide how they will use the new technology, 4) new kinds of data change the way employees behave, 5) performance improve locally, 6) local performance aligns with company goals. These six interlinked phases describe the ground-level change crucial for DT to work and succeed. While the process illustrates how the change happens, it could also be used in reverse by managers to plan for a successful transformation (Leonardi, 2020).

To summarize, much research in DT has focused on various aspects of the phenomenon, but few have studied the holistic transformation process in organizations. As DT is entering a new stage, separate from ITOT, coming with more speed, there seems to be a call to study the process of DT. Therefore, in this study, a linear process is used to discover and unfold a particular type of DT. Cloutier and Langley (2020) describe how a linear process study constitutes a single, more or less well-defined sequence of prescribed stages where each stage

occurs after the other in a particular order. As Coutier and Langley (2020) highlight, this method is used to investigate or unpack a process by explaining stage-level or cross-level dynamics in an existing process model, in this case, the process of hyperautomation in Telecomms.

2.2 Hyperautomation

The concept of hyperautomation was coined by the research institute Gartner in 2019 (Haleem et al. 2020). As of 2022, Gartner estimates that more than 56% of organizations have four or more hyperautomation initiatives ongoing and companies in the forefront have over ten initiatives (Stoudt-Hansen, Karamouzis & Guttridge, 2021). Gartner's official definition of hyperautomation is:

> *Hyperautomation is a business-driven, disciplined approach that organizations use to rapidly identify, vet and automate as many business and IT processes as possible. Hyperautomation involves the orchestrated use of multiple technologies, tools or platforms, including: Artificial intelligence (AI), Machine learning, Event-driven software architecture, Robotic process automation (RPA), Business process management (BPM) and intelligent business process management suites (iBPMS), Integration platform as a service (iPaaS), Low-code/no-code tools, Packaged software and Other types of decision, process and task automation tools.*
> (Gartner, n.d.b).

The increased use of robotization supports the transformation of business processes, product development, and new emerging business models. It allows for better operational efficiency and significantly reduces operational costs (Siderska, 2020). These factors make hyperautomation central to DT today. However, it differs from previous versions of DT by combining existing tools and concepts into something new and more agile.

One of the few academic articles on hyperautomation defines it as *"the combination of automation technologies and artificial intelligence that, when combined, boost humans' capabilities, allowing them to execute activities faster, more efficiently, and with fewer errors"* (Haleem et al. 2021, p.2). The authors describe that the primary goal of hyperautomation is to add another layer of intelligence and adopt a more effective system-based approach to automation. Moreover, the main advantages of hyperautomation as lower automation costs, improved IT-business alignment, and improved security and governance (Haleem et al. 2021). Lasso and Winkler (2020) question the lower cost and instead emphasize the increased costs of building and maintaining hyperautomation. Moreover, Haleem et al. (2021) argue that hyperautomation do not intended to replace humans but rather free employees from repetitive and low-value duties allowing them to focus on more value-adding tasks. Siderska (2020) agrees and explains how business processes being robotized on a large scale should be treated as organizational and technological change that leads to the emerging hybrid work environment. There is no reason

to fear losing a job to a robot: on the contrary, software robots and humans will become one hybrid environment (Siderska, 2020).

Lacity, Willcocks and Craig (2017) studied the implementation of cognitive virtual agents, combining the technologies Cognitive Automation and RPA, in a Swedish bank. They found that shareholders were pleased over the gained competitive advantage, increased scalability, increased agility, operational efficiency, high long-term return on investment, and increased compliance (Lacity, Willcocks & Craig, 2017). In this study of Telecomms, the increased agility resulting from this particular case of DT became apparent through iterations between the empirical data and theory. Interviewees highlighted many features coming with the phenomenon, such as; how hyperautomation is a complex problem making it difficult to find the correct solution and combination of technologies, how cross-technology competence and collaboration across units are necessary, and how the hyperautomation solutions could be modularized and implemented incrementally. These features have in previous literature been described as the concept of agile (Rigby, Sutherland & Takeuchi, 2016).

Previous studies have discussed various automation technologies and their features separately. There are also studies presenting the concept of agile. In hyperautomation, they are combined, creating a new version of DT. In the following sections the elements necessary for hyperautomation will be explained separately to unfold this new phenomenon, starting with the core technology RPA.

Robotic Process Automation, RPA

The most central part of hyperautomation is RPA, as it is the most prominent automation technology. The research institute Gartner defines RPA as:

> *A productivity tool that allows a user to configure one or more scripts (which some vendors refer to as "bots") to activate specific keystrokes in an automated fashion. The result is that the bots can be used to mimic or emulate selected tasks (transaction steps) within an overall business or IT process. These may include manipulating data, passing data to and from different applications, triggering responses, or executing transactions.*
> (Gartner, n.d.a).

What most definitions of the term RPA have in common is the aim to reduce the burden of repetitive, simple tasks with automation as a tool (Aguirre & Rodriguez, 2017; Siderska, 2020). The most common areas to use RPA have been in typical back-office processes such as finance, procurement, and human resources since these processes often are standardized. Common business processes supported with RPA are accounts payable, accounts receivable, travel expenses, fixed asset accounting, and master data management (Aguirre & Rodriguez, 2017). That the finance function is a common area to start can be explained by how repetitive tasks were commonly outsourced in countries where the workforce was cheap. Having outsourced many of the back-office capabilities to different locations, the ability to optimize these processes became weaker. Wanting to take back control of operations, companies

instead started developing more efficient processes by replacing people with technology through automation (Gadre, Jessel & Gulati, 2017).

The main benefits of RPA are cost reduction, increased process speed, error reduction, and productivity improvement (Aguirre & Rodriguez, 2017). Although RPA is a great tool to make repetitive tasks more efficient, there are some challenges. Fung (2014) describes how RPA can create job losses since the primary goal of RPA is to replace employees' repetitive tasks. Even if an alternative could be to re-skill staff, it can be costly and time-consuming. There is also a contradiction in the statement of reducing costs as the deployment costs of RPA can be very expensive (Fung, 2014). Lacity, Willcocks and Craig (2017) describe how they have seen in multiple automation case studies how ROI only occurred in the long run. Another common obstacle mentioned around automation is what Gadre, Jessel and Gulati (2017) describe with the expression "*When your tool is a hammer, everything looks like a nail*" (p.37). The authors relate to how organizations struggle with robotic adoption when they approach it from the perspective of the technology and not from the business problem. In addition, Siderska (2020) stresses the importance of identifying, standardizing, and optimizing the correct processes before implementing RPA. Fung (2014) states that a process suitable for RPA should have a high number of transactions and a high value on those transactions, and there should be low human intervention.

RPA in combination with intelligent technologies

Coombs, Hislop, Taneva and Bernard (2020) define AI as *"the broad suite of technologies that can match or surpass human capabilities, particularly those involving cognition such as learning and problem solving"* (p. 1). The authors further highlight how the applications of AI can include everything from knowledge reasoning, Machine Learning (ML), Natural Language Processing (NLP), computer vision, and robotics. Siderska (2020) describes how RPA is coupled up with other AI technologies such as Optical Character Recognition (OCR) and NLP, among others, to enable the automation of increasingly more complex processes, in other words, hyperautomation. RPA automates standardized tasks, but other technologies bringing in intelligence are needed to automate more extensive processes.

RPA is limited to highly rule-based, structured, standardized, repetitive, and well-documented decision logic where the data input is structured and digitized and the processes are simple (Ng, Chen, Lee, Jiao & Yang, 2021). In other words, RPA has a low level of exception handling and intelligence. When combining RPA with AI technologies in hyperautomation, the technological capabilities expand. The cognitive decision-making ability can overcome the challenges in handling unstructured data, computer vision, NLP, fuzzy rule-based decision, and more (Ng et al. 2021). The authors further state how these features accelerate end-to-end business processes and create agile, speedy, and efficient cognitive decisions with human-like capabilities. Coombs et al. (2020) describe how this can enable knowledge work and service work to be automated that previously have been considered too complex to automate, giving organizations the strategic opportunity to increase business value.

Agile methodologies

Josyula, Suresh and Raghu Raman (2021) argue that organizations investing in intelligent automation (synonym for hyperautomation) need to adopt agile software development practices. Agile methodologies require the organization to break a siloed delivery structure in traditional software development and instead embrace close collaboration between the business and software development teams. In addition, they stress how teams being diverse in their experience and expertise strongly reflect the level of optimization of the hyperautomation solution (Josyula, Suresh & Raghu Raman, 2021)

Rigby, Sutherland and Takeuchi (2016) describe how the concept of agile arose when 17 software developers met in 2001 to discuss and improve the traditional "waterfall" methodology of software development. Four new values for developing software were established as a response to "The Agile Manifesto," today known as agile techniques or methods (Rigby, Sutherland & Takeuchi, 2016). The four principles were: 1) people over processes and tools, 2) working prototypes over excessive documentation, 3) responding to change rather than following a plan, and 4) custom collaboration over rigid contracts (Rigby, Sutherland & Takeuchi, 2016). Some agile practices existed before this event, but the way these were grouped into a model became a giant leap from the previous dominant plan-driven approaches (Port & Bui, 2009).

The software market is a rapidly changing market driven by uncertainty, and to effectively deal with this, Lee and Xia (2010) argue that it has become imperative to use agile methods. Agile development attempts to manage volatile and changing requirements by using various practices and techniques (Lee & Xia, 2010). Agile is often characterized by minimal upfront planning, and instead of adapting to changing requirements throughout the process, utilizing prototyping and testing (Chan & Thong, 2009; Lee & Xia, 2010; Bianchi, Marzi & Guerini, 2020). The customer is central in the agile process, and collecting customer feedback is essential (Rigby, Elk, & Berez, 2020). Another characteristic of the agile methods is cross-functional, small, diverse, and autonomous teams that work in short iterative cycles called sprints (Chan & Thong, 2009; Lee & Xia, 2010). Chan and Thong (2009) highlight how the sprints actively involve user feedback, adjusting project scope "on-the-fly" and face-to-face communication instead of documentation. The teams should have various skills and perspectives to see a problem from multiple angles (Lee & Xia, 2010). Having the people with the appropriate skills and empowering them in decision-making have been argued to be essential for the success of agile development (Chow & Cao, 2008). Furthermore, Chan and Thong (2009) argue that KM becomes particularly important for agile methodologies. Since agile often means stopping using formal documentation, knowledge of projects can become tacit, and its transfer relies on the rotation of team members in the different phases of the project.

Agile is not only applicable in software development, but there are some circumstances where agile methods are more applicable. Some indicators that agile methods should be appropriate are: when the problem is complex, solutions are initially unknown, requirements are likely to change, and close collaboration with end-users is possible (Rigby, Sutherland &

Takeuchi, 2016)**.** Moreover, Reifer, Maurer and Erdogmus (2003) discuss the difficulty of scaling agile methods. The authors highlight how agile methods fit small projects, and scaling the methods into fitting larger projects, where different teams have to work together, becomes difficult. In addition, it is pointed out how one must ensure that the agile methods work together with traditional methods without sacrificing the Agile manifesto.

Furthermore, many organizations adopt agile methods without clearly understanding how agility is defined, measured and what factors they can control (Lee & Xia, 2010). Rigby, Sutherland and Takeuchi (2016) argue how leaders often do not understand agile and, as a result, continue to employ their old ways of working that undermine agile projects. Furthermore, Rigby, Elk and Berez (2020) point out how organizations often do not work bottom-up, staying close to the customer as agile methods intend, and instead keep a top-down structure leading to halfhearted and inconsistent adoption of agile methodologies. Rigby, Elk and Berez (2020) argue that simply changing the organizational chart to succeed with agile methodologies is not enough. Instead, the operational model is of much more significant importance since there is more needed to break down silos and hierarchies. Leaders must commit to the agile methodologies and focus on the organization as a whole rather than their silos. In addition, the authors highlight the particular case of IT that traditionally is divided into separate IT units responsible for different tasks that are often at odds with each other, which slows down processes. Rigby, Elk and Berez (2020) highlight how one must break the functional silos, make architecture more modular, and make engineers more versatile.

2.3 Knowledge management

What is knowledge?

As knowledge is a central part of KM, it is interesting to start by discussing it. Since ancient Greek, human knowledge has been central in philosophy and epistemology. During the last century, knowledge has regained an interest and is now also studied in economics, organizational theory and psychology (Kakabadse, Kakabadse & Kouzmin, 2003). Although knowledge is a complex concept with varying definitions across the research fields, scholars agree that knowledge is more than data or information (Omotayo, 2015). Instead, data and information are explained as two prior stages on a continuum toward knowledge. In each stage of the continuum, more value is added (Kakabadse, Kakabadse & Kouzmin, 2003; Ponelis & Fairer-Wessels, 2014). Zack (1999) explains that data is observations or facts that alone are not meaningful. When using data in a meaningful context, such as in a message, it becomes information and thereby more valuable than data. Based on the information we have acquired through experience or communication, we create beliefs and values that represent our knowledge (Zack, 1999).

Moreover, two common dimensions of knowledge are tacit and explicit knowledge. While explicit knowledge is easy to codify and formally communicate, tacit knowledge is the practical knowledge acquired and stored within the individual and hence is more difficult to

formalize and communicate (Polanyi, 1966). Tacit knowledge is personal and gained through experience, not formal training (Nonaka & Takeuchi, 1995). Individuals in organizations often use tacit knowledge to perform their tasks, and since it is difficult to transfer this type of knowledge, it is also hard for competitors to imitate. On the one hand, tacit knowledge can thus be a source of competitive advantage (Omotayo, 2015). On the other hand, since tacit knowledge is subjective, organizations can become vulnerable if the employee possessing the knowledge leaves. Consequently, stressing the importance of organizations having strategies to make internal knowledge explicit to sustain the organization's intellectual capital (Hall & Andriani, 2003; Omotayo, 2015).

Knowledge management

In a globalized world where it is easy to transfer information, the consequence is an emergence of knowledge-based economies that stress the importance of effectively managing human capital (Kakabadse, Kakabadse & Kouzmin, 2003; Omotayo, 2015). Similarly, Drucker (1993) referred to this as a "knowledge society" and stressed that it led to a shift in critical economic resources. Previously these resources were capital, natural resources, or labor, but due to the knowledge society, more emphasis is on knowledge as an important resource. This also impacts organizations' need to manage knowledge to improve organizational effectiveness (Omotayo, 2015). Some argue that knowledge is increasingly seen as a crucial source for comparative or competitive advantage (Grant, 1996). Thus, the need for structured KM is increasing where the emphasis is on creating, managing, sharing, and utilizing knowledge effectively (Omotayo, 2015).

Several research disciplines are interested in studying KM and have contributed to the current understanding, with psychology being the most prominent contributor (Kakabadse, Kakabadse & Kouzmin, 2003). Considering the broad field of research, it is hard to appoint a single definition of KM as it differs depending on the perspective (Ponelis & Fairer-Wessels, 2014). However, consistent among the definitions is that KM provides a framework that builds on past experiences to create new ways of sharing and creating knowledge (Kakabadse, Kakabadse & Kouzmin, 2003). To succeed with managing knowledge, Desouza (2011) argues that four key components need to be managed which are: knowledge, people, processes, and technology. By using KM, organizations usually have some of the following objectives: to create knowledge repositories, improve knowledge access, enhance the knowledge environment, or manage knowledge as an asset (Davenport, De Long & Beers, 1998).

A literature review of KM by Omotayo (2015) describes how KM is perceived as a process of activities to pursue the organization's KM strategy. Some of these activities include how the organization must identify and capture knowledge needed to transfer it among the organization's members by utilizing technological or human means. To manage KM Omotayo (2015) also identifies some recurrent themes in academia as: the importance of KM strategy to align with the organizations' goals, encouragement from top management to share learning across functional boundaries, a culture promoting the KM, incentives for employees to share

knowledge, and organizations should also have knowledge repositories where codified knowledge easily can be shared and retrieved.

Considering the broad research contribution to understanding knowledge, Kakabadse, Kakabadse and Kouzmin (2003) argue that there are as many KM models as there are theorists. The most prominent KM models are; the cognitive model, the community model, the network model, and the philosophical model. However, the cognitive model is given the most attention in both academia and practice. This model aims to capture and codify explicit knowledge and information stored in memory (Kakabadse, Kakabadse & Kouzmin, 2003).

Digital transformation and knowledge management

Many articles have studied the integration of KM and DT. One example is how Turulja and Bajgoric (2018) identified that by transforming a human resource management function to become more digital, they could improve employees' knowledge. They also found that this positively impacted business performance (Turulja & Bajgoric, 2018). Like Turulja and Bajgoric, most literature emphasizes how DT tools can improve access to information and thereby increase knowledge in an organization. However, there are few articles discussing the implications of knowledge and KM, or the lack of it, in the process of implementing DT. One study that does this is Alvarenga et al. (2020). By studying the relationship between the implementation of DT and KM practices, their findings showed that KM is a critical success factor when implementing DT.

The implementation process of the type of DT studied in this study can be equated to the process-oriented innovation type, where the innovation outcome is described as the introduction of something new, such as new ways of organizing or new service (Swan & Scarbrough, 2001). In innovation research, some studies investigate the relationship between innovation and KM. Considering that the process investigated in this study is similar to the process-oriented innovation, this research could support understanding KM in hyperautomation.

As mentioned, one type of innovation is process-oriented. The other type is often referred to as thing-oriented and focuses on innovations where the outcome is a new product or device (Abou-Zeid & Cheng, 2004). Abou-Zeid and Cheng (2004) combine the existing understanding of the knowledge characteristics for each innovation type with knowledge manipulating activities, which are problem-solving tasks. Process-oriented innovations are often characterized by using tacit, systemic, and complex forms of knowledge. By knowing these characteristics, Abou-Zeid and Cheng (2004) argue that the cognitive fit model, called SECI (see Figure 1.) should be used to identify the appropriate knowledge manipulating activities that match the characteristics of the innovation type. The better the match is, the more successful the innovation will become. Abou-Zeid and Cheng (2004) hence argue that *"the success in developing innovation outcomes of type 1* [process-oriented type] *is positively related to the existence of knowledge creation processes, such as socialization and externalization"* (Abou-Zeid & Cheng, 2004, p.270). Socialization and externalizations are two versions of knowledge-creation activities, as shown in the SECI model. Socialization is a

process focusing on creating new tacit knowledge through experiences. Since tacit knowledge is personal, socialization often happens through activities that are either informal or semi-formal, which enable increased knowledge through observation, imitation, and practices (Abou-Zeid & Cheng, 2004). Externalization is a process that aims to transform tacit knowledge into explicit knowledge (Nonaka & Reinmoeller, 2000). Hence, the externalization process entails articulating tacit knowledge into words and forming concepts.

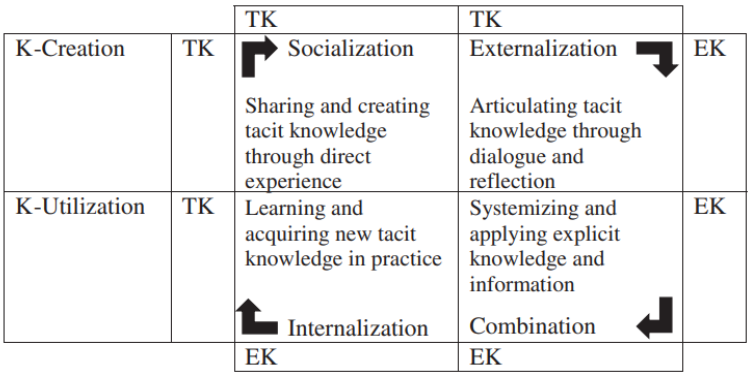

Figure 1. Abou-Zeid and Cheng (2004) modified version of the SECI model of knowledge creation and utilization, originally made by Nonaka and Reinmoeller (2000).

In a case study by Swan and Scarborough (2001), they studied the innovation process in an IT-based organizational innovation. The authors underline how the cognitive view of KM often focuses on *"the extraction, codification, and diffusion of employees' knowledge in explicit forms through IT-based tools"* (Swan & Scarborough, 2001, p.4). The focus is on spreading or exploiting the knowledge that exists in the organization to enable re-use. In other words, to transfer explicit knowledge or information in an organization where the ideas have already been developed. Further, Swan and Scarborough (2001) state how each phase of the innovation process involves developing, sharing, and applying knowledge. However, the different episodes have varying knowledge focus, placing different challenges on the KM strategies applicable. Therefore, they argue that using a single KM model is difficult. Instead, one should pay careful consideration to both the process and the purpose of the innovation, while also identifying the specific purpose that KM should fulfill (Swan & Scarbrough, 2001). As a result of Swan and Scarborough's (2001) case study, they explain the purpose of KM they identified in each step of the innovation process and how they matched that purpose with appropriate KM models. In the initial episode, Agenda formation, when the focus is on increasing awareness of new ideas within the organization and its potential application areas, the purpose of KM is to acquire knowledge from external sources. Swan and Scarbrough (2001) argue that the network model of KM is most appropriate in this episode, with strategy methods including boundary spanning and external networking that encourage employees to access new information. In the following episodes, the Selection and Implementation, a need for creating and appropriating knowledge is emphasized, meaning that organizational explicit knowledge needs to be reinterpreted and recreated alongside tacit knowledge about organizational processes and practices. Hence, the community model is best suited as the

purpose should be to develop social communities to create a mutual understanding and attitude towards innovation. In the final episode, Routinization, when the solution is implemented, the purpose of KM is to capture and store the new knowledge by making it explicit. Therefore, Swan and Scarborough (2001) argue the cognitive model to be appropriate.

To summarize, previous literature studying the relations between DT and KM focuses primarily on how DT leads to increased knowledge instead of how KM could facilitate in the implementation process of DT. One exception was found in the study by Alvarenga et al. (2020), who identified that KM is critical to succeeding with DT. Nevertheless, in innovation research, more literature was found that had taken the implementation perspective. Since the process-oriented type of innovation and the hyperautomation process are similar, the insights from innovation research could help to better understand how KM could be used in this novel phenomenon. In this thesis, the empirical findings were analyzed first and followingly the authors revisited previous research. Through such a process, the literature by Swan and Scarborough (2001) was identified to be the most relevant for the purpose of this thesis since it also uses a process perspective. Hence it is the most frequently used literature in the analysis.

3. Methodology

3.1 Research approach

This thesis is conducted as a qualitative single-case study and adopts an exploratory inductive approach (Bell, Bryman & Harley, 2019). In this case study, the case object is a multinational telecommunications company, referred to as **Telecomms**, with more than 100 thousand employees worldwide. Since the focus is to explore hyperautomation, the study investigates the Automation unit that works with other units in Telecomms to drive DT throughout the company, making them operate more efficiently and save costs. However, since the solutions are implemented in other units, the automation process happens not only in the Automation unit but also across Telecomms in collaboration with other units. To deeply understand the automation process, the study should therefore include the perspective of such a unit. Thus, this study also focuses on the Finance unit in Telecomms since they were early adopters of automation and have initiated the implementation of hyperautomation solutions. In the first section of the analysis 4.1, a detailed description to set the scene of the case will be presented.

As a first step of this study, we searched broadly for how scholars have previously studied and explained the phenomenon of DT, which the literature review presents. Secondly, we conducted two exploratory interviews with managers in the Automation unit at Telecomms to understand the current status of their hyperautomation efforts and the challenges they experience. They explained how there is uncertainty in how to best prepare the organization for this new type of automation effort. Based on the exploratory interviews, we perceived it

most fruitful to focus on the engagement between the Automation unit and the Finance unit. Moreover, when we had an increased understanding of DT and the phenomenon of hyperautomation, both from an academic and a practical perspective, an interview guide was created. Followingly, we identified the first respondents with the help of the Automation managers and conducted the first interviews. Throughout the process, we read and discussed the collected data to identify recurring themes. Based on the themes we found, we adjusted the interview guide to dig deeper into those in upcoming interviews. Through the interviews, we identified several challenges referring to knowledge and knowledge gaps between the Automation and Finance units in the automation process. These findings led us to investigate theories of KM that we then used to analyze our empirical findings in the discussion section.

3.2 Methodological fit

This study aims to contribute to an increased understanding of this new type of DT. As hyperautomation is a new concept coined by Gartner in 2019 (Haleem et al. 2020) companies are questioning how to best leverage its potential. This study is based on the social constructionist perspective grounded in the ontological assumptions that the world is a product of social interaction between actors (Bell, Bryman & Harley, 2019). Hence, the epistemological method in this study becomes an interpretive approach to how the interviewees at Telecomms experience the reality (Bell, Bryman & Harley, 2019). As hyperautomation is a new phenomenon, research on the topic is limited. Thus, there is room to explore the topic as nascent theory research, which Edmondson and McManus (2007, p.1158) argue *"proposes tentative answers to novel questions of how and why, often merely suggesting new connections among phenomena"*. Research questions in nascent theory research should take an open-ended approach since the researchers cannot predict findings in the data (Edmondson & McManus, 2007). This aligns with our research question, *"How and why do knowledge gaps arise in the digital transformation phenomenon of hyperautomation?"*. In understanding the implementation processes of great automation efforts like hyperautomation, the thesis is conducted as a qualitative single-case study adopting an exploratory inductive approach. The data is collected through interviews, which Edmondson and McManus (2007) argue to be useful in nascent theory research to gain rich and detailed data. Additionally, an exploratory approach was taken since the phenomenon is so new. It was therefore considered most useful to start with the empirical findings, instead of previous theories. Hence, using an inductive approach can be motivated (Bell, Bryman & Harley, 2019).

Further, Darke, Shanks and Broadbent (1998) argue that case studies are appropriate when one wants to understand interactions between IT innovations and organizational contexts. Case studies are also a widely used research design and focus on the complexity and particular nature of the case studied (Eisenhardt & Graebner, 2007; Stake, 1995). Since Telecomms has come far with their automation and AI efforts compared to other organizations, the study's findings could lead to a greater understanding of hyperautomation

as a phenomenon. Even though most organizations have not started with hyperautomation, many are likely to encounter it when becoming more mature in their automation efforts.

3.3 Data collection

3.3.1 Interview sample

The study used a purposive sampling approach when choosing a relevant case company and units for the research question, which is common in qualitative research (Bell, Bryman & Harley, 2019). In this study, Telecomms is considered an appropriate case as they have come far in their automation efforts and have started with hyperautomation. Therefore, it is assumed that there is much to learn from them, which Stake (1995) argues should be a guiding principle when selecting. Bell, Bryman and Harley (2019) argue that gaining access to conduct research in a closed and non-public setting is often a problem for researchers. To find an appropriate organization, some propose to adopt an opportunistic approach by considering what is possible and desirable (Buchanan, Boddy & McCalman, 1988). In this case, one of the authors knows a manager in the Automation unit, which facilitated access to the organization and to conduct this study. Furthermore, considering that the thesis is investigating hyperautomation, it became natural to study the Automation unit responsible for developing and implementing hyperautomation. As argued above, to understand the automation process comprehensively, the study also chose to investigate the Finance unit because they have come far in their automation efforts.

The selection of interviewees was made in a sequential manner and followed the purposive sampling approach (Bell, Bryman & Harley, 2019). The managers in the Automation unit that initially were interviewed later acted as “gatekeepers” to help gather respondents in both the Finance and Automation unit (Bell, Bryman & Harley, 2019). To answer the research question, we wanted representatives from all perspectives involved in the automation implementation process. To ensure this, two criteria were used to choose respondents: 1) that they have or are working with automation solutions and 2) that they represent a variety of roles and levels in hierarchy in both Finance and Automation.

3.3.2 Semi-structured interviews

In total, 20 representatives from the Automation and Finance units were interviewed (see Table 1). Most interviews lasted between 45 to 60 minutes to ensure enough time for the respondents to elaborate on the questions. In a few interviews, the respondents were senior managers with limited time, and therefore these interviews lasted for 30 minutes each. These insights were still perceived as highly valuable, considering the importance of gaining the management perspective on the topic. Further, the interviews were conducted as semi-structured interviews using an interview guide to ensure all themes were covered (see interview guides in appendix 8.1 and 8.2). Prior to each interview, some questions were modified to fit the respondent's role. As Bell, Bryman and Harley (2019) suggest, the interviews are flexibly conducted by sometimes deviating from the interview guide. Being

flexible is essential in qualitative research to deeply understand the respondents' perspectives (Bell, Bryman & Harley, 2019).

Telecomms is a multinational company, and some of the interviewees are working in Asia or the USA. Hence, all interviews were conducted through the digital meeting platform Teams using audio and video. To analyze the data, all video interviews were recorded, which Bryman, Bell and Harley (2019) recommend. Before starting the recording, all respondents were asked for permission and assured of anonymous participation. Using the video function enabled us to see the body language of all respondents. Although Bryman, Bell and Harley (2019) argue that online video meetings can be a disadvantage compared to face-to-face meetings, it was necessary given the circumstances. Having the interviews digitally also facilitated access to employees worldwide and senior managers with limited time. Furthermore, since Telecomms is international and has experienced the pandemic, all respondents were very familiar with the setting. Perhaps, it made them more comfortable than if we had met physically. Additionally, all interviews were conducted in English, the primary language at Telecomms.

Unit + Interview number	Interviewee's job role	Interview date
Automation Interviewee 1	Digital Transformation Strategy	27.01.22
Automation Interviewee 2	Digital Transformation Strategy	28.01.22
Automation Interviewee 3	Digital Transformation Sales towards Finance	03.02.22
Automation Interviewee 4	Digital Transformation Sales towards Supply	03.02.22
Automation Interviewee 5	Strategy & Implementation	10.02.22
Finance Interviewee 6	Operations Support	10.02.22
Finance Interviewee 7	Data Management	16.02.22
Finance Interviewee 8	Data Management	16.02.22
Finance Interviewee 9	Global Finance	22.02.22
Automation Interviewee 10	External Consultant	23.02.22
Automation Interviewee 11	Implementation & Delivery	01.03.22
Finance Interviewee 12	Automation & IT in Finance	02.03.22
Finance Interviewee 13	Data Management	03.03.22
Finance Interviewee 14	Strategy & Change Management	07.03.22
Automation Interviewee 15	Technology expert	08.03.22
Finance Interviewee 16	Digital & Operational Excellence	08.03.22
Finance Interviewee 17	Processes within cost management	15.03.22
Finance Interviewee 18	Global Finance	16.03.22
Automation Interviewee 19	Business Operations	23.03.22
Finance Interviewee 20	Cash operations	28.03.22

Table 1. Interviewee list.

3.3.3 Data analysis

This study takes inspiration from how Braun and Clarke (2012) explain thematic analysis to analyze the data. The thematic analysis is a flexible approach that allows researchers to

identify recurring topics across the data set and make sense of the commonalities. Since this is an inductive study, the codes and themes derive from the data, hence adopting a bottom-up approach (Braun & Clarke, 2012). To facilitate the data analysis, when an interview was done, it was immediately transcribed using the tool Otter.ai. To become familiar with the data, which Braun and Clarke (2012) argue to be crucial, both authors took supporting notes during the interviews and discussed key takeaways straight after. Additionally, during the interview process, both authors read all transcripts separately in Otter.ai to highlight relevant quotes and add notes on all data that could be interesting to answer the research question. By using Otter.ai, we could both listen and read the transcription simultaneously, enabling us to hear the tonality of the interviewees' responses. Braun and Clarke (2012) argue that this is beneficial in qualitative studies. We then discussed our comments and highlights, in line with investigator triangulation to reduce the risk of biases (Bell, Bryman & Harley, 2019). Whenever we disagreed, we revisited the data. When we agreed on what data to be relevant for the research question, those became our initial codes (Braun & Clarke, 2012). Following this, we revisited the initial codes to look for similarities or patterns to couple them into themes. When revising and evaluating these themes, we further identified how they could be coupled into larger themes. Therefore, the data analysis resulted in a coding table of initial codes, sub-themes, and themes. As seen in Figure 2., the coding table was divided into two sections, one that presents the experienced knowledge gaps and a second section presenting the efforts to conquer these gaps.

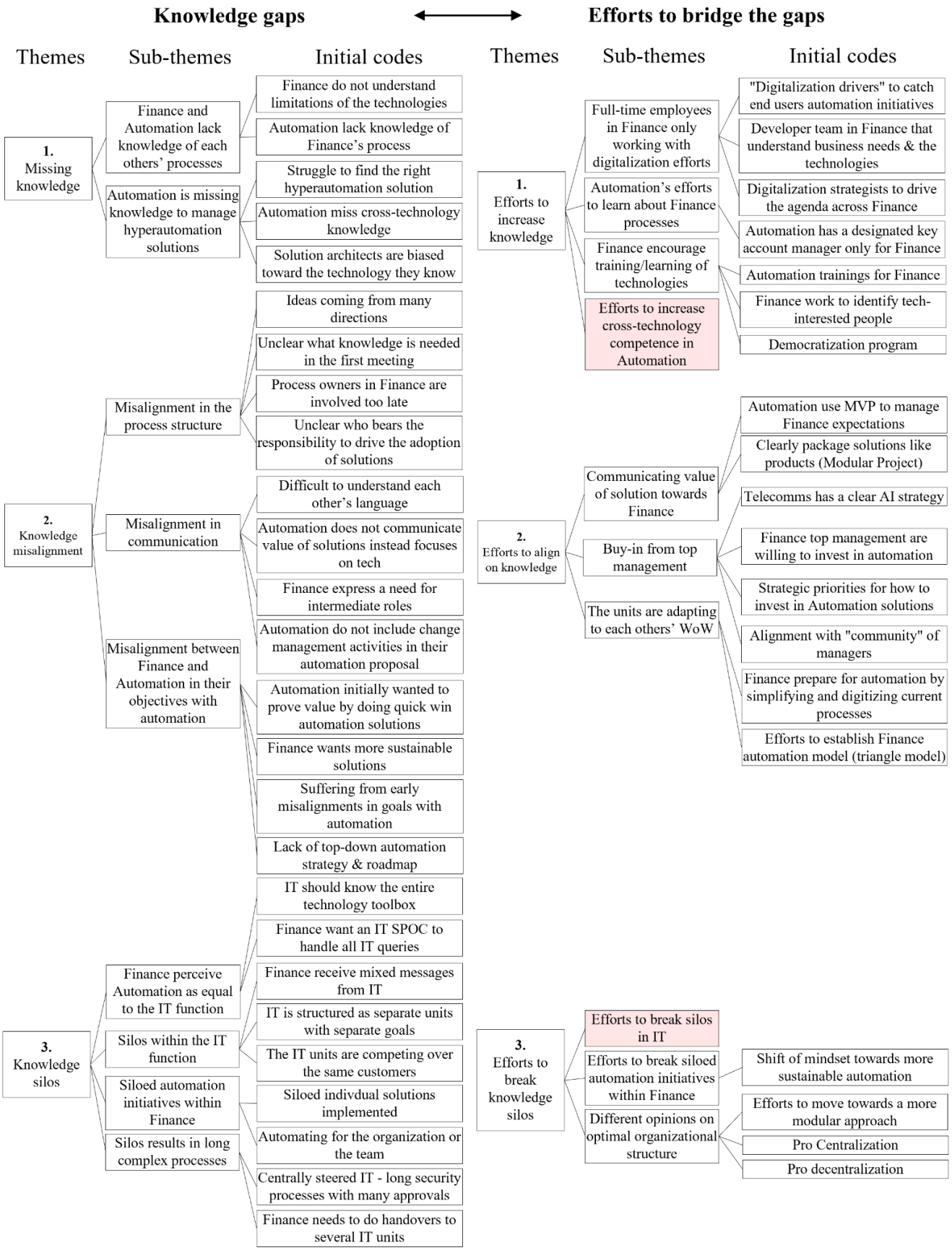

Figure 2. Coding table. Red boxes indicate where efforts are missing.

3.4 Quality of the study

Throughout this study, we have strived to conduct the thesis to generate as high quality as possible. Traditional quality criteria, such as reliability and validity, are developed primarily for quantitative research and are not as appropriate when assessing qualitative studies (Bell, Bryman & Harley, 2019). Instead, we will evaluate the quality according to the four criteria of trustworthiness, which (Lincoln & Guba, 1985) argue to be more helpful. These criteria are credibility, transferability, dependability and confirmability.

3.4.1 Credibility

Guba and Lincoln argue that when studying the social reality of others, e.g., through interviews, there is no absolute truth, but instead, it is the researcher's task to reveal them. Hence, to assess the findings, one should look at credibility, meaning that the investigators have accurately understood the social world of the study's participants and the meaning in their answers (Lincoln & Guba, 1985). To ensure that our findings are representative of the case, we have in all interviews asked follow-up questions to the respondents. If anything was unclear afterward, we sent emails to the respondents to clarify and validate the answer, which is called member validation (Lincoln & Guba, 1985). As argued, to ensure that we covered as many perspectives of the situation as possible, we used two selection criteria when selecting interviewees. We have also adopted investigator triangulation to agree on how we interpret the data. Whenever we have not agreed, we have discussed the particular answer.

3.4.2 Transferability

In contrast to quantitative research, the findings in qualitative studies are often unique to the context that is studied, and it is therefore less applicable to argue for the transferability of the results. Lincoln and Guba (1985, p.316) say that *"whether or not findings hold in some other context, or even in the same context at some other time, is an empirical issue"*. To make our findings relevant for future researchers, we have aimed to provide a thick description of our research approach and the case company (Lincoln & Guba, 1985). Some examples of this are how we have thoroughly explained our research process, described the case company in the methodology as well as in the analysis, and provided a table of interviewees, including their job roles and in which unit they work. We have also included the interview guide in the appendix to be transparent with the questions asked. All of these things aimed to provide the reader with many details, which Lincoln and Guba (1985) argue provide readers with a database to judge to what extent the findings are transferable to their study.

3.4.3 Dependability

Dependability determines the steadiness of the research results over time (Lincoln & Guba, 1985). Lincoln and Guba argue that an auditing approach would be preferable so that the researchers' procedures can be verified. However, this is not used much due to the large amount of data usually gathered in qualitative studies (Bell, Bryman & Harley, 2019). In this study, we have discussed our data analysis and coding table with our supervisor for an additional perspective on the data. As mentioned, we have also gone back to the raw data if

there have been any uncertainties and used supported written material from the organization to validate facts. By striving toward dependability, one increases the chances of getting the same result if replicating the study another time (Lincoln & Guba, 1985).

3.4.4 Confirmability

While it is impossible to be completely objective in business research, the confirmability criteria stress that the researchers should act in good faith (Bell, Bryman & Harley, 2019). In striving toward confirmability, the authors have aimed to describe all aspects of the study in a detailed manner. To stay true to the material, we have kept and structured all produced material by saving initial coding documents in folders with easy accessibility and keeping the initial memos and highlights in the transcribed material to revise the material throughout the process. As mentioned, we have also used investigator triangulation, used a video function to see our interviewees, and recorded all interviews with the possibility of rewatching them. These actions intend to increase the credibility of the study.

4. Empirical findings and analysis

The following chapter presents the empirical findings from the case study at Telecomms. The structure follows the automation process used by the Automation unit in Telecomms. Firstly, in 4.1, an initial presentation of the case object Telecomms and the two units investigated are presented to set the scene for the analysis. Secondly, in 4.2, the process used by the Automation unit when implementing solutions is explained. Thirdly, in 4.3 to 4.6, each step of the process is uncovered in great detail bringing in the perspective of the Finance unit. Finally, in 4.7, the findings are summarized, concluding on three major themes.

4.1 Setting the scene of the case at Telecomms

Telecomms have come a long way on their automation and AI journey compared to many other companies, having a technology stack consisting of blockchain, ML, Low-code, NLP, RPA, Process Mining, OCR and more. They have set a clear goal of becoming AI leaders within the telecommunications industry by including AI in their product portfolio, recruiting AI competence, and incorporating AI in internal working processes. One step towards achieving this was establishing a separate IT unit working only with automation and AI in 2017. The unit is here referred to as the "Automation unit." The unit's "customers" are other business units within Telecomms, supporting the units in becoming more efficient and saving costs. Since the Automation unit is relatively new within the IT function and does not generate any external revenue, it is under cost pressure. To receive funding, the unit had to prove its value early on by pushing out many solutions to the business units in Telecomms that delivered value in the short term, so-called "quick wins."

Initially, business units could choose between two operating models when working with the Automation unit. Option A was to entirely rely on this central Automation unit for all automation initiatives. Option B was a more federated model, where the unit had its own

development team and used the Automation unit as a center of excellence. The Automation unit would then support with expertise, frameworks, knowledge, and research in new technologies, and the Automation unit's Execution team could be used to develop more advanced solutions.

The Finance unit was one of the first units in Telecomms to start implementing automation. They chose option B as an operating model and hence have their own development team. Since the start, Finance has received many automation and AI solutions, whereby a few are hyperautomation solutions. Since Finance is a support function, they are also under cost pressure, and making processes more efficient is in line with their strategy. Within Finance, the interviewees experience clear top-management support, and buy-in for automation and digitalization is a high priority. The Finance managers have also been working to spread a digitalization mindset in the unit, illustrated in below managerial quote:

> *I think we need to continue the mindset change that people need. It's not like, 'am I going to be part of it or not?' I mean, you have to be on board. Because it's happening no matter if you like it or not, you cannot stop it… If you're not willing to do that, maybe it's time to look for a new job, basically.*
> - **Finance interviewee 14**

To foster the digitalization mindset, employees are encouraged to train, be involved in automation projects, and spread their knowledge as ambassadors. They have also introduced a "citizen developer program," a democratization initiative that enables employees to build their own bots to perform their standardized tasks. The program's goals have been to increase the number of bots to scale automation and create a tool to spread the automation knowledge. Today, the current focus in Finance is to further prepare for automation by simplifying and digitizing business processes and establishing a digital architecture and backbone. However, Telecomms is a large and old organization with an organizational matrix structure, and the work to digitize processes and manage data is difficult. Due to the organization's size, functional silos have arisen, in which the processes and ways of working differ. Hence, there is a lack of centralized standardized processes across the silos. In addition, the company has a very complex IT security that requires many approvals, while the requirements are also continually changing.

In contrast to the early initiatives in Finance, where automation solutions were implemented everywhere without a clear long-term vision, the current implementations aim to be sustainable solutions automating entire end-to-end flows. This has partly to do with a large new ERP-system (Enterprise Resource Planning) implementation, making many of the early implemented automation solutions obsolete due to new interfaces and features. Another reason for this shift is that previous investments in spreading a digitalization mindset and the citizen developer program have resulted in many small automation solutions. They now want to implement solutions that bring more significant value to the organization and not just to the individual. Hence, the focus is now to leverage the new ERP system, focus on end-to-end solutions solving larger needs and make the solutions long-lasting. Meanwhile, the

Automation unit has established goals to deliver 10-20 hyperautomation solutions during 2022. In other words, there is a clear wish to move to the next stage of managing larger end-to-end hyperautomation projects. However, many agree that there is still a long way to go before they reach the full capacity of hyperautomation.

> *Of course, we have, if you interpret hyperautomation as a combination of technologies, like combining machine learning and low code. Okay, that we have, yes. You could look at a lot of use cases and tick that off. But if the aim is to automate a process, entire process end-to-end, I don't feel confident on that yet.*
> ***- Automation interviewee 4***

To summarize, Telecomms have come far in their automation and AI efforts, and the Finance unit, in particular, is characterized by top-down commitment and a positive digitalization mindset. There is a clear vision to move towards larger end-to-end projects. However, several respondents argue that there still is a long way to go before reaching the full potential of hyperautomation.

4.2 The automation process

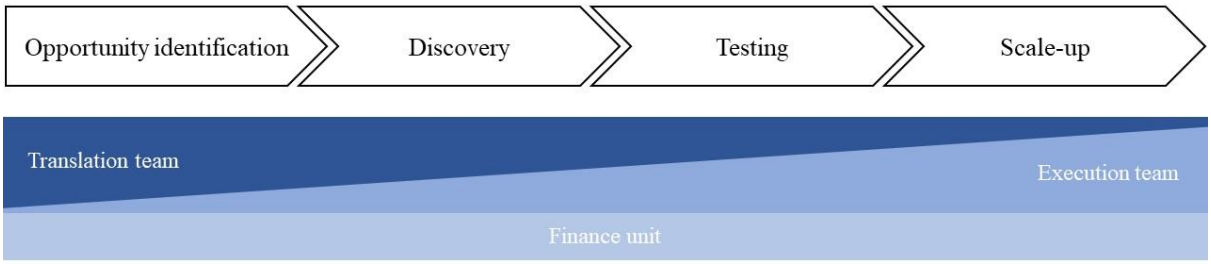

Figure. 3.0 The automation process. Figure illustrating its phases and level of involvement by the teams.

Through the interviews and internal documents, it is clear how the Automation unit has set a process for delivering all automation and AI solutions that follow predefined steps. In the study, the process has been simplified and includes four linear phases: Opportunity identification, Discovery, Testing, and Scale-up. The process will further be referred to as the "automation process." This process also lay the basis for how the Automation unit is structured, which if simplified, could be explained by two teams. The **"Translation team"** acts as intermediates between the different business units and the technical expertise. These people are technical but also have business unit-specific knowledge. The **"Execution team"** instead consists of people with deep technical expertise involving roles such as data scientists and developers.

Opportunity identification is the initial phase of the automation process. The purpose here is to capture ideas and identify automation opportunities out in the business. In this phase, the Translation team engages with the business unit to identify processes that could be automated and the potential value that they would bring. Therefore, the main activities include qualifying, prioritizing, and preparing ideas.

In the **Discovery** phase, the aim is to evaluate what technology could be suitable for the spotted automation opportunity in the first stage. In this phase, the Translation team is still primarily responsible for the engagement between the units. They gain further understanding of the business problem, map out the current business process as-is, agree on a technical solution, and secure funding from the business. The output of this step is a business case and a plan to move forward.

In the **Testing** phase, the Automation unit's Execution team becomes involved in testing and building the agreed-upon solution on a small scale as a proof of concept (POC). The Execution team works with the Translation team and the business units to test and validate the solution. A minimum viable product (MVP) is implemented when the POC is successful, and the Execution team has secured the data needed. The MVP is a functional prototype showcasing the final solution on a basic level.

Scale-up is the final phase and refers to when the solution is implemented and built on a larger scale. In this phase, the adoption rate of the implemented solution is measured to ensure that the solution is working. The Execution team mainly owns this stage.

The Automation unit's automation process follows a straightforward development process where solutions are implemented in incremental steps. Followingly, each phase in the process will be uncovered in detail and brings in the Finance unit's perspective to enclose the identified knowledge gaps between the units.

4.3 Opportunity identification phase

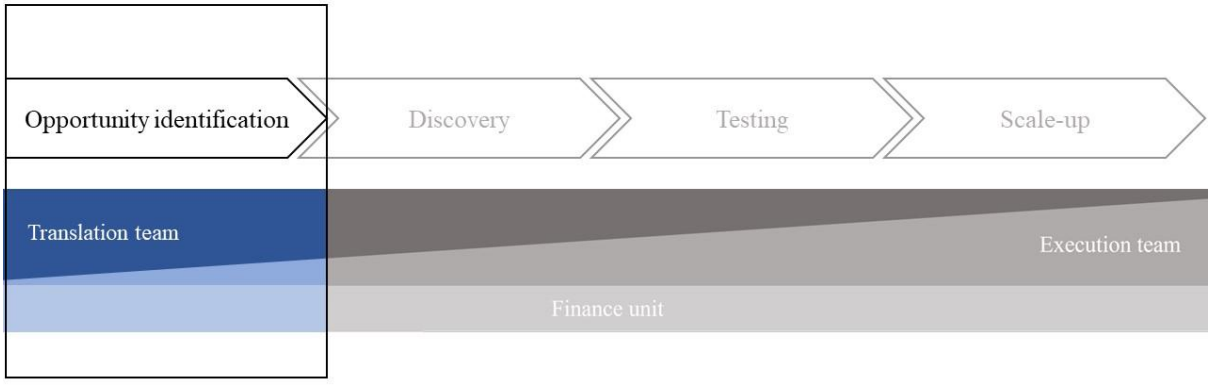

Figure. 3.1 The first phase of the automation process.

According to the Automation unit, the Opportunity identification phase aims to capture ideas and identify automation opportunities in the business. The Finance perspective of this phase is shown to lack structure. Ideas are coming from many directions, it is unclear what competence is needed in the first meeting, and silos within the IT function result in mixed messages and parallel initiatives. All of these challenges will be further discussed in coming sections.

The units are adapting to each other's way of working

There is top-down support for automation initiatives in Finance, and managers have worked to spread a digitalization mindset amongst the employees. Meanwhile, early on, the Automation unit aimed to deliver many simple automation solutions to raise excitement and demonstrate the benefits of the solutions to the Finance management team. These initiatives have shown excellent results in spreading a positive automation mindset in the Finance unit. However, it has also resulted in a lack of structure in Finance's automation process, with initiatives coming from many directions. To structure their part of the Opportunity identification phase, Finance has made efforts to establish new ways of working. One of the initiatives has been to establish an operating model, as described below:

> *I don't think that was a good start, in the very beginning* [with the many initiatives at once]. *Soon the higher management more or less noticed this, and they tried to enhance a model, I think we are still on the journey to enhance that model.*
> **- Finance interviewee 17**

The model referred to in the quote is here named the "triangle model." The idea of the model is to set up a triangle of a functional owner, an operational owner, and a process owner working in Finance. As brought up in the literature review, it is essential to find the proper process to automate and not waste time on too complex processes with unstructured data. Hence, stressing the importance of understanding the process from all angles. The process owner is responsible for a specific process and knows everything about a particular stream in Finance. The operational owner knows everything about one operational unit in Finance, while the functional owner is a higher-up manager and a sponsor of the automation project. The operational owner contributes with specific knowledge on ways of working, and the functional owner makes sure the initiative is part of the larger strategic vision. These three roles are meant to capture automation ideas within Finance and participate in the initial meetings with the Automation unit to provide all critical perspectives of the problem. The Automation unit adds the technical knowledge to the equation, and together they contribute to the competence needed for an automation implementation. However, there seems to be a lack of adherence to the triangle model:

> *Let's be frank, they* [the operational owner] *can go straight to *the Automation unit* and say, 'Okay, let's take it.' In the very beginning, maybe *the Translation team* has not an overview of everything because they're lacking the three components on top to discuss it together, lack that forum.*
> **- Finance interviewee 17**

Without the three roles present in the meeting, the Automation unit will not fully understand Finance's processes and ways of working. The interviewees stressed how this could lead to a suboptimal start of projects. For example, process owners state how they often are not involved until the project has run into obstacles or when decisions have already been made.

Misalignment in the process structure

Even though the Finance unit has tried to structure its part of the Opportunity identification phase, it is above indicated how they lack clarity in this phase. The lack of adherence to the triangle model from the Finance side and the ideas coming from many directions results in many parallel initiatives and ideas on how to automate the same problem. One example brought up in the interview was how many employees wanted to automate the tiresome task of time reporting. Process owners had received 10 to 20 different ideas on automating the same thing, coming from different channels. While ideas flow from the direction of the employees, it has been expressed from the Execution team that they would prefer to control the process of coming up with the proposed solution rather than having suggested ideas coming from Finance. This was expressed in the interviews since the Execution team believed that the Finance unit often lacks knowledge of the entire technology toolbox that Telecomms can offer and when what solution fits.

Furthermore, one discussion in the interviews was about what competence is needed in the initial meeting to investigate these ideas properly. There seems to be a scattered view on whether the competence of the Execution team should be involved earlier in the process to provide deep technical expertise already from the start. However, some argue that the gap between developers and people from Finance goes deep and that they practically speak different languages.

> *If you put data scientists to talk to business, I can tell you that it will not fly. They don't understand each other. You need someone in the middle, who knows, who has competencies in both areas that can translate and see the opportunities. We often call them digitalization drivers.*
> **- Finance interviewee 12**

The above quote indicates how respondents in Finance believe that the technical knowledge of the Translation team should be enough for the initial meeting. However, representatives from the Automation unit instead argue that developers and data scientists should be involved early in the process to provide a deep technical understanding from the start:

> *I think we're wasting a lot of time by working in a functional way, you need to integrate it more all the way to the back. So it's really important that the developers actually meet the customer early in the first meeting. It is almost key. Today, we don't do that. We have a very step-by-step approach when *Translation team* does the first part and does a pre-study, then they hand it over to execution. Then execution has to re-do it because new people don't understand, and that is too costly. The *Translation team* is complaining that they don't have the competence to do this, and in a way, they shouldn't do it.*
> **- Automation interviewee 15**

Even though there seems to be a misalignment in communication between the Execution team and the Finance unit, the lack of deep technical knowledge in the first stage, or rather,

the lack of ability to transfer the deep technical knowledge in the first phase of the process can have consequences later on, as expressed in the quote below:

> *We all speak English, but it's like people, especially from Finance and IT, are talking two different languages. In the beginning, I really didn't understand why things should be done in this way or things could not be done. Sometimes when I expressed my demand, I heard feedback from the IT side 'this is totally possible, it's no problem, it's easy'. But when it really comes to the implementation stage, there could be some trouble popping up, which actually is a very specific or detailed problem.*
> **- Finance interviewee 7**

Silos within the IT function

Another contributing factor to the unclear structure in the Opportunity identification phase is how the Finance unit perceives the entire IT function more or less as one. However, in reality, the IT function is split into several units, the Automation unit being one of them. Examples of other units within the IT functions are Data Analytics, Enterprise Systems, and Cloud Services. The IT function has an overall strategy and shared goals, but the different units seem to work in a siloed way with separate goals that do not necessarily comply with each other or the overall strategy:

> *I think the *IT function* strategy is not very specific in certain areas, I think it tries to encompass everything, and that leads to it not being clear in certain cases. But I think there's an issue with the collaboration in *the IT function*. I think we have defined what we want to achieve as *IT function*, but then, do the *units within IT function* collaborate and work together to achieve that as a whole? Not really, I think.*
> **- Automation interviewee 19**

The different IT units do not always collaborate toward the same goal efficiently, and a reason behind this is how the IT function is structured and how goals are measured. The different IT units compete over the same internal business units as customers, with capabilities that sometimes overlap. Since the IT function is a cost center for Telecomms, all units are under cost pressure and constantly have to deliver value to convince higher management of their utility.

> *They* [IT units] *need to collaborate, and it's not a competition between them. We are still *Telecomms*, and they should work closely together. And it's not about leadership; it's about everyone in IT. I can see that we have different teams like totally different organizations, even though they are all in IT.*
> **- Finance interviewee 18**

Both Finance and Automation have realized that the silos in the IT function affect the success of the automation process. As a result of the silos within the IT function, Finance receives mixed messages from competing teams while having to do many handover meetings that slow down the process. Instead, several Finance interviewees described how it would be

beneficial with a single point of contact from the IT function that could guide them through all potential solutions.

Summary of knowledge gaps in the Opportunity identification phase
To summarize, it is apparent that Finance lacks a straightforward process for the Opportunity identification phase, with automation initiatives coming from many directions. From the Automation unit's perspective, it seems unclear what competence is needed in the first meeting. In other words, Finance is missing technical knowledge, and deep technical knowledge from the Execution team is missing in the initial meeting. There is also knowledge misalignment in how Finance and Automation struggle to communicate and align on the process for Opportunity identification. Finance has not established its internal model for capturing opportunities, and without a holistic perspective, the Automation unit does not receive a complete understanding of the business processes. Furthermore, there are also knowledge silos represented in the siloed way of working between the IT units, resulting in parallel solutions to the same problems and longer processes for Finance with the many handovers.

4.4 Discovery phase

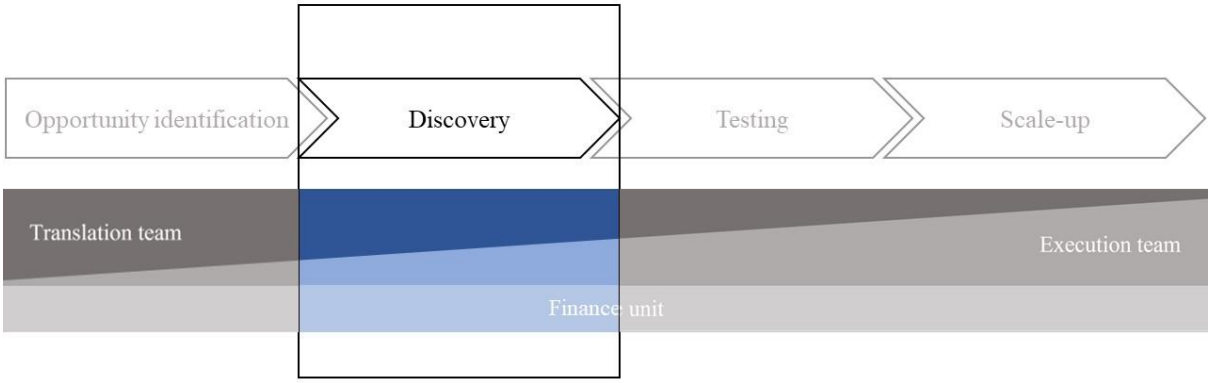

Figure. 3.2 Second phase of the automation process.

The Discovery phase aims to evaluate which technology is most suitable for the automation opportunity identified in the first stage. The interviews with both Finance and Automation highlighted that figuring out what technology to use is difficult. With hyperautomation, which includes several technologies, the complexity enhances further, as this chapter will further discuss.

The Automation unit is missing knowledge to manage hyperautomation solutions
The challenges in this phase overlap, to some extent, with the ones described in the previous phase. However, some challenges were found that refer to this phase, in particular, the first being the difficulty in finding the right solution to the problem.

You don't know if it's an RPA? Is it just a dashboard? Is it an improvement in SAP? Is it a blockchain solution? Should we connect cognitive to this one, etc.? So I think this is one of the biggest discussions that we have - what kind of solution are we going to look for?
- Finance interviewee 14

Many times, things are not very clear. Maybe there could have been an RPA, there could have been a low-code solution, there could have been hyperautomation to even get a greater benefit.
- Automation interviewee 11

The quotes above explain the difficulty in knowing the right solution to the problem. With hyperautomation, this challenge becomes even more prominent since it involves several complicated technologies. Although the interviewees describe how this is difficult to overcome, one solution described is to gather people with different technical competencies in the same room. This suggests that to succeed with hyperautomation, one needs to have the competence of several technologies present simultaneously, which Telecomms have started to realize.

You need to have these types of end-to-end solution architects… So this would be people that know enough about RPA, low code, AI, cognitive to be able to determine which of these technologies would be appropriate and what type of solutions from our large set of solutions.
- Automation interviewee 10

Hence, hyperautomation brings new knowledge-related challenges as it requires cross-technology competence. Since that is missing in the Automation unit today, solution architects tend to be biased toward solving problems with the technology they know instead of suggesting solutions across the entire spectrum. One interviewee explained that "*there are too few people who see across technologies or even across customers. So depending on whom you ask, you get a different technology proposed"* (**Automation interviewee 15**).

Efforts to increase cross-technology competence in Automation
Adding this problem to the previously brought up theme of the different IT units working in silos, it is clear how it, in the current set-up, becomes hard to fulfill the Finance unit's wish of having a single point of contact with knowledge of the entire technology toolbox. The siloed way of working in IT and the lack of cross-technology knowledge within the Automation unit is not an optimal set-up for delivering the best hyperautomation solutions. Hence, the question is how to overcome this gap of missing knowledge. The respondents explain that alternatives could be to upskill or re-skill employees or recruit new competence. However, they also argue that it is difficult to learn multiple technologies, and the market for the right competence is small. Another alternative is to break the siloed way of working suggested below:

I think hyperautomation is a big change because suddenly, you're actually breaking the silos completely to make this happen. That means silos in every aspect. Silos in how people are organized, or work silos in your competence domain, silos in how your platforms and underlying support mechanisms are working, because they are designed to fit a certain frame... They're not designed to go across.
- Automation interviewee 5

Summary of knowledge gaps in the Discovery phase
As a result of the missing knowledge across technologies within the Automation unit and the siloed knowledge in the respective IT units, the Discovery phase is characterized by the difficulty of finding the right solution. As a result of these knowledge gaps, they risk having suboptimal solutions. With hyperautomation, this problem becomes even more significant.

4.5 Testing phase

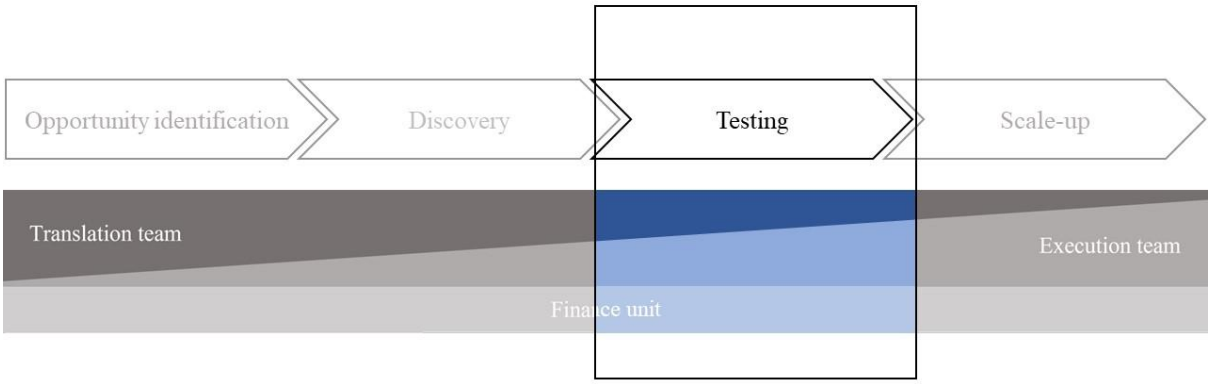

Figure. 3.3 Third phase of the automation process.

In the Testing phase, the Execution team aims to test and demonstrate how actual data can be used to deploy the solution in a real but smaller setting. Here the Execution team has more responsibility, leading to closer collaboration between technology experts and non-technology educated Finance employees. The respondent in the Finance unit revealed misalignment in communication between Finance and Automation due to both units lacking knowledge of each other's processes.

Misalignment in communication
The developers and data scientists who primarily work with the technologies are unfamiliar with Finance methods. Similarly, employees in Finance do not naturally encounter terms used by data scientists and their struggles to find the correct data for an AI solution. Although this is a challenge throughout the automation process, it is particularly noticeable during the Testing phase. The interviewees in Finance explained how they sometimes struggle to supply the Execution team with the correct data input since they have a hard time visualizing the result. If Finance does not understand what data is needed and how it should be structured, the Execution team must put effort into structuring the data. This slows down the process, and "*kills the fun*" for the data engineers who specialize in building solutions **(Automation**

interviewee 5). Further, several interviewees highlighted how the two units speak different languages and how the Execution team cannot sometimes explain in a way that Finance understands:

> **The Automation unit* is, of course, very professional and talented in the coding area, all the different solutions and everything. But they don't know our business needs. (...) So how to make sure the two sides really talk one language, that's a very big challenge because we have really had some failures, to be honest. And that's, of course, a waste of time.*
> **- Finance interviewee 13**

> *That storytelling aspect is not present. Data scientists are very data-driven, not information-driven. So they can talk about something like 'outliers,' 'box plots,' and 'deviations.' If you were hearing these terms and you want to have a solution, you really don't know what these all are… This morning, I was helping one of my young team members to build a story around it. So he had done 750 plots, and he started presenting his code to the stakeholders, and they were stunned; they were not even able to ask questions.*
> **- Automation interviewee 11**

The last quote mentions how data scientists miss "the storytelling aspect", which can be interpreted as data scientists struggling to explain in a way that makes non-data scientists understand what they are referring to. The interviewees from Finance express a need for more intermediate roles to translate between the units.

> *You need to have people in the organization in the business understanding the challenges and understanding the area because you need to be able to talk to each other. If I'm going to put requirements and demands on the *Automation* guys, I need to have people that understand robotics, automation, and AI, machine learning. Because if I don't have that one, it's very easy for the central team to build a solution that will not fit the business because they have their own perception about what's happening.*
> **- Finance interviewee 14**

In addition, several respondents in the Automation unit brought up how they must improve how they present the potential value that the solutions bring to the particular business unit. They also stressed how this is key to scaling and improving collaboration with the business units. Hence, indicating that they should improve how they transfer knowledge to Finance.

> *I think we need to really work on being able to translate what we can do to improve the business outcomes. I think that's the key.*
> **- Automation interviewee 19**

The units are adapting to each other's way of working

Although they have not conquered the misalignment in communication yet, the interviewees explained that both units have taken action to understand each other better and how the collaboration has improved over time. One example is how the Automation unit explained their ways of working to the Finance unit by introducing the MVP concept to better manage the expectations that Finance had on the outcome of projects. Finance thereby learned that the project revolves around testing and iterating rather than receiving a perfect solution that solves all problems.

> *How we finally conquered this kind of difficulty is… We put people who were assigned for this digitalization program to participate in the training 'what's the IT ideal way of working'... my people always think when we design some use cases, it will give us a perfect product, but it's not even possible. And then the people don't understand it because in our world, accounting, we will never deliver something…*[that is not perfect]. *Then we apply the trainings and learned about this concept, minimum viable product, and we start to really educate internally. This is a big breakthrough.*
> **- Finance interviewee 13**

Summary of knowledge gaps in the Testing phase

The Testing phase is characterized by misalignment in communication between Finance and Automation, resulting from the lack of knowledge about each other's processes. They have difficulties understanding each other's terms and language, which is visible in how the Automation unit struggles to articulate the value to Finance and how Finance requests more intermediate roles. This results in slower and suboptimal processes where data scientists have to structure data instead of working on developing the solutions. They have come a far way to align better, and efforts have been made to understand each other's ways of working better. However, there are still efforts to be made to conquer this gap.

4.6 Scale-up phase

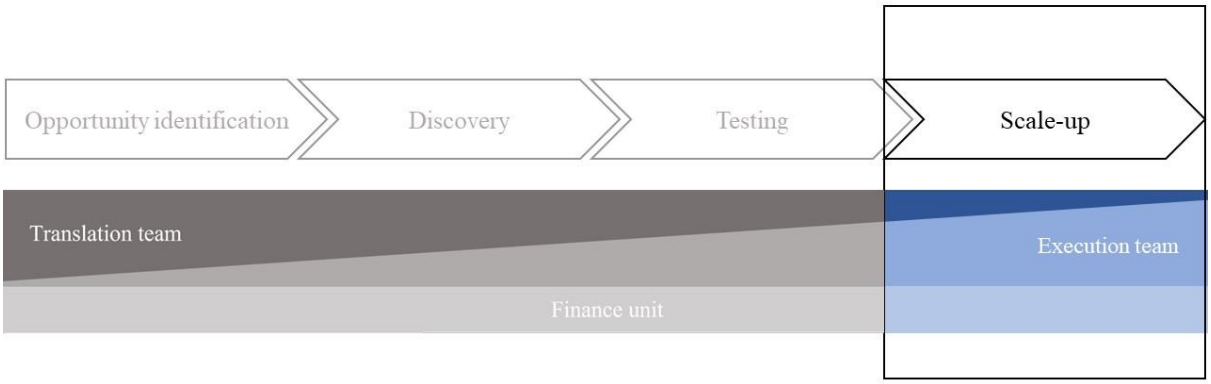

Figure. 3.4 Final phase of the automation process.

The Scale-up phase aims to implement the solutions on a larger scale. In this phase, follow-up and measuring the adoption are central tasks to ensure that the solution is used and

valuable for the business. However, there seems to be a misalignment in the phase concerning who is responsible for the adoption of the solutions. Another challenge, following the scale-up of solutions, is how Finance and Automation still suffer from how the goals with the automation efforts were misaligned between the two units in the beginning. The Automation unit has realized that they must break siloed initiatives and restructure themselves to manage more extensive end-to-end hyperautomation solutions efforts. This will be discussed in the following sections.

Misalignment in the process structure

It is critical to follow up on the adoption rate in the Scale-up phase to ensure that the implemented solution is used as intended. The Automation unit describes how they track and report the adoption of the solutions monthly. However, even if the Automation unit measures the adoption rate, there are split views on where the actual responsibility for the adoption lies.

> *Who is accountable to drive the adoption? I'd say it's the business. Of course, they have an objective and key result that they want to achieve. We enable them by providing a digital product or a tool to do that. So they should be accountable for actually making sure that people change and use that tool... If they will do something that's not related to an IT product, but they want to change how they work, it's the same thing. It's just that now we also have a product in the mix that can enable them to work in a different way.*
>
> **- Automation interviewee 19**

The above quote argues that responsibility for adoption lies on the Finance unit as it would for the implementation of any sort. Meanwhile, the Finance unit expresses how it is hard to drive adoption if the solution is not meeting their expectations, not working as intended or if they are not given support from the Automation unit:

> *When you're developing and rolling out new tools, and the support doesn't work. That's very tough from a business side. If you're a user and the tool is not working as intended, and on top of that, they're not getting a response from support. That kills adoption, right? It becomes very hard to convince people to move to a new way of working.*
>
> **- Finance interviewee 6**

The Finance unit experiences a lack of support concerning the adoption of the solution. One interviewee explains how they had to learn from how others in Finance have done and through trial and error since lacking support from the automation unit. As a result, many solutions were "killed" when realizing that it took more effort to maintain them than the value they delivered.

Siloed automation initiatives within Finance

Another reason adoption is not always high, and bots are being killed as a response is that the Finance and Automation unit initially had contrasting incentives to drive automation. The

Automation unit delivered "quick wins" to prove themselves, resulting in an overload of individual solutions. Meanwhile, Finance wants more solutions to solve their business problems, making them more efficient and lowering their costs. This initial goal misalignment between the units seems to still have an impact.

> *I think we're still suffering a little bit from that the wanted position is not always aligned. And I think that's also one of the key prerequisites for automation to be able to continue to deliver, is that we sort of align with the ambitions that we have and that is a constant ongoing discussion.*
> **- Finance interviewee 14**

The lack of alignment between the Finance unit and the Automation unit's goals resulted in many separate siloed initiatives making it more difficult to scale.

> *You will realize, okay, we are doing actually things in silos. And that is never going to be scaled up. And that is why even in Finance, we killed a lot of bots, after we develop them with efforts from IT, with money we paid for.*
> **- Finance interviewee 17**

Although the Finance unit successfully manages the siloed initiatives, the end-to-end solutions seem to be further away. One of the interviewees expresses a need for a clearer top-down strategy and roadmap that unites the units in Finance and bridges the goal misalignment between Automation and Finance.

> *I think, first of all, there must be a super clear top-down clear target. Top-down not even in my level or my organization, but top-down *Telecomms*. IT and Finance both functions should assure a super clear goal. And this is number one to assure that in the end, the solution suits the problem. We should be able to scale up together, instead of one unit have something A, the other unit have B and the third unit have C, And ABC being very similar?*
> **- Finance interviewee 13**

Different opinions on optimal organizational structure

The need for a clear top-down strategy and goal could be argued to come from how Telecomms, as a large and old company, has a siloed way of working. This is visible both within the IT function and the Finance unit. It has been present throughout the automation process how there are knowledge gaps between the units and even within the units. Therefore, the question becomes how the units should work to conquer the knowledge gaps to enable more extensive end-to-end hyperautomation solutions. The interviewees expressed a need for a reorganization within the Automation unit, but the ideas for restructuring differ.

How do we organize our work? How do we clarify the processes? Or, how do we actually deliver a hyperautomation case? Who does what? Is there a mind shift that needs to happen? Will they interact in different ways because it's a hyperautomation case?... Where do we need investment to be able to figure out how to do this?
- Automation interviewee 19

Within the Automation unit, there is an ongoing initiative to modularize the way of working with automation. This means a "productization" of their solutions to enable reuse of solutions by combining several already developed modules to fit a unit's need.

We're trying to modularize what we're doing, which means that some of the modules can be directly reused by business. The reason why we are going to do it modular is that, first of all, you don't need to reinvent the wheel again and again.
- Automation interviewee 1

It is also suggested that this modular approach could facilitate the adoption by packaging the solutions like products that could be demonstrated and clearly show the business value. However, this modular initiative is still in its early phases, and the exact outcome is unclear.

Many also expressed opinions on whether to have a more centralized or decentralized structure. A centralized automation structure would mean more power and control for the Automation unit. In contrast, a more decentralized structure would allow more democratization efforts, such as the citizen developer program, which has great value in engaging employees. Below, the struggle to balance between the two is lifted:

If I'm taking the company hat here, I want to save money to make my company become hyperautomated, right. In that case, I would want every automation idea before you invest any money. You need to have a central team, a Center of Excellence, to review. That is a way to avoid waste of money on creating silo automation projects or bots. That's my own thinking, you must also involve and invest in people... You invest in nurturing this digital idea, this digital mindset, and that can only be done where this network of citizen developers or those pioneers is trying out the initiatives.
- Finance interviewee 17

In the beginning, when the business units could choose between two alternative operating models when working with the Automation unit. The Finance unit chose option B, meaning a more federated model where they have their own internal development team and use the Automation unit as a center of excellence. If the decision was to be taken today, a respondent in Finance does not think there would be an option B, as indicated in the quote below. This suggests that the Automation unit strives to have a more central role, while Finance would prefer to have it more decentralized.

> *The gap is still that we have a different viewpoint sometimes over how it is best executed. Maybe as an example, Option A or Option B, we took B. If we would do the same kind of selection today, maybe we wouldn't even have option B. Maybe they* [the Automation unit] *would push us into option A that everything should be done centrally. While we, from experience, see that you need to have people sitting close to the business, because when we talk about how you develop the things and how you maintain them over time, the kind of approach to the solution, you need to involve the process people. If you sit in the business, you have a much better understanding of what you need to do.*
>
> **- Finance interviewee 14**

Finance is very mature in their automation efforts, which could explain their eagerness to have their own automation operations. One argument lifted in the interviews is that different levels of maturity need different levels of support, and the Automation unit, therefore, needs to offer a flexible operating model.

> *When you're in an early stage, and this is new, you need to develop new skills and capabilities, and you don't have a lot of people who know this - I'm a firm believer in keeping it central... When you reach a more industrialized and mature stage, and the adoption of the great solutions is key, then I probably believe that you can push more and more of this capability out in the organization. Adoption is always easier if people sitting next to or in your own organization hold that competence, rather than you need to reach out to a central team that is not part of your team.*
>
> **- Automation interviewee 10**

Summary of knowledge gaps in the Scale-up phase

In the Scale-up phase, the Automation unit follows up and measures adoption but believes that the responsibility should lie with the Finance unit. Meanwhile, Finance lacks adoption support from the Automation unit and kills bots when they take too much effort to maintain. In addition, both units still suffer from the early misalignment of goals between the two units, which then resulted in an overload of siloed automation initiatives. To manage larger end-to-end hyperautomation solutions, the Automation unit believes that they must restructure themselves to better bridge the knowledge misalignment between the units. There is, however, a battle between moving things more central or decentralizing. The efforts to break knowledge silos then become stuck somewhere in the middle.

4.7 Summary of knowledge gaps in the automation process

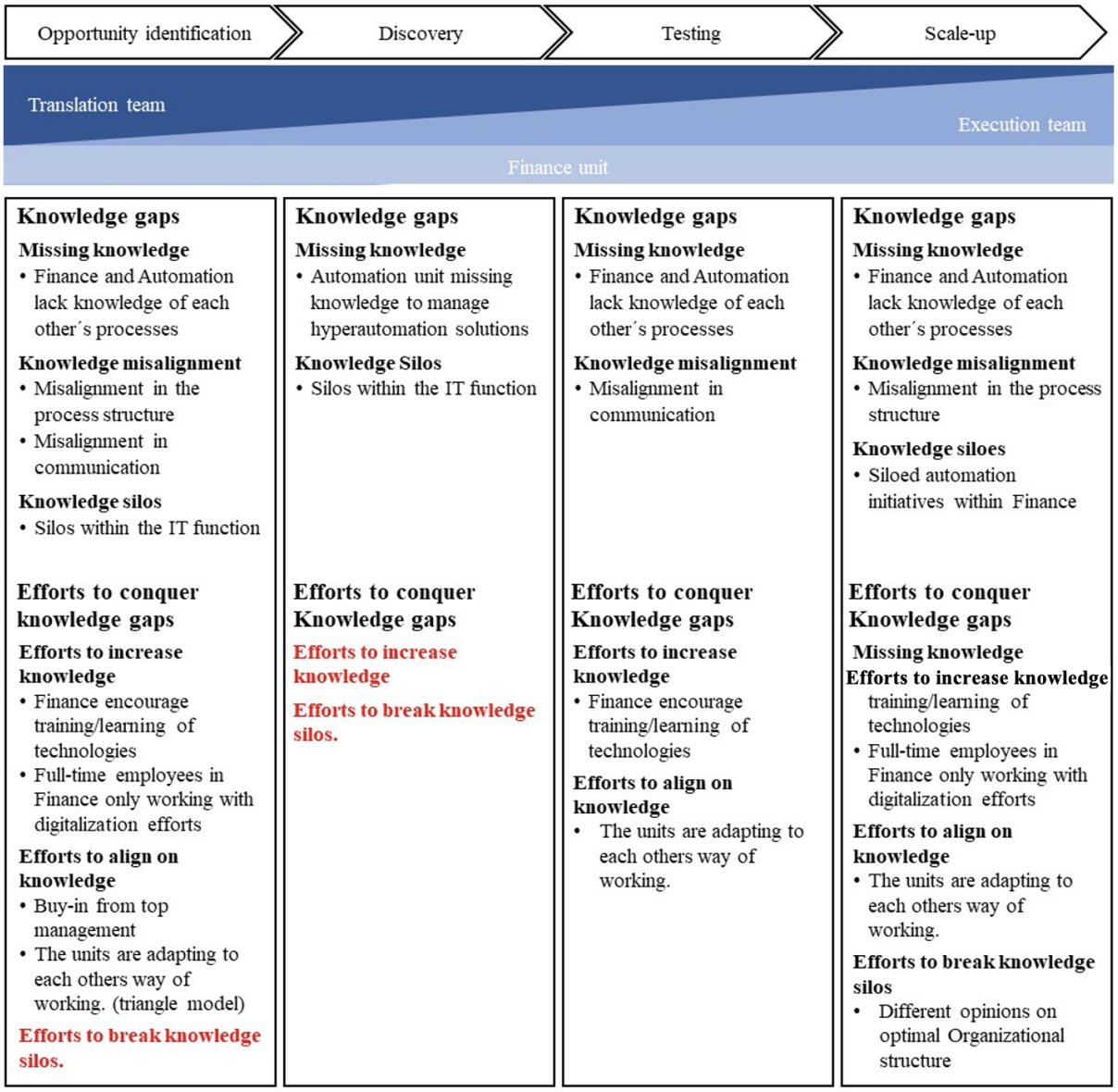

Figure. 3.4 The automation process, including the knowledge gaps and the mitigation efforts. Red text indicates efforts missing.

Each phase of the automation process has now been described in detail, taking in the perspectives of both the Finance and Automation units. By analyzing the challenges explained by the interviewees, it became clear that they arise as a result of knowledge gaps in the process. Both units have taken actions to conquer these gaps: however, some areas have not been addressed sufficiently. As mentioned, the knowledge gaps presented somewhat overlap between the phases. Hence, three main themes can be derived to summarize all gaps that represent the main knowledge gaps identified between Finance and Automation. These are **Missing knowledge, Knowledge misalignment,** and **Knowledge silos.** Figure 3.4 uses the automation process and adds boxes that summarize the knowledge gaps identified in each phase and the efforts taken to conquer them.

Missing knowledge

Missing knowledge could be argued to be the root cause of most knowledge gaps in the process. The main issue is how individuals in the two units have diverse knowledge bases. In other words, Finance employees lack technical knowledge, while Automation employees lack a detailed understanding of Finance processes. This issue is recognized, and both units have made efforts to minimize the gap. From the Finance side, the managers support automation and encourage their employees to engage in training and activities to learn new technologies. In Finance, they also have full-time employees working to coordinate the digitalization efforts. From the Automation side, the Translation team has a designated person that only works with the Finance unit to understand their problems. Another issue related to missing knowledge is how cross-technology knowledge is missing within the Automation unit, which is necessary to suggest hyperautomation solutions. Although there is an awareness of the problem, concrete measures and actions are not present.

Knowledge misalignment

Another recurring theme throughout the process is how there are knowledge misalignments between Automation and Finance, primarily relating to processes that do not match between the units or misalignment in communication.

The misalignment in the process structure is especially considered challenging in the Opportunity identification phase, where Finance lacks a clear structure for gathering and analyzing ideas. The lack of structure has resulted in parallel initiatives or suboptimal processes since the Automation unit is not given all the perspectives needed to evaluate an opportunity properly. The process misalignment is also identified later in the process when there are uncertainties about where the responsibility of adoption lies. The Finance unit has made efforts to change their way of working to better align with the Automation unit's process by establishing the "triangle model" and participating in workshops to better understand each other's ways of working.

The misalignment in communication comes from the missing knowledge, and it becomes more significant in the phases where the deep-technical competence in the Execution team meets the Finance unit. The larger the knowledge gaps, the larger misalignment in communication between the two parties. There have been efforts to hire translating roles between the units, such as the Translating team within automation and the process owners in Finance. However, the gap still seems to remain. Perhaps the discussion regarding what competence is needed in the first meeting shows that, instead of having translating people in between, there is a larger need to close the distance between the deep-tech knowledge and the Finance Process knowledge by collaborating closely with each other. This was further discussed concerning how to scale initiatives in the Scale-up stage better. Efforts have been taken, such as moving towards a modular approach. However, there seems to be a while before the two units align on where the power and control should be. In other words, whether to centralize or decentralize.

Knowledge silos
That the knowledge is structured in silos has had a strong impact in many phases. Firstly, the units in IT are working in silos, and knowledge about each unit's capabilities stays in those instead of collaborating cross-functionally. Meanwhile, Finance wants a single point of contact from the IT function. Instead, they receive mixed messages and perform many handovers between the IT units. The Automation unit is aware of this and its effects on the business units. However, there seems to be little effort to increase collaboration in the IT function. Hence there is still a need to conquer the knowledge silos in IT.

5. Discussion

This section discusses the empirical findings in the light of literature presenting two theoretical contributions of the study. Firstly, in 5.1 the primary contribution of KM in DT is discussed as it was shown how hyperautomation places particular challenges on knowledge and KM. Secondly, in 5.2 hyperautomation is unfolded to contribute to an increased understanding of the phenomenon. Thirdly, in 5.3 the practical implications to managers are presented.

5.1 Knowledge management in digital transformation

The literature review discussed that most KM literature emphasize how DT tools can improve access to information and thus increase knowledge in an organization. However, few articles address the need for KM in the DT implementation process, thereby motivating the research gap that this study addresses. In the case of Telecomms, the challenges that arise due to a lack of structured KM are prominent. This indicates that the main challenges with hyperautomation may not be the complex technologies or the process but instead how to manage knowledge and make it available for all parties involved. Hence, treating hyperautomation as a DT phenomenon could be enriched further by adding the perspective of hyperautomation as a knowledge phenomenon. By adding the dimension of KM literature to a process perspective of DT, the main theoretical contribution of this study becomes an increased understanding of how KM models can help manage a DT implementation process.

One example in the study that demonstrated the knowledge gaps between the Automation unit and the Finance unit was how data scientists were missing a "storytelling" aspect when explaining technical aspects to non-technical individuals in a way that they could understand. The argument was that "*data scientists are very data-driven, not very information-driven."* In the perspective of data and information being two prior stages on the continuum towards knowledge (Kakabadse, Kakabadse & Kouzmin, 2003; Ponelis & Fairer-Wessels, 2014), this quote indicates that some value layers were missing to turn the data into information. As Zack (1999) explains, data is not worth much without a context in which it becomes valuable information. Without a relevant context, the non-technical individuals had a hard time translating the data to information that, in turn, could be transferred into knowledge. This

could indicate that much of the knowledge possessed by the technical employees was tacit knowledge that they failed to codify and communicate into explicit knowledge (Polyanyi, 1966). The same reasoning could apply to other situations in Telecomms, one being how the Finance unit perceived that the Automation unit does not fully understand their business processes and ways of working. One could argue that much of the business process-related knowledge was tacit within the Finance unit and not easily transferred to Automation. In other words, the units struggled with transferring and communicating tacit knowledge into explicit knowledge so that the receiver could understand. This could be a consequence of that the employees originate from different backgrounds.

As argued in the literature review, research that studied KM in innovation processes could help explain how KM can be used in hyperautomation. According to Abou-Zeid and Cheng (2004), the knowledge characteristics of process-oriented innovations often consist of tacit, systemic, and complex forms of knowledge, which align with the knowledge characteristics identified in the hyperautomation process. Using the insights of the cognitive KM model, it can be argued that to succeed with this type of innovation, organizations would benefit from adopting knowledge creation processes such as socialization and externalization (Abou-Zeid & Cheng, 2004). One can argue that socialization is present in the case study in how the two units' collaboration and communication have improved over time. They have also come to understand each other better through learning by doing and from each other. Although it is positive that socialization occurred, it also renders a risk if employees who possess this tacit knowledge leave (Abou-Zeid & Cheng, 2004). The interviews also indicate that it takes time to teach new employees what they already know. This is in line with how Chan and Thong (2009) argue that KM becomes particularly important for agile methodologies since knowledge of projects can become tacit, and its transfer relies on the rotation of team members in the different phases of the project. Hence, one could argue that it would be beneficial if some tacit knowledge could be transferred into explicit knowledge through externalization by articulating the tacit knowledge through dialogue and reflection (Abou-Zeid & Cheng, 2004). Articulating tacit knowledge was one main challenge in the case, as described in the examples of the data scientists' storytelling skills and how the Automation unit stated that they are not clearly expressing what value the solutions can deliver to Finance. Another example is how Finance did not understand what data was needed from them as they did not have a complete picture and understanding of the output. These examples relate to the knowledge misalignment in Telecomms and exemplify how tacit knowledge does not translate into explicit knowledge. Instead, learning is dependent upon socialization and learning by doing.

Moreover, the innovation process studied by Swan and Scarborough (2001) includes the episodes: Agenda formation, Selection and Implementation, and Routinization. This process is comparable to the automation process presented in this case and could help explain which KM model is applicable to bridge the knowledge gaps. Swan and Scarborough's (2001) first episode, Agenda formation, is concerned with acquiring knowledge. They further argue that the network model is most suitable with strategies that include boundary spanning and external networking. This episode is comparable to the Opportunity identification phase in

Telecomms, which aimed to capture ideas and identify automation opportunities in the business, similar to acquiring new knowledge. Although Automation and Finance are sourcing internally within Telecomms for ideas, networking could be useful. By encouraging increased networking within and between the units, they might reduce the number of parallel initiatives coming from many directions. Moreover, the Opportunity identification's main issue did not seem to be acquiring new knowledge but rather how to structure the many ideas and gaps related to knowledge misalignment and knowledge silos. This indicates that the networking model may facilitate the Opportunity identification to some extent but is not entirely solving the knowledge challenges arising in this phase.

Further, the Selection and Implementation episodes are concerned with applying knowledge in a specific context, which requires explicit knowledge to be reinterpreted alongside tacit knowledge about organizational processes (Swan & Scarborough, 2001). This resembles the Discovery and Testing phases in the case, where the Execution team's technical knowledge is reinterpreted in a Finance context. Hence, meeting Finance's local and tacit knowledge regarding their processes. Swan and Scarborough (2001) here suggest the community model, with strategies emphasizing relationships and shared understandings, suggesting working in cross-functional teams. The model, however, warns about the difficulty of sharing the knowledge in heterogeneous groups (Swan & Scarborough, 2001). As both knowledge silos and knowledge misalignment were present in these phases, one could argue, along with the authors, that Telecomms could benefit from establishing relationships and cross-functional teams. This could bridge the difficulties they are experiencing due to their heterogeneous backgrounds.

In the final episode, Routinization, the aim is to exploit the implemented innovation by establishing rules, procedures, and processes for how to use them (Swan & Scarborough, 2001). This episode is comparable to the Scale-up phase, where the focus was on securing the adoption of the solution. The type of knowledge described in this episode is a mix of external, generic and explicit knowledge and locally situated tacit knowledge. Therefore, knowledge in this episode should be made explicit (Swan & Scarborough, 2001). The Finance interviewees explained a lack of support and guidance when solutions are implemented, indicating a lack of explicit knowledge to exploit the solution successfully. Swan and Scarborough (2001) suggest the cognitive model to enable efficient utilization of established and accepted knowledge and suggest using information and communication technology systems (ICT) to make knowledge explicit. However, as argued above, the knowledge misalignment was not only present during the Scale-up phase. Instead, it was present throughout the automation process, indicating that the cognitive method is not only applicable in the phase of Scale-up.

In the study by Swan and Scarborough (2001), the episodes have differentiating purposes of KM, and hence different KM models are argued to be appropriate. In contrast, the purposes of KM in the phases at Telecomms were not as distinguishing but were instead similar throughout the process. However, Swan and Scarborough's (2001) findings could explain how different KM models could be used to conquer the different knowledge gaps. The network model could be applicable when there is missing knowledge as it suggests acquiring

new knowledge through strategies like boundary spanning and networking. The cognitive model could support when there is knowledge misalignment as it offers strategies to translate tacit knowledge into explicit. Finally, the community model could be suitable for bridging knowledge silos as the strategies suggest the centrality of relationships and work in cross-functional teams. The importance for managers to identify the knowledge needed in the organization to be able to manage it, is also stressed by Omotayo (2015).

5.2 Hyperautomation as a new type of digital transformation

Hyperautomation is a top priority for many companies. Meanwhile, there are no best practices to follow since few companies have initiated these efforts. In addition, considering its novelty, academic research on the phenomenon is still limited. Hence, hyperautomation is an interesting and relevant topic from both an academic and practical perspective to investigate. Therefore, a second theoretical contribution of this study is to provide an increased understanding of hyperautomation as a phenomenon.

Telecomms have several factors that literature argues to be critical factors to succeed with DT. For instance, there was a clear buy-in from top management in Telecomms to drive DT (Sia, Soh & Weil, 2016; Omotayo, 2015). Another success factor is encouraging employees to work towards DT bottom-up strategizing (Chanias, Myers & Hess, 2019). In line with this, Telecomms have performed initiatives to raise a digitalization mindset among employees, which has increased the number of ideas coming from the employees. Although these factors support Telecomms DT efforts, both literature and the interviews indicate that hyperautomation is more agile compared to previous versions of DT. It also adds complexity by enabling automation of more extensive end-to-end processes, where the number of potential solutions is big. Hence, hyperautomation creates a challenge in simultaneously having deep technical expertise in many technologies while also having strong business process knowledge, as discussed in the previous section.

Rigby, Sutherland and Takeuchi (2016) explained that agile methodologies are suitable when the problem is complex, solutions are initially unknown, requirements are likely to change, and close collaboration with end-users is possible. This type of problem is similar to how interviewees explain hyperautomation, where the main problem is to identify the right solutions, and there is close collaboration between Automation and Finance. The interviewees also stressed the increased importance of collaboration across the IT function to combine the full scope of technologies in hyperautomation. Rigby, Elk, and Berez (2020) argue that one is forced to break functional silos, particularly within IT, to make architecture more modular and engineers more versatile when using agile software development. Similarly, the interviewees mentioned that having "*end-to-end solution architects*" who know several technologies and establishing a modular approach are necessary to manage hyperautomation. Further, it is emphasized throughout the automation process how organizational silos hinder hyperautomation. This study, therefore, confirms Josyula, Suresh and Raman's (2021) findings on how the organization needs to break a siloed delivery

structure and instead embrace close collaboration between the business and software development teams. It is, therefore, reasonable to believe that by leveraging agile methodologies, Automation and Finance could create a more collaborative environment to benefit hyperautomation.

However, it is not always easy to implement agile in practice (Rigby, Sutherland & Takeuchi, 2016), and scaling agile has been proven difficult (Reifer, Maurer & Erdogmus, 2003). The Automation unit has already implemented some characteristics of agile methods, such as working with prototypes and iterations, and developing a modular structure, while also staying close to the business (Chan & Thong, 2009; Lee & Xia, 2010; Bianchi, Marzi & Guerini 2020; Rigby, Elk & Berez, 2020). However, the agile initiatives do not seem to bring the wanted effect since they struggle to bridge knowledge silos and collaborate efficiently. Rigby, Sutherland and Takeuchi (2016) argue how leaders often do not understand agile and, as a result, continue to employ their old ways of working that undermine agile projects. In Telecomms, one could argue that top-down control, bureaucracy, and siloed working hinder the agile methodologies. The interviewees brought out the need for reorganizing to enable hyperautomation, but the opinions were scattered regarding if hyperautomation calls for a more centralized or decentralized structure. While a more agile approach leads to autonomous teams and a more decentralized structure, some argue that a more centralized approach is preferable in an early stage when there is a need to develop new skills and capabilities to gather the competence.

5.3 Practical implications

This study provides implications for practitioners, providing an increased understanding of hyperautomation and its challenges. By showing how and why knowledge gaps arise with hyperautomation, this study can better equip managers with tools to prepare. Firstly, one main problem identified throughout the process was knowledge misalignment due to failing efforts to transfer tacit knowledge into explicit. This could be mitigated by leveraging a cognitive KM model through externalization efforts (Abou-Zeid & Cheng, 2004), suggesting that managers should facilitate and encourage articulate tacit knowledge through words and concepts. In addition, Swan and Scarbourough (2001) here suggest using ICTs. Secondly, there are other KM models useful to manage the gaps related to Missing knowledge and Knowledge silos. When knowledge is missing, the networking model is argued to be appropriate, including strategies such as boundary spanning and networking. Further, the community model suggests strategies that could help bridge knowledge silos by emphasizing relationships and cross-functional teams (Swan & Scarborough, 2001). Finally, to leverage the benefits of agile methodologies necessary for hyperautomation, managers at large corporations like Telecomms should strive to reduce the barriers that can undermine agile's effects, such as top-down control, bureaucracy, and working in silos (Rigby, Sutherland & Takeuchi, 2016).

6. Conclusion

The study aims to answer the research question *How and why do knowledge gaps arise in the digital transformation phenomenon of hyperautomation?,* by conducting a single-case study in the multinational telecommunications company "Telecomms". The Telecomms automation process was studied from the perspective of the company's Automation and Finance unit. By studying this as a process, it addresses researchers' call for more process studies of DT. Through the data, three recurring types of knowledge gaps were found: 1) Missing knowledge, 2) Knowledge misalignment, and 3) Knowledge silos. Furthermore, KM literature supports in explaining why these knowledge gaps arise and suggests measures of how to mitigate them. Hence, there are two main theoretical contributions of this study. Firstly, by using KM literature in the context of a DT implementation process, it is displayed how investigating hyperautomation as a knowledge phenomenon enriches the DT phenomenon further. Secondly, the study contributes to an increased understanding of hyperautomation and places it in a theoretical domain by discussing it through the lens of established concepts, such as agile methodologies. Furthermore, the managerial implications stress the need to understand how and why knowledge gaps arise and how agile methods and KM strategies can support managers in meeting the challenges.

6.1 Limitations and future research

The study's findings are subject to certain limitations. Conducting a single-case study was argued to be a methodological fit to the research question, although it should be emphasized that the findings only portray the situation at Telecomms and the perspective of the 20 interviewees. Transferability was not the aim of this study and learnings should not be interpreted as such. The aim was instead to take an exploratory and interpretive perspective of the rather unstudied phenomenon of hyperautomation. The findings demonstrate that KM is particularly important to handle the challenges that the interviewees' experienced. This confirms the finding by Alvarenga et al. (2020) which emphasizes the importance of KM in DT. However, the study's findings cannot be argued to yield grand theoretical development, instead it resembles mid-level theorizing, subject to its contextual factors (Bell, Bryman & Harley, 2019). By contributing with a thick description of the case, future researchers are provided with data to judge its transferability to the specific case as argued for in the section Transferability 3.4.2. Additionally, to gain a broad perspective on the process, the interviewee sampling was made to include representatives from various roles and hierarchical levels, however potentially resulting in a somewhat dispersed view.

Furthermore, since this study investigates the automation process between two units in one company it is likely that the complexity will increase when more stakeholders are involved, e.g. if hyperautomation is implemented across several units. Therefore, future research is suggested to investigate the phenomenon of hyperautomation further and especially in a wider context involving several units. It would also be interesting to conduct similar studies in other companies' implementation processes, to increase the understanding of DT as a

process. Another suggestion for future research is to investigate alternative ways to structure the organization to bridge knowledge gaps when implementing hyperautomation.

7. References

Abou-Zeid, E., & Cheng, Q., (2004). The effectiveness of innovation: a knowledge management approach. *International Journal of Innovation Management*, vol. 8, no.3, pp. 261-274.

Aguirre, S., & Rodriguez, A. (2017). Automation of a Business Process Using Robotic Process Automation (RPA): A Case Study, In: Figueroa-García, J., López-Santana, E., Villa-Ramírez, J., Ferro-Escobar, R. (eds) Applied Computer Sciences in Engineering. *Communications in Computer and Information Science*, vol. 742. Springer, Cham.

Alvarenga, A., Matos, F., Godina, R., & Matias, J.C.O., (2020). Digital transformation and knowledge management in the public sector. *Sustainability,* vol. 12, no. 14, pp. 5824.

Baiyere, A., Salmela, H., & Tapanainen., (2020). Digital transformation and the new logics of business process management, *European Journal of Information Systems,* vol. 29, no. 3, pp. 238-259.

Bell, E., Bryman, A. & Harley, B., (2019). *Business research methods.* Oxford: Oxford University Press.

Bianchi, M., Marzi, G., & Guerini, M., (2020). Agile, Stage-Gate and their combination: Exploring how they relate to performance in software development. *Journal of business research,* vol. 110, pp. 538-553

Bordeleau, F., Santa-Eulalia, L.A., & Mosconi, E., (2021).Digital Transformation Framework: Creating Sensing, Smart, Sustainable and Social (S^4) Organisations, Proceedings of the 54th Hawaii International Conference on System Sciences, Available online:https://aisel.aisnet.org/cgi/viewcontent.cgi?article=1431&context=hicss-54, [Accessed 9 May 2022]

Bornet, P., Barkin, I., & Wirtz, J., (2020). *Intelligent Automation: Welcome to the world of hyperautomation,* [e-book] World Scientific, Available through: https://www.worldscientific.com/worldscibooks/10.1142/12239 [Accessed 9 May 2022]

Braun, V., & Clarke, V., (2012). Thematic analysis, in H. Cooper, P. M. Camic, D. L. Long, A. T. Panter, D. Rindskopf, & K. J. Sher (eds.), APA handbook of research methods in psychology, Vol. 2. Research designs: Quantitative, qualitative, neuropsychological, and biological, Washington: American Psychological Association, pp. 57–71

Brunetti, F., Matt, D.T., Bonfanti, A., De Longhi, A., Pedrini, G., & Orzes, G., (2020), Digital transformation challenges: strategies emerging from a multi-stakeholder approach, *TQM journal,* vol. 32, no.4, pp. 697-724

Buchanan, D., Bobby, D., & McCalman, J., (1988). *Doing research in organizations.* London: Routledge

Chan, F.K.Y., & Thong, J.Y.L., (2009). Acceptance of agile methodologies: A critical review and conceptual framework. *Decision Support Systems,* vol. 46, no. 4, pp. 803-814

Chandrasekaran, A., & Linderman, K., (2015) Managing Knowledge Creation in High-Tech R&D Projects: A Multimethod Study. *Decision sciences; Decision Sciences,* vol. 46, no. 2, pp. 267-300

Chanias, S., Myers, M.D., & Hess., T., (2019) Digital transformation strategy making in pre-digital organizations: The case of a financial services provider. *The Journal of Strategic Information Systems,* vol. 28, no.1, pp. 17-33.

Chih-Yi, S., & Bou-Wen, L., (2021). Attack and defense in patent-based competition: A new paradigm of strategic decision-making in the era of the fourth industrial revolution. *Technological forecasting & social change,* Vol. 167, no 120670,

Chow, T., & Cao, D., (2008). A survey study of critical success factors in agile software projects. *Journal of Systems and Software,* vol. 81, no. 6, pp. 961-971

Cloutier, C., & Langley, A., (2020). What Makes a Process Theoretical Contribution? *Organization Theory,* vol. 1, no. 1, pp. 1-32.

Coombs, C., Hislop, D., Taneva, S.K., Bernard, S., (2020), The strategic impacts of Intelligent Automation for knowledge and service work: An interdisciplinary review, *The journal of strategic information systems,* vol. 29, no. 4, pp. 10600

Darke, P., Shanks, G., & Broadbent, M., (1998). Successfully completing case study research: combining rigour, relevance and pragmatism. *Information systems journal,* vol. 8, no.4, pp. 273-289.

Davenport, T.H., De Long, D.W., & Beers, M-C., (1998). Successful Knowledge Management Projects . *Sloan Management Review,* vol. 39, no. 2, pp. 43-57

Desouza, K.C., (2011). An introduction to knowledge management. *In: K.C. Desouza and S. Paquette (Eds), Knowledge management: An introduction.* New York: Neal-Schuman Publishers, pp,3 -34.

Dikert, K., Paasivaara, M., & Lassenius, C., (2016). Challenges and success factors for large-scale agile transformations: A systematic literature review. *The Journal of systems and software*, vol. 119, pp. 87-108

Drucker, P.F., (1993). *Post-capitalist society.* New York: Routledge

Edmondson, A.C., & McManus, S.E., (2007). Methodological Fit in Management Field Research. *The Academy of Management review,* vol. 32, no. 4, pp.1155-1179.

Eisenhardt, K.M., & Graebner, M.E., (2007) Theory building from cases: Opportunities and challenges. *Academy of Management journal,* vol. 50, no. 1, pp. 25-32

Fleming, M., Gantz, J,F., & Hamel, J., (2021) The Economic Impact of UiPath Robotic Process Automation: $55 Billion a Year by 2025, Available online: https://www.uipath.com/hubfs/idceconomicimpact.pdf [Accessed 9 May 2022]

Fung, H.P., (2014). Criteria, Use Cases and Effects of Information Technology Process Automation (ITPA), *Advances in Robotics & Automation,* vol. 3

Gadre, A., Jessel, B., & Gulati, K., (2017) Rethinking robotics? Take a step back, *Henley Business School - Capco Institute.* vol 46, pp. 34-46

Gartner. (n.d). Hyperautomation, Available online: https://www.gartner.com/en/information-technology/glossary/hyperautomation [Accessed 9 May 2022]

Gartner. (n.d.a). Robotic Process Automation (RPA), Available online: https://www.gartner.com/en/information-technology/glossary/robotic-process-automation-rpa [Accessed 9 May 2022]

Gong, C., & Ribiere, V., (2021). Developing a unified definition of digital transformation. *Technovation,* vol. 102, pp. 102217

Gotthardt , M., Koivulaakso, D., Paksoy, O., Saramo, C., Martikainen, M., & Lehner, O., (2020), Current State and Challenges in the Implementation of Smart Robotic Process Automation in Accounting and Auditing. *ACRN Journal of Finance and Risk Perspectives*, Vol. 9, no. 1, pp. 90-102

Grant, R.M., (1996). Toward a knowledge-based theory of the firm. *Strategic Management Journal,* vol. 17, no. S2, pp. 109-122

Haleem, A., Javaid, M., Singh, R.P., Rab, S., & Suman, R. (2021). Hyperautomation for the enhancement of automation in industries. Sensors International, vol. 2, no 100124

Hall, R., & Andriani, P., (2003). Managing knowledge associated with innovation. *Journal of Business Research,* vol. 56, no. 2, pp. 145-152

Hernes, T., & Maitlis, S., (2010). *Process, Sensemaking & Organizing.* Oxford: University press

Josyula, S.S., Suresh, M., & Raghu Raman, R., (2021). How to make intelligent automation projects agile? Identification of success factors and an assessment approach. *International journal of organizational analysis*, Vol. ahead-of-print No. ahead-of-print. Available online: https://www.emerald.com/insight/content/doi/10.1108/IJOA-05-2021-2749/full/html [Accessed 9 May 2022]

Kakabadse, N. K., Kakabadse, A., & Kouzmin, A., (2003). Reviewing the knowledge management literature: towards a taxonomy. *Journal of knowledge management.* vol. 7, no. 4, pp. 75-91

Kane, G., (2019). The Technology Fallacy: People Are the Real Key to Digital Transformation. *Research Technology Management.* vol. 62, no. 6, pp. 44-49

Kipping, M., & Lamberg, J.A., (2017) History in process organization studies: What, Why and How, in A. Langley & H. Tsoukas, The SAGE handbook of process organization studies. Los Angeles: SAGE, pp. 303- 321.

Lacity, M., Willcocks, L., & Craig, A., (2017). Service Automation: Cognitive Virtual Agents at SEB Bank, The Outsourcing Unit Working Research Paper Series, vol 17, pp. 1-29

Langley, A., & Tsoukas, H., (2017). *The SAGE handbook of process organization studies.* Los Angeles: SAGE.

Lasso, R.G., & Winkler, K., (2020). Hyperautomation to fulfil jobs rather than executing tasks: the BPM manager robot vs human case. *Revista Română de Informatică și Automatică,* Vol. 30, no. 3, pp. 7-22

Lee, G., & Xia, W., (2010), Toward Agile: An Integrated Analysis of Quantitative and Qualitative Field Data on Software Development Agility. *MIS quarterly,* vol. 34, no. 1, pp. 87-114

Leonardi, P., (2020). You're Going Digital - Now What?*MIT Sloan Management Review,* vol. 61, no. 2, pp. 28-35

Lincoln, Y.S., & Guba, E.G., (1985). *Naturalistic inquiry.* Los Angeles: SAGE.

Ng, K.K.H., Chen, C., Lee, C.K.M., Jiao, J., & Yang, Z., (2021), A systematic literature review on intelligent automation: Aligning concepts from theory, practice, and future perspectives, *Advanced engineering informatics,* vol. 47, pp. 101246

Nonaka, I., Reinmoeller, P., (2000). Dynamic business systems for knowledge creation and utilization, in C. Despres & D. Chauvel, (1edn.), Knowledge Horizons. Oxfordshire: Routledge. pp.89-112

Nonaka, I., & Takeuchi, H., (1995). 1995. *The knowledge-creating company.* New York: Oxford University Press.

Omotayo, F.O., (2015), Knowledge Management as an important tool in Organisational Management: A Literature Review. *Library Philosophy and Practice*

Polanyi, M., (1966). The logic of tacit inference, *Philosophy*, vol. 41, no. 155, pp. 1-18. Available at: https://www.jstor.org/stable/3749034, [Accessed 9 May 2022]

Ponelis, S., & Fairer-Wessels, F., (2014). Knowledge management: a literature overview. *South African journal of library and information science,* vol. 66, no.1

Port, D., & Bui, T., (2009). Stimulating mixed agile and plan-based requirements prioritization strategies: proof-of-concept and practical implications. *European journal of information systems,* vol. 18, no. 4, pp 317-331

Reifer, D.J., Maurer, F., & Erdogmus, H., (2003). Scaling agile methods. *IEEE Software,* vol. 20. no. 4, pp. 12-14

Rigby, D., Elk, S., & Berez, S., (2020). *Doing Agile Right: Transformation Without Chaos*, Boston: Harvard Business review press

Rigby, D., Sutherland, J., & Takeuchi, H., (2016). Embracing Agile, *Harvard Business Review,* vol. 50, pp. 40-48.

Schneider, S., & Kokshagina, O., (2021). Digital transformation: What we have learned (thus far) and what is next. *Creativity and Innovation Management,* vol. 30, no. 2, pp. 384-411.

Sebastian, I.M., Ross, J.W., Beath, C., Mocker, M., Moloney, K.G., & Fonstad, N.O., (2017). How big old companies navigate digital transformation. *Association for Information Systems.* vol. 16, no. 3, pp. 197-213.

Shahi, C., & Sinha, M., (2020). Digital transformation: challenges faced by organizations and their potential solutions. *International Journal of Innovation Science,* vol. 13, no. 1, pp. 17-33.

Sia, S.L., Soh, C., & Weil, P., (2016). How DBS Bank Pursued a Digital Business Strategy. *MIS Quarterly Executive,* vol. 15, no. 2, pp. 105-121.

Siderska, J., (2020) Robotic Process Automation - a driver of digital transformation? *Engineering Management in production and services,* vol. 12, no. 2, pp. 21-31.

Stake, R.R., (1995). *The art of case study research.* Los Angeles: SAGE

Stoudt-Hansen, S., Karamouzis, F., & Guttridge, K., (2021). Top Strategic Technology Trends for 2022: Hyperautomation, Available online: https://www.gartner.com/doc/reprints?id=1-27U4ZXLL&ct=211101&st=sb [Accessed 9 May 2022]

Swan, J., & Scarbrough, H., (2001). Knowledge, Purpose and Process: Linking Knowledge Management and Innovation, *34th Annual Hawaii International Conference on System Sciences,* Available at: https://ieeexplore.ieee.org/abstract/document/926486?casa_token=k8r8Xneh3J4AAAAA:8dSNc6_6c9E6i6eCbhAGkU_bIl1vpp2rtg-V6Y1quR2dwtIxc3T8jDq6GLOh2e0BLaro9tsF, [Accessed 9 May 2022]

Turulja, L., & Bajgoric, N., (2018) Information technology, knowledge management and human resource management: Investigating mutual interactions towards better organizational performance. *VINE journal of information and knowledge management systems,* vol. 48, no. 2, pp. 255-276.

Vial, G., (2019). Understanding digital transformation: A review and a research agenda. *The Journal of Strategic Information Systems,* vol. 28, no. 2, pp. 118-144.

Wessel, L., Baiyere, A., Ologeanu-Taddei, R., Cha, J., & Blegind-Jensen, T. (2021). Unpacking the Difference Between Digital Transformation and IT-Enabled Organizational Transformation. *Journal of the Association for Information Systems,* vol.22, no. 1, pp. 101-129.

Westerman, G., Soule, D.L., & Eswaran, A., (2019) Building Digital-Ready Culture in Traditional Organizations. *MIT Sloan Management Review,* vo. 60, no. 4, pp. 59-69.

Wikipedia. (n.d.). industrial revolution, Available online: https://en.wikipedia.org/wiki/industrial_Revolution [Accessed 9 May 2022]

Zack, M.H., (1999). Developing a Knowledge Strategy. *California management review,* vol. 41, no. 3, pp. 125-145.

8. Appendices

8.1 Appendix 1: Interview guide - Finance unit

Note: this interview guide will be used when interviewing representatives from the Finance unit.

Preparatory questions and information

- Introduce ourselves and what we are investigating in this thesis.
- Ask if we can record the interview
- Let them know how their answers will be used and inform them of their anonymity.

About interviewee

1. Please tell us about what your role at Telecomms includes and what your responsibilities are.
2. In what way have you been involved with the automation and AI efforts in your unit?

The interviewee's and the unit's connection to and experience of automation

3. How would you define the automation efforts in your unit?
    a. How would you define hyperautomation?
    b. How would you describe the status of the hyperautomation efforts in your unit?
    c. Are you doing any other efforts, except for the engagement with the Automation unit, to digitally transform your unit?

4. Can you explain, in your own words, your experience of the historical development of automation within Finance?
    a. What technologies did you start with and why?
    b. What processes did you start with and why?
    c. What was the outcome of these efforts?
    d. What is your experience of these efforts?
    e. How would you describe that Finance previously has responded to implementation of automation solutions?

5. What are your future thoughts on automation and hyperautomation?
    a. Is this something you want to invest in?
    b. What are your incentives for doing so?
    c. What goals would it help you to achieve?

6. Could you please describe the process of implementing automation and hyperautomation in your business unit?
    a. From your perspective, what are the prerequisites necessary to manage the implementation of hyperautomation?
    b. What are factors that have made you manage/succeed with these efforts?

    c. What are the greatest obstacles that you and your unit have encountered when implementing the Automation solutions?

7. What impact/consequences have the automation solutions had for your unit? (negative & positive)
    a. What have the solutions affected the employees in your unit?

8. How are you working to facilitate the implementation and adoption of new technologies/solutions?

9. In the implementation process, what does the collaboration between you and the Automation unit look like? How do they support you?
    a. To what extent does your unit understand the benefits of the solutions before they are implemented?

10. To what extent do you experience that the overall strategic objectives (in both Finance and Telecomms), as well as other factors, are supporting your automation/hyperautomation journey?

11. Is there anything you have learned from your early initiatives of implementing RPA solutions (or other technologies) that could benefit you in your hyperautomation efforts?

12. What do you believe is/will be challenging with hyperautomation compared to other technologies?

Final questions

13. If you were us, who would be interesting for us to talk to?
14. Is there any material you believe we would benefit to have a look at?

8.2 Appendix 2: Interview guide - Automation unit

Note: this interview guide will be used when interviewing respondents from the Automation unit.

Preparatory questions and information

- Introduce ourselves and what we are investigating in this thesis.
- Ask if we can record the interview
- Let them know how their answers will be used and inform them of their anonymity.

About the interviewee

1. Tell me briefly what your role at Telecomms includes and what your responsibilities are.

Current focus & strategic initiative

2. Can you elaborate on what the current focus is for the Automation unit - what are you investing in and what are your main objectives with these investments? (e.g. new technologies or overall strategic objective)

3. Do you believe that the overall IT function/Telecomms Strategy is in line with what you are investing in, in the Automation unit?
    a. Do you perceive that you are given support for your initiatives?
    b. Do you believe that C-suite shares the long-term vision of your initiatives?

About their work with business units and the Finance unit

4. How would you describe hyperautomation in your own words?
    a. What are the benefits you hope to leverage by using hyperautomation?

5. In the implementation process, what does the collaboration between the business unit and the Automation unit look like?
    a. What do you do to facilitate and support the implementation of this new technology in the unit?

6. How mature and involved would you say that the business units are in your solutions?
    a. To what extent do they understand the technologies you use?
    b. How much would you say that they are aware of the pros- or cons with the technologies?
    c. What do you emphasize when communicating implementation of new solutions? (e.g. the business problem they solve, or the benefits of the technologies)

7. What characterizes the units where implementation of solutions has been smoother/more successful compared to others?

a. From an organizational perspective? (e.g. people, competence, interest, relationship, maturity level, leadership, engagement level)
b. From a technical perspective? (e.g. processes, competence, integrated systems)

8. What are the greatest obstacles that the Execution team are encountering when implementing the automation solutions?
    a. How do you experience that the employees in Telecomms react to the solutions you implement? (e.g. employees? C-suite? The units?)
    b. Is there anything in the way you or the business unit work today that specifically hinders hyperautomation?

9. Is there anything you have learned from your earlier initiatives in RPA (or other technologies) that could benefit you in your hyperautomation efforts?
    a. What do you believe is/ will be challenging with hyperautomation compared to other technologies?

10. What do you believe are the prerequisites necessary to succeed with the implementation of hyperautomation?

Final questions

11. If you were us, who would be interesting for us to talk to?
12. Is there any material you believe we would benefit to have a look at?

8.3 Appendix 3: Coding table including quotes

Knowledge gaps

1. Missing knowledge	Finance and Automation lack knowledge of each others' processes	Finance do not understand limitations of the technologies	*"And I think even we, we all speak English, but I would, frankly speaking, it's like we people from business or from IT, especially people from finance and IT, I think we're talking about two different languages. Yeah, I think, at the beginning, I really don't quite understand some sometimes why, why this can can mean, why this should be done in this way or this cannot be done. Or sometimes when when I expressed my demand, then I heard from the the feedback from the IT side. So this is totally possible. It's no problem. It's easy. But when it's really come to the implementation stage, then I mean, there could be some trouble popping up, which actually is very specific or detailed problem with that, I mean, we maybe we could not really identify until it really pops up. But I would say, I mean, it's really a deer the barrier at the beginning between IT and business."*
		Automation lacks knowledge of Finance's process	*"You need to have people in the organization in the business, understanding the challenges and understanding the area because you need to be able to talk to each other, if I'm going to put requirements and demands on the *Automation* guys, I need to have people that understand robotics and automation and AI, machine learning. Because if I don't have that one, it's very easy for the central team to build a solution that will not fit the business because they have their own perception about what's happening."*
	Automation is missing knowledge to manage hyperautomation solutions	Struggle to find the right hyperautomation solution	*"You don't know if it's an RPA? Is it just a dashboard? Is it an improvement in SAP? Is it the blockchain solution? Should we connect cognitive to this one, etc. So I think this is one of the biggest discussions that we have, What kind of solution are we going to look for in the beginning?"*
		Automation miss cross-technology knowledge	*"It's not enough anymore to just know one technology. So you need the multiple. And that, of course, requires upskilling for the people we have, or recruiting new competence."*
		Solution architects are biased toward the technology they know	*"There's too few people who see across technologies or even across customers. So depending on whom you ask, you get a different technology proposed."*

	Misalignment	Ideas coming from many directions	*"Many people are very, not a fan of trying to keep a record of where we are when you work for this when you work for that and you need to fill out every day or every week. So people want to automate this. And there are at least 10 or 20 different ideas I heard that actually reached me from different channels wanted to automate that."*
		Unclear what knowledge is needed in first meeting	*"So it's really important that the developers actually meet the customer early in the first meeting, almost the key. So in today, we don't do that today."* *"If you put the data scientists to talk to business, I can tell you that will not fly, they don't understand each other. You need something in the middle, who knows, who have the competencies in both areas that can translate and also see the opportunities. Yeah, we often call them digitalization drivers."*

2. Knowledge misalignment	in the process structure	Process owners in Finance are involved too late	*"And then they involve what I (process owner) want to see is the involved process so late. So it's already nothing we can do, they already invested a lot of money for, they already paid it to start working. And they already have this POC and they even have moved forward with other stuff before they reach you for asking for access for data for your recognization of their project."*
		Unclear who bears the responsibility to drive adoption of solutions	*"Who is accountable to drive the adoption? I'd say it's with the business, of course, they have an objective and key result that they want to achieve. We enable them by providing you know, a digital product or a tool to do that. So they should be accountable for actually making sure that people actually change and use that tool."*
	Misalignment in communication	Difficult to understand each others' language	*"ML is something still very abstract many times. That storytelling aspect is not present. Data scientists are very data driven, not very information driven. So they can talk about something like outliers, and, you know, box plots and deviations. Any, if you were somebody hearing these terms, and you want to have a solution, you really don't know what these are all are."*
		Automation does not communicate value of solutions instead focuses on tech	*"We need to kind of drive the educate the business a lot more about what's the what's in it for you? What does the automation AI bring to you"* *"I think we need to really work on, on being able to translate what we can do to how to improve the business outcomes. I think that's, that's the key."*
		Finance express a need for intermediate roles	*"We need the people who can be the, I call it like, The intermediate to the…or the little bit like, entrepreneurs sitting in the middle who can talk to both business and to IT."*
		Automation do not include change management activities in their automation proposal	*"Some of the things are missing there. For example, process alignment. For example, change management, it's never there in an automation proposal or the discovery thing."*
	Misalignment between Finance and Automation in their objectives with automation	Automation initially wanted to prove value by doing quick win automation solutions	*"Now, I think, the drive to just implement robots, I think that was not a good idea. I think you really have to see the business benefit on all of... and have a good collaboration with business."*
		Finance wants more sustainable solutions	*"It must be that the incentives and investments going forward has to be much more about, end-to-end, the broader scope. I think we have matured as an organization. So before we worked very much with Blue Prism robots, and we automated this smaller activity for a person shuffling the paper from A to B, and we put a robot in that one. And that was okay. I mean, like that is that is a solution. And of course, we have business cases for all the things that we implement but I think that the wheels are turning quicker and quicker in the digital world. So you need to be much broader in your approach."*
		Suffering from early misalignments in goals with automation	*"I think we're still suffering a little bit from that the wanted position is not always aligned. And I think that's also one of the key prerequisites for automation to be able to continue to deliver, is that we sort of align with the ambitions that we have and that is a constant ongoing discussion."*

		Lack of top-down automation strategy & roadmap	*"I think, first of all, there must be a super clear top-down clear target. First of all, and top-down not even in my level or my organization, but top-down *Company Name*. IT and finance both functions should assure a super clear goal. And, you know, why this is number one is to assure that in the end, the solution to suit the solution. We should be able to, you know, go scale up together, instead of one unit have something A, the other unit have B and the third unit have C, but ABC very similar?"*

3. Knowledge Silos	Finance perceive Automation as equal to the IT function	IT should know the entire technology toolbox	*"I expect the AI and automation team to come in with a maybe a broad sort of, you know, with all the tools, right, not just to say that okay, then then we do a blue prism, but we really think through is it? Is it a blue prism? Or is it something else here? Is it actually something that we can integrate into to SAP (...) So, in terms of roles and responsibilities, I think we need to explain the processes in a clear way and AI automation team need to need to, you know, understand the processes and and bring the, the different solutions and the tools for how we can, how we can improve in the process automate in the process."*
		Finance want an IT SPOC to handle all IT queries	*"Our IT organization, I think they should look into how to organize and how they better can support the business and operations, we have different teams. The business needs to have a good understanding of the different kinds of tools and the technology(...) So my view is that I should have one contact that could feed me within a total one toolbox including (ERP system) and maybe we are missing out other kinds of tools or technologies that I don't know about."*
	Silos within the IT function	Finance receive mixed messages from IT	*"So the customer, or like this internal stakeholder experience perspective, I think it's going to be scattered, I think they get mixed messages. (...)I think that effect is that we don't deliver as much value as we could to the customer to the internal stakeholder, the business unit. And it probably slows down as well. Because there's, you know, there's confusion, there needs to be extra alignment meetings about what to actually deliver here and who needs to deliver what."*
		IT is structured as separate units with separate goals	*"I think the group IT strategy is, is is my take on this is sometimes is maybe a bit it's not very specific in certain areas, I think it tries to encompass everything. And, and that leads to it not being you know, clear in certain cases, but I think there's an issue with the collaboration group by IT. I think we have defined what we want to achieve as a, as a as a, you know, as group IT. But then, you know, do the *different units within group IT* collaborate and work together to achieve that as a whole? Not really, I think."*
		The IT units are competing over the same customers	*"They need to collaborate and not it's not a competition between them. We are still *Company name* and they should work closely together. And it's not about leadership, it's about everyone in IT, I can see it, that we have. We have different teams like to do totally different organizations, even though they are IT all of them."*
	Siloed automation initiatives within Finance	Siloed individual solutions implemented	*"You will realize okay, we are doing actually things in silos. And that is never going to be scaled up. And that is why even in finance, we killed a lot of bots, after we develop them with efforts from IT, with efforts from… with money we paid for"*
		Automating for the organization or the team	*"To some extent, there can be two types of automation. One is automation for the company. One is automation for your team. The difference is the automation for a company involves global standards of compliance and of process efficiency. But the automation for your team is another thing. It's just about*

			okay, this is good. I have a bot ID and then I save some efforts, people's life become easier, but only for your team. And the bots created for those activities are never documented in global standard way of working."
	Silos results in long complex processes	Centrally steered IT - long security processes with many approvals	*"And one big thing is that there is a lot of IT controls, right. And then it it may take some times for them to get the authorization. And apart from that there, there are so many documents, approvals are things and I mean, we I understand we need we need control, there were some there is some risk if we don't have that maybe documentation writing, but that really I mean, for the first time, I really don't understand why they need to have so many things to be ready and they need so many approvals."*
		Finance needs to do handovers to several IT units	*"You (The customers) get too many handovers. I mean, already today. If you're in the business, I need to explain to an IT person what it actually is you want you already get frustrated, right? Yeah, it takes time and they don't know your business. And if you have to do that two three times handovers is worse, right. So every time you lose quality."*

Efforts to bridge the gaps

1. Efforts to increase knowledge	Full-time employees in Finance only working with digitalization efforts	"Digitalization drivers" to catch end users automation initiatives	*"If you put the data scientists to talk to business, I can tell you that will not fly, they don't understand each other. You need something in the middle, who knows, who have the competencies in both areas that can translate and also see the opportunities. Yeah, we often call them digitalization drivers."*
		Developer team in Finance that understand business needs & the technologies	*"We from experience, see that you need to have these people (developers) sitting close to the business, because when we talk about, you know, how you develop the things and how you may maintain them over time, the kind of approach to the solution, you need to involve the process people if you sit in the business, you have a much better understanding of what you need to do. The rest is yes, technology and no one could actually build it. But if you could also then have this self service capabilities out in the, in the different units, I think the efficiency and the solution in the end will be much better."*
		Digitalization strategists to drive the agenda across Finance	*"So my responsibility now and what it has been for the last three years, is not only global strategy.(...) So I set the strategy globally for what we do in terms of development of tools, bringing in new tools, etc."*
	Automation's efforts to learn about Finance processes	Automation has a designated key account manager only for Finance	*"*Name*, you're a little bit to me, you're the bridge between the finance teams and the automation teams here in some way. Right. So I trust on you very much to build this, this bridge."*
	Finance encourage training/learning of technologies	Automation trainings for Finance	*"We have put, like, automation 101 as a mandatory training activity for all finance people to take. (...) Besides the sort of 101 automation, nothing is really mandatory, it's more like highly recommended."*
		Finance work to identify tech-interested people	*"It's the people that will create a macro in Excel to do something quicker and then share it with the world, all their colleagues and you know, it will be more efficient. So to try to find those peoples through those people throughout the organization. (...) And we have done sort of extra programs around them, they have, they have gone to trainings to learn more about the automation capabilities, and we call it citizen developers."*
		Democratization	*"They, they had this automation democratization project more or less that we*

		program	*started, where we should be trying to give the employees an opportunity to automate their own tasks. And I raised my hand and said, Okay, let's try it in our organization."*
	Efforts to increase cross-technology knowledge in Automation		

2. Efforts to align on knowledge	Communicating value of solution towards Finance	Automation use MVP to manage Finance expectations	*"I also very much recall, that a breakthrough concept is called MVP. Because my people in a very early stage, they always think when when we design some use case and it will give us a perfect product. But it's not, it's not even possible actually and then the people don't understand it. Because in our world, like accounting in HR, whenever we deliver something we assure them of data there we checked, it's done. It's a completion completed on situation."*
		Clearly package solutions like products (Modular Project)	*"If we have better products where we have packaged together, or solutions in more of an end to end or hyperautomation type of cases, and where we have some technical solutions that allow these business users to more quickly get a demo or get a proof of concept, because we can leverage from pre existing solutions, then I think that would would HIGHLY that would be beneficial to drive that type of understanding and adoption."*
	Buy-in from top management	Telecomms has a clear AI strategy	*"It is all connects back to the *Company name* wanted position or *Company name* AI wanted position. So they want to be the market leaders in the telecom industry when it comes to AI."*
		Finance top management are willing to invest in automation	*"Number one, that they have leaders that has, let's say, curiosity, and willingness to invest, then explore new opportunities are not set in their own way, but kind of really curious to understand new things and test new things.(...) So this kind of acceptance that you could see among among leaders, because you need to have that mindset, because you're not going to get it this type of new technologies and new solutions, you probably going to get more things wrong than right, the first time trials, and you can't kill people, if they get it wrong the first time, because then you will kill basically the willingness to test these things."*
		Strategic priorities for how to invest in Automation solutions	*"And then you have competing demands, right? I mean, who should go first? Which tool should get allocated the money to develop the most? Should we do what? In what order? So prioritization becomes a real challenge and a struggle. (...) But this is where, you know, having an overall architecture strategy helps a lot."*
		Alignment with "community" of managers	*"Every quarter basically we go through our community, through our representatives and and those managers and leaders that represent the roles in our area. And we show them, this is our IT roadmap, this is what we're planning on doing. You know, is this what you think we should be doing? We rely on their feedback and and they will come often and say yes, this is of course what we we love this."*
		Finance prepare for automation by	*"What we've focused on for the last few years is really establishing the architecture establishing the backbone, if you will, sorting out our data*

	The units are adapting to new WoW	simplifying and digitizing current processes	*management strategy, sorting out our integration strategy, sorting out our orchestration and our layers, right, bringing online previous steps of our process that were not digital at all. So we're kind of in that digitize and wrap your whole process stage. We've come a long way on that."*
		Efforts to establish Finance automation model (triangle model)	*"This is supposed to be work like this, you have a triangle with someone on the top, which is a functional owner, or the principal, and someone on the operational level, it's the operational owner. And in my case, I'm the process lead. So we form a triangle in this, this model, you can call it functional owner operational owner model. That's the way how finance is operating."*

3. Efforts to break knowledge silos		Efforts to break silos in IT	
	Efforts to break siloed automation initiatives within Finance	Shift of mindset towards more sustainable automation	*"I got a message from my manager, who is the head of the all these pieces in finance. And he told me that he had a meeting with *Name*, and he pointed out that we should do very good evaluation of any automation where we prove to go ahead. It's not about just; okay this RPA you can save effort from human but you also must approve, it can be scaled up and it is easier or it has not that cost followed by maintain it. Otherwise, you build something it cannot be scaled up and you take a lot of efforts, meaning you build a bot but you have two people to serve the bot."*
	Different opinions on optimal organizational structure	Efforts to move towards a more modular approach	*"We're trying to modularize what we're doing, you know, which means then some of the modules can be directly reused by business, or by other solutions that we develop. But the reason why we are going to do making it modular is that, first of all, you don't need to reinvent the wheel again and again."*
		Pro centralization	*"So that's what I mean, with the central funding centered investments, central focus, and the top management accountability, because that is one way to overcome this problem, I believe."*
		Pro decentralization	*"Democratization, really empowering the business, the people in the company to use the assets, the skills, and the value enablers to to drive their own kind of transformation of their daily operations, because that will be a fantastic way to reach 100,000 people and to reach scale."*