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Managing Robotics Process Automation (RPA)

A Qualitative Case Study of the Adoption and Implementation Process in the Banking Sector

by

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Abstract

Firms are investing heavily in adopting and implementing Robotics Process Automation (RPA), although they lack the ability or understanding to capture the value of such investments. Value is created with the acceptance and usage of a new technology. As a response to limitations in existing IT adoption literature, the study sought to synthesize the often overlapping and complementary constructs of the field into an integrative theoretical framework. The purpose of this study was to increase the understanding of how RPA is adopted and implemented in an attempt to create value. A qualitative single case study design with two embedded cases was undertaken. The empirical findings were primarily based on semi-structured interviews with employees involved in the adoption and implementation process of RPA within a Banking Group operating on the Swedish market. To a large extent, the study confirmed the proposed framework. Adjustments were made to recognize the collective-user of RPA, consisting of both direct and indirect users. The thesis contributes with an integrative framework grounded in existing literature, with an extensive description of an organization adopting and implementing RPA. It highlights the collective user of RPA, who has previously not been recognized in traditional models of user acceptance.

Keywords - IT adoption, Robotics Process Automation (RPA), Banking Sector, direct and indirect user, collective-user

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List of Abbreviations

AI	Artificial Intelligence
C-TAM-TPB	Combined model of TAM and the TPB
CoE	Centre of Excellence
IDT	Innovation Diffusion Theory
IT	Information Technology
IS	Information System
RPA	Robotics Process Automation
TAM	Theory of Acceptance Model
TRA	Theory of Reasoned Action
TOE	Technology-Organisation-Environment
TPB	Theory of Planned Behaviour
UTAUT	Unified Theory of Acceptance and Use of Technology

1. Introduction

1.1 Background

Over the last decades, digitalization has been said to rewrite the rules of competition. A recent survey reported investments in digital reinvention totaling more than USD 100 billion between 2016 and 2018 (Sutcliff, Narsalay & Sen, 2019). This is not surprising as digital transformation serves as an important source of productivity growth, enabling innovation and reduced costs of various business processes (Hirt & Wilmott, 2014; Kazaks, Shi, & Wilms, 2017). Despite rapid advancements in digital technologies, a report by OECD has found that aggregated productivity growth has slowed over the last decade (OECD, 2019). There are uneven uptakes and diffusion of technologies across the economy, and the performance gap between more and less productive firms is increasing (Andrews, Criscuolo & Gal, 2016).

Digital transformation has been considered a major challenge for many firms (Morgan, 2019). Expected results often fail to materialize and executives have reported poor returns, primarily as a result of unsuccessful efforts to scale digital initiatives beyond pilot work (Sutcliff, Narsalay & Sen, 2019). With the continued improvement of advanced technologies, the gap between what technological innovations make possible and what companies are able to internalize is expected to grow (Abbosh, Nunes, Savic & Moore, 2018). As the competitive environment is becoming more uncertain and rapidly changing, market incumbents that fail to capture the value of their IT investments are facing an increasing risk of falling behind (Hirt & Wilmott, 2014; Kazaks, Shi, & Wilms, 2017). Thus, it needs to be understood how and why firms fail to capture the value of their IT investments.

A technology currently receiving great interest among practitioners is Robot Process Automation (RPA), often referred to as robotics (Gadre, Jessel & Gulati, 2017). Many firms have already invested heavily in the technology and are expected to increase their investments in RPA over the upcoming years (Wright, Witherick & Gordeeva, 2017). Out of the firms who had begun their RPA journey, 64 percent of the respondents considered it to be a strategic or firm-wide initiative. It is worth noting that this number rose from 15 percent to 64 percent over 12 months, highlighting the rapid increase in its perceived importance (Wright, Witherick & Gordeeva, 2017). Successful RPA implementation has been recognized for creating many benefits and perhaps most importantly it is associated with increased operational efficiency. However, the benefits associated with the technology does not come without challenges. Many of those challenges mentioned are associated with the human-related aspects of implementation. For instance, the importance of managing the fear of possible job loss and overcoming 'mistrust' associated with RPA plays major roles (Syed, Suriadi, Adams, Bandara, Leemans, Ouyang, ter Hofstede, van de Weerd, Wynn, Reijers, 2020).

As with any new technology receiving great interest and uptake among practitioners, there is a time lag until a theoretical foundation has been established within academia. Automation and the usage of industrial robots have indeed been covered within the literature since industrial robots were introduced in the 1950's (Hägele, Nilsson, Pires & Bischoff, 2016). However, an objective interpretation of RPA application and evolvement has not yet been established (Syed et al., 2020). RPA aims to replace administrative human tasks in business processes with software robots while allowing the software to interact with systems in a similar way that humans do. In other words, RPA enables software agents to mimic the manual paths taken by humans as they operate in a set of computer applications (e.g., email, payroll systems and expense accounts) when performing a set of tasks in a business process (Syed et al., 2020). Similar to an employee, the software robot is assigned its own logon ID and password to operate in various systems. Associations may be drawn to Artificial Intelligence (AI), although RPA is considered to be more rule-based and structured (Lacity & Willcocks, 2018). From a technical perspective, the implementation of RPA differs from other types of broad scope systems or applications, such as Enterprise Resource Planning (ERP), and automation tools, such as Business Process Management (BPM). In contrast to such systems and automation tools, RPA does not require IT programming skills. It is also non-invasive, which means that it leverages the current IT infrastructure and operates in the same way a human would do (Lacity & Willcocks, 2018). RPA tools are considered easy to use and manage since it allows for process staff lacking programming skills to be trained in a few weeks to automate a process. Hence, RPA allows for quick process automation, often with little involvement from a centralized IT department (Lacity & Willocks, 2018). This implies that both the implementation process and the usage of the system strongly differs from other technologies. These peculiarities suggest that the RPA implementation process requires further investigation.

It has been argued that the human-related aspects of RPA implementation might be similar to other technology adoption challenges (Syed et al., 2020), which suggests that the IT adoption literature may be appropriate to investigate the implementation of RPA. Turning to the IT-adoption literature, researchers are confronted with a multitude of models and theories that compete with each other in trying to explain how firms may capture value when adopting and implementing new technology, making the field hard to navigate (e.g., Taylor & Todd, 1995; Venkatesh, Morris, Davis & Davis, 2003). As highlighted by Venkatesh et al. (2003) this multitude of options has caused confusion among researchers, as they are required to "pick and choose" between different characteristics and combinations (Venkatesh et al., 2003). Many of these models are both overlapping and complementary. Most scholars within the technology adoption field seem to agree upon the notion of using perceptions of a technology as a key independent variable. Although, since they provide an alternative conceptualization of perceptions, they do not seem to provide any consensus on what variables to include (Agarwal & Prasad, 1997). An example that highlights this problem is how some prominent scholars within the literature suggest only two perceptions of technology characteristics (e.g., Davis, 1989), while the founder of the highly recognized diffusion of innovation theory (IDT) originally proposed five perceived characteristics. The confusion continues, as several other characteristics and combinations have been added since (e.g., Moore & Benbasat, 1991; Schillewaert, Ahearne, Farmbah & Moneart, 2005; Tornatzky & Klein, 1982). Most established theories on information system usage, such as Theory of Planned behavior (TPB) and Technology Acceptance Model (TAM), were initially developed to address IT adoption issues at the individual level (Salahshour Rad, Nilashi & Mohamed Dahlan, 2017), whereas other scholars have attempted to describe technology adoption at the firm level (Tornatzky & Fleischer, 1990). This has caused many scholars to argue that models describing technology adoption at various levels should be combined to reach a richer understanding of IT adoption (e.g., Chong, Ooi, Lin & Raman, 2009; Hsu, Kraemer & Dunkle, 2006). Attempts to synthesize the literature, current models and perspectives are therefore needed (e.g., Venkatesh et al., 2003).

Moreover, much of the previous studies within the IT and innovation literature tend to focus on the adoption decision as a single event-phenomenon, despite conceptualizing it as a multiphase process (King, 1990). For instance, studies such as the one carried out by Tornatzky and Klein (1982) and Schillewaert et al. (2005) focused on the characteristics and how those affect the likelihood of adoption (i.e. the decision to use an innovation). However, as noted by Klein and Knight (2005), the adoption decision per se may not create value unless the users have committed to the use of a new technology, i.e implementation. Many researchers have thus treated the implementation process as a 'black box', not fully decomposing what enables firms to realize the value of their innovations (Van de Ven & Poole, 1990). Authors such as Slappendel (1996) and Wolfe (1994) have argued that scholars have been unable to capture the complex relationship between the individual's action and the organizational context over time since it has been analyzed mainly in static terms. This problem is further highlighted by Williams, Dwivedi, Lal and Schwarz (2009) who argue that the IT adoption literature is reaching methodological homogeneity as most studies within the field are quantitative survey studies, and they call for more qualitative research within the field. Furthermore, it has been advocated by many scholars to take a process perspective when studying how value is created when IT is adopted and implemented within organizations (e.g., Hameed, Counsell, & Swift, 2012; Van de Ven & Poole 1990). Understanding how the IT adoption and implementation process evolves over time is particularly important from a strategic perspective, as the IT projects are part of the firm's strategic change process (Andreu & Ciborra, 1996; Ciborra, 1994). Change progresses within an organization and is thought to be a response to both a strategic behavior induced by senior management and the response to the environment at the operational level (Ciborra, 1994). In line with Burgelman's (1983) reasoning, the strategic change process is thought to be a result of the interplay between organizational members at various hierarchical levels. Consequently, an understanding of how a new technology is perceived at various levels of the organization and across time is needed.

1.2 Research Purpose

This study aims to address both the empirical and theoretical problems stated above. First, there is an empirical problem associated with the fact that firms are spending enormous resources on adopting and implementing RPA, although they lack the understanding and ability to capture the value of such investments. Since value is created with the acceptance and usage of a new technology, it is vital to investigate the implementation process of RPA. Moreover, the characteristics of the RPA technology differ in many ways from previously studied technologies, which suggests that further studies on RPA adoption and implementation is needed. Many of the human-related aspects of RPA implementation show similarities with implementation of other systems or IT solutions, and the IT adoption literature should therefore be suitable. However, this leads to the theoretical problem. The given state of the IT adoption literature calls for a synthesization of current constructs. There is also a need for more qualitative and in-depth research of the dynamic process of the adoption and implementation of new IT innovations to fully capture the implementation process. Consequently, the purpose of this study is to increase the understanding of how RPA is adopted and implemented in an attempt to create value. This will be done by combining the various models and constructs in the IT adoption literature in a theoretical framework, which will elucidate the role of organizational members in the adoption and implementation process. Moreover, the study will be undertaken in a firm operating in the banking sector. Our definition of value aligns with the internal values of the studied firm.

1.3 Outline of the Thesis

This thesis is structured into six main chapters. The next chapter presents a comprehensive literature review of the IT adoption literature, its most frequently used perspectives and models, their similarities and unique characteristics. The chapter will end with a presentation of the tentative framework that was used for data collection. Chapter three will provide a presentation of the applied methodology. Whereas chapter four presents and analyses the empirical findings from a case study on a Swedish banking group, we discuss these findings and present the final framework of this study in chapter five. Subsequently, chapter six concludes this thesis by presenting the contributions, implications and suggestions to future research.

2. Literature Review and Theory

The following section aims to provide a comprehensive review of previous research that explains how value is created with the adoption and implementation of new technologies. It has been recognized that IT has a significant effect on firm performance, but that these effects will only be realized if, and when, such technologies are widely spread and used (e.g., Devaraj & Kohli 2003). The main objective in much research on IT has therefore been to assess the value of information technology to an organization and to understand what determines that value. This by seeking to understand, predict and explain variables influencing adoption behavior of accepting and using technological innovations at both an individual and organizational level. Hence, the purpose of such research is to enable firms to better manage their IT resources and increase their overall effectiveness (Taylor & Todd, 1995). For this reason we provide a presentation of various definitions of adoption and implementation, followed by an introduction of the most commonly used theoretical frameworks, and their shared similarities and differences. The chapter ends with a presentation of our tentative framework, which aims to serve as a basis in our study on how value is created in the adoption and implementation process of RPA.

2.1 IT Adoption

According to the IT innovation literature, the adoption of IT innovations has commonly been conceptualized as a process aimed at maintaining and improving firm performance (Wolfe, 1994). Rogers (2003, p. 20) defines the adoption process as:

> the process through which an individual (or other decision-making unit) passes from first knowledge of an innovation, to forming an attitude toward the innovation, to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision (Rogers, 2003, p. 20).

Thus, the adoption process is explained as a sequence of stages leading to acceptance. This process has been divided into various sets of stages (e.g., Zhu, Dong, Kraemer & Xu, 2006; Zmud, 1982). In organizations, two stages are commonly recognized: *initiation,* when the organization becomes aware of the innovation, and *implementation,* when target users show continued committed use (e.g., Rogers, 2003). Between these two stages an adoption decision is made. There are also two types of adoption decisions that may be recognized at the organizational level, the one made by the firm and the one made by an individual within the firm. The latter is often referred to as intra-organizational acceptance. In contrast to for instance consumer adoption, where the individual is the primary unit of analysis, organizational adoption is dependent on the outcomes of both these decisions (Frambach & Schillewaert, 2002).

Tornatzky and Fleischer (1990, p. 197) further highlights the importance of knowing what an organization does (i.e. implementation), rather than what it has decided to do (i.e. adoption) and points to the fact that a technology "has to be implemented, or all the effort is wasted". This is supported by Frambach and Schillewaert (2002), who argue that incorporated innovations are of little value to an organization if they are not used, and further emphasize that the intended benefits need to be accepted by the target user group who need to accept an innovation. It is thus important to determine the level of acceptance of innovations in an organization as the desired consequences cannot be realized if there is no acceptance in the target group. Researchers such as Devaraj and Kohli (2003) have thus conceptualized committed use at organizational level as the aggregated usage of individuals. Despite conceptualizing the adoption process consisting of different stages, most studies tend to focus on the adoption vs. the non-adoption decision (e.g., Fichman, 2000). There are however, some researchers that have tried to overcome this by testing determinants of IT adoption across the various stages of the process (e.g., Karahanna, Straub & Chervany, 1999; Zhu et al. 2006).

2.2 IT-adoption Frameworks

Over the last 30 years the research on adoption and diffusion of IT-based innovations have developed into a diverse body of theoretical and empirical work, and the IT innovation research has tested a large number of theories (Jeyaraj, Rottman & Lacity, 2006). It has been recognized that the most frequently used perspectives on technology adoption are the Innovation Diffusion Theory (IDT), the Technology Acceptance Model (TAM), the Theory of Planned behavior (TBP), the Unified Theory of Acceptance and Use of Technology (UTAUT), and the Technology-Organization-Environment (TOE) framework (Oliveira & Martins, 2011). In this section we will go through these different frameworks, their different characteristics and applications. As will be noted, these models are overlapping. Thus, we will not present them as separate models, but rather compare and present them based on their similarities and unique characteristics.

The IDT, TAM and TPB were initially developed to understand and explain individual behavior of technology adoption and usage (Ajzen, 1991; Davis, 1989; Rogers, 2003). IDT, introduced by Rogers, seeks to explain the adoption rate as well as how and why innovations spread (Rogers, 2003). The theory has provided solid theoretical foundation and empirical support when applied within the IT adoption literature (e.g., Bradford & Florin, 2003; Hsu, Kraemer & Dunkle, 2006; Mallat, Rossi, Tuunainen, & Öörni, 2006). It has also been considered a useful theory for studying a variety of information systems (IS) innovations (Moore & Benbasat, 1991).

Both TAM and TPB have emerged from the sociological behavior literature and share many similarities (Ajzen, 1991; Davis, 1989). The two models aim to explain why users accept or reject information technology, making behavioral intention its dependent variable. behavioral intention is in turn thought to be closely linked with actual behavior. Accordingly, the stronger an individual's intention to engage in a certain behavior, the more likely he or she will actually do it (Ajzen, 1991). Intentions are thus thought to capture the motivational factors that influence a behavior, since they indicate how hard people are willing to work and how much effort they are planning to exercise to perform a certain behavior (Ajzen, 1991; Davis, 1989). It has been acknowledged that TAM and its modified versions have gained strong empirical and theoretical support and is thus the most widely used model among IS researchers (Gangwar, Date & Raoot, 2014).

Venkatesh et al. (2003) recognized the need for a unified view on technology acceptance among the multitude of theoretical perspectives and developed the unified theory of acceptance and use of technology (UTAUT), which integrates previously identified antecedents of technology acceptance from eight prominent models. Besides TAM, TPB and IDT, Venkatesh et al. (2003) also included the Theory of Reasoned Action (TRA), the Motivational Model, a model combining the technology acceptance model and the theory of planned behavior (C-TAM-TPB), the Model of PC Utilization and the Social Cognitive Theory. These models share the intention and/or usage behavior as a key dependent variable, but differ in their explanations of acceptance and usage as they contain different technology attributes and contextual factors. Based on previous empirical similarities described by other researchers as well as their own comparison of the eight models, Venkatesh et al. (2003) suggested four determinants of behavioral intention and use: (1) performance expectancy, (2) effort expectancy, (3) social influence and (4) facilitating conditions. The first three concepts are assumed to be direct determinants of intention to use, whereas intention and facilitating conditions posits direct determinants of usage behavior. The concepts and their embodied constructs are presented in Table 2.1.

Table 2.1 A summary of the concepts and constructs of UTAUT, introduced by Venkatesh et al. (2003)

Concept	**Constructs**
Performance expectancy	*Relative advantage* (IDT), *perceived usefulness* (TAM/TAM2 and C-TAM-TPB), *job-fit* (the Model of PC Utilization), *extrinsic motivation* (the Motivational Model) and *outcome expectations* (the Social Cognitive Theory).
Effort expectancy	*Ease of use* (IDT), *perceived ease of use* (TAM/TAM2) and *complexity* (the Model of PC utilization)
Social influence	*Social factors* (the model of PC utilization), *image* (IDT) and *subjective norm* (e.g., TRA, TAM2, TPB)
Facilitating conditions	*Compatibility* (IDT), *perceived behavioral control* (TPB, C-TAM-TPB) and *facilitating conditions* (the Model of PC Utilization)

Studies have argued that models such as IDT, TPB and UTAUT were originally developed for predicting individual adoption and self-reported usage, without recognizing the organizational context (Liu, 2008; Oliveira & Martins, 2011). However, the models have evolved over time. For instance the IDT has been developed to better fit an organizational context (Rogers, 2003). Since organizations are more complex entities than individuals, it has been acknowledged that organizational adoption also needs to consider and include internal and external factors. In this context, individual characteristics refers to the leader's attitude towards change, whereas internal and external characteristics concern the organizational structure and system openness (Oliveira & Martins, 2011; Oliveira, Thomas & Espadanal, 2014). Not only has IDT been adjusted to fit an organizational context. Throughout the years, TAM has been extended to also include external factors, thus making it suitable to examine firm-wide acceptance and adoption of IT (Gangwar, Date & Raoot, 2014).

While the IDT is commonly known for emphasizing the characteristics of an innovation, the Technology-Organization-Environment (TOE) framework emphasizes its context (Zhu et al., 2006). The framework was developed by Tornatzky and Fleischer (1990) and identifies and explains three contextual aspects that influence the process by which an organization adopts and implements a technological innovation: the context of technology, the organization and the environment (Baker, 2012; Tornatzky & Fleischer, 1990). Despite its broad theoretical and empirical applicability, the TOE framework has barely evolved since its initial development and research points to multiple reasons (Baker, 2012). For instance, Zhu and Kraemer (2005, pp. 63) describe it as a "generic" theory, as the framework allows the freedom to vary the factors within each context. Even though some would argue that TOE's generic nature serves as one of its limitations (Riyadh, Akter & Islam, 2009), the adaptability of the model is above all seen as a strength, why many scholars have seen little need to refine the theory (Baker, 2012). Another reason why the model has evolved very little is because the TOE framework has not been viewed as being competitive, but rather aligned and consistent with other perspectives of innovation adoption, such as the IDT (Baker, 2012; Gangwar, Date & Raoot 2014).

2.2.1 The Perceived Characteristics of Using a Technological Innovation

It has been argued that attributes of the technology influence the rate and patterns of how technological innovations are adopted and used within an organization (Wolfe, 1994). Scholars such as those mentioned in the above have provided and tested various sets of innovation characteristics that may affect an individual's perception of the innovation. Some of the most common ones are summarized and explained in Table 2.2.

Perhaps most commonly known are the five attributes proposed in IDT that explain the organizational adoption of an innovation (Rogers, 2003). These attributes are *relative advantage, compatibility, complexity, observability* and *trialability* and have been tested by various scholars and across various settings. While most studies applying Roger's innovation attributes share methodological approaches in quantitative and retrospective designs (Kapoor, Dwivedi &

Williams, 2014) variations in research constructs occur among studies. Most of them vary in terms of the number of variables included in the model, and the choice of adopting units (Lyytinen & Damsgaard, 2001).

Out of Rogers' five attributes, *observability* and *trialability* has been criticised and are less used within the literature (Kapoor, Dwivedi & Williams, 2014). Some studies acknowledged that trialability was not a very fitting innovation attribute in regards to the specific innovation. For instance, some innovations could not be presented in parts (Hashem & Tann, 2007) or would be too effortful to do so (Sia, Teo, Tan, & Wei, 2004). In addition, observability has been widely criticised within the literature for being complexly and unclearly defined (e.g., Moore & Benbasat, 1991; Tornatzky & Klein, 1982). A well cited meta-analysis by Tornatzky and Klein (1982) tested these attributes, but also identified and added other characteristics. Among these attributes, the authors found *relative advantage*, *compatibility* and *cost* to be the most commonly recognized.

A number of studies have also tested the attributes suggested by the TAM model, namely: *perceived usefulness* and *perceived ease of use.* These attributes were originally developed by Davis (1989) in the TAM model and have been widely tested (Williams et al., 2009). Researchers have acknowledged that perceived ease of use is very similar to for instance Rogers's (2003) definition of complexity, and relative advantage is similar to the notion of perceived usefulness (Carter & Bélanger, 2005). The similarities across the technology attributes has further caused authors such as Venkatesh et al. (2003) to synthesize these attributes into (1) *performance expectancy,* which among others include perceived usefulness (TAM) and relative advantage (IDT) as well as (2) *effort expectancy,* which among other concepts includes perceived ease of use (TAM) and complexity (IDT) (see Table 2.1). When tested, the performance expectancy construct has been recognized as the strongest predictor of intention, both in voluntary and mandatory settings (Venkatesh et al., 2003). Together these two constructs determine the behavioral intention and usage of a technology.

The technological attributes of IDT have also been said to equate with the *technology context* of the TOE framework (Baker, 2012; Zhu et al. 2006), which further implies that the models are overlapping. The technology context specifies the relevant internal and external technologies available to an organization for possible adoption. Thus, some scholars have used IDT's innovation attributes to describe the technology context when applying the TOE framework (e.g., Wang, Wang & Yang, 2010; Zhu et al., 2006).

Moreover, several authors have also come to recognize differences in the determinants of adoption and usage across various stages of the adoption process. For instance, authors such as Karahanna, Straub and Chervany (1999) recognized that pre-adoption attitude is based on perceptions of usefulness, ease-of-use, result demonstrability, visibility and trialability, whereas post-adoption attitude was based on beliefs about image enhancements and usefulness Bhattacherjee (2001) also found that continued usage is determined by user satisfaction and perceived usefulness of continued usage.

Table 2.2 Commonly perceived characteristics of using an innovation

Attribute/ Determinant	Definition	Authors
Relative Advantage	the degree to which an innovation is perceived as superior to its previous generation	Rogers (2003)
Compatibility	the extent to which an innovation can be assimilated into existing value systems, past experiences and needs of potential adopters	Rogers (2003)
Complexity	how difficult it is to understand and use the innovation	Rogers (2003)
Observability	the degree to which an innovation is visible to others	Rogers (2003)
Trialability	the ease of experimenting with the innovation on a limited basis	Rogers (2003)
Cost	how expensive the innovation is	Tornatzky & Klein (1982)
Communicatibility	the degree to which aspects of an innovation may be transmitted and understood by others	Tornatzky & Klein (1982)
Divisibility	the extent to which an innovation may be tried on a small scale before adoption	Tornatzky & Klein (1982)

Profitability	the level of profit that is to be gained from the adoption	Tornatzky & Klein (1982)
Social approval, image	the status attained in one's reference group	Moore & Benbasat (1991); Tornatzky & Klein (1982)
Perceived ease of use	the extent to which the individual believe that using a specific system will be effortfree	Davis (1989)
Perceived usefulness	the extent to which the individual believes that using a specific system will increase his or her productivity	Davis (1989)
Performance expectancy	"the degree to which an individual believes that using the system will help him or her to attain gains in job performance" Based on the constructs: *Relative advantage* (IDT), *perceived usefulness* (TAM/TAM2 and C-TAM-TPB), *job-fit* (the model of PC utilization), *extrinsic motivation* (the motivational model) and *outcome expectations* (the social cognitive theory).	Venkatesh et al. (2003, p. 447)
Effort expectancy	"the degree of ease associated with the use of the system" Based on the constructs: *Ease of use* (IDT), *perceived ease of use* (TAM/TAM2) and *complexity* (MPCU)	Venkatesh et al. (2003, p. 450)

2.2.2 Contextual Factors

All models mentioned above, have to various degrees been developed to consider contextual factors. This has been operationalized in various ways, although in more general terms they may be divided into social factors, voluntariness, organizational factors and environmental factors. This will be described below.

2.2.2.1 Social Factors

The communication network of the individual has been recognized to have an important role in the adoption and implementation process of a new technology (Rogers, 2003). It has been argued by authors such as Karahanna, Straub and Chervany (1999) that the communication network aspect of IDT is closely related to the concept of *subjective norm,* which is recognized in the TPB model (Ajzen, 1991) and in later versions of the TAM model (Venkatesh & Davis, 2000). Ajzen (1991, p. 188) refers to subjective norms as "the perceived social pressure to perform or not to perform the behavior". The concept suggests that people may perform a behavior, despite not themselves favouring a behavior or its consequences, since they believe that one or more important referents think that they should.

Karahanna et al (1999) found that work networks are important determinants of subjective norm for both users and potential adopters in their study on adoption and use of the Microsoft Office package. However, the authors also recognized some differences between potential adopters and users. For potential adopters, the significant referent groups in order of importance were top management, friends, supervisor, peers, and the IT department. Importantly, this highlights the importance of top management support in adoption decisions. Moreover, Karahanna, Straub and Chervany (1999) suggest that the strong signals from top management might reduce the perceived risk and uncertainty associated with adoption as they provide legitimacy for the behavior. In contrast to potential adopters, the significant referent groups for users, in order of importance, were peers, local computer specialists, top management and supervisors. This was thought to reflect how local computer experts are considered an important source of assistance with potential problems and questions related to the technology. Thus, the sustained use intentions may depend on the groups ability to provide such support. Here formal change agents were also recognized as important referent groups.

Related to the concept of subjective norm, is the concept of *social approval* (Tornatzky & Klein, 1982) or *status*, which Moore and Benbasat (1991, p. 195) refer to as “the degree to which use of an innovation is perceived to enhance one's image or status in one's social system”. The idea of image was also recognized by Venkatesh and Davis (2000) in the later versions of the TAM model. It should be noted that both social approval and image are associated with an individual’s perception of its context, but also towards the technology, why they also can be found in section 2.2.1. Karahanna, Straub and Chervany (1999) found in their study that perceptions of image enhancement are particularly important, influencing the attitude towards the technology in the post-adoption stages when the user has gained concrete knowledge about the technology.

Venkatesh et al. (2003, p. 451) recognized the many similarities among the different concepts related to social factors, and integrated them into a broader concept, *social influence*, defined as “the degree to which an individual perceives that important others believe he or she should use the new system". Social influence is thus represented by the concepts of subjective norm (TAM and TPB) and image (IDT) and is a direct determinant of behavioral intention of using a new technology.

2.2.2.2 Voluntariness

On a related note, voluntariness has been recognized as a form of social influence (Karahanna, Straub & Chervany, 1999). A voluntary use environment refers to one where the user perceives the technology adoption as wilful, whereas a mandated environment is one where users perceive use to be organizationally compulsory (Venkatesh & Davis, 2000). Authors such as Hartwick and Barki (1994) argue that all technology use is fundamentally volitional, as users in a mandatory context still have the ability to choose to use a technology or not. For instance, by 'working around' the technology and thus not fully using it. Most of the models within the IT adoption literature have been developed and tested in voluntary settings (Brown, Massey, Montoya-Weiss & Burkman, 2002). For instance, IDT and TAM were developed to understand the voluntary individual behavior of technology adoption and usage (Davis, 1989; Rogers, 2003). However, Ajzen (1991, p. 182) recognized that "the performance of most depends at least to some degree on such non-motivational factors as availability of requisite opportunities and resources (e.g., time, money, skills, cooperation of others)". This is captured in the *perceived behavioral control* component of the TPB model. The construct of voluntariness was also added to the later versions of TAM as a moderating factor, and the model has been found to predict technology acceptance among individuals in both mandatory and voluntary settings (Venkatesh & Davis 2000). The authors also found that the subjective norm had a significant effect on intention to use the technology in mandatory situations, although this effect was weakened over time.

2.2.2.3 Organizational Factors

Authors such as Orlikowski and Hoffman (1997) argue that the inclusion of organizational and social factors is necessary since any change process is dependent on the interdependence between the technology, the organizational context and the change model used to manage the change. The traditional theories of acceptance model has been criticized for not fully capturing the dynamics of organizational conditions. For instance, Legris, Ingham and Collerette (2003) recognized that a critical limitation of TAM is that it considers IS adoption as an independent issue, without a clear linkage to the organizational dynamics. The TPB has to some extent tried to cover the organizational factors with the construct of *perceived behavioral control,* which is assumed to reflect past experiences and the presence and perceived power of factors that may facilitate or impede performance of the behavior. Control beliefs are thus reflecting the individual's perception that he or she has the skills, resources and opportunities necessary to engage in a certain behavior (Ajzen, 1991). Notably, the normative and control factors may be managed by organizations to facilitate implementation (Taylor & Todd, 1995). Moreover, Venkatesh et al. (2003) incorporated the control beliefs construct in the construct of *facilitating conditions,* which posits a direct determinant of usage behavior.

Taking an organizational perspective, the TOE framework explicitly acknowledges the importance of the organizational context. Accordingly, the *organization context* concerns the process of communication among employees (both formal and informal), resources (slack resources), and descriptive characteristics of the firm (e.g., firm size, the degree of centralization, managerial structure, and organizational structures (Oliveira, Thomas & Espadanal, 2014; Tornatzky & Fleischer, 1990). Some commonly recognized organizational factors are discussed below.

Organizational size

It has been recognized within the literature that *size* may affect the adoption and implementation of new technologies (e.g., Damanpour 1996; Gurbaxani & Whang, 1991), although the results have been mixed (Zhu et al. 2006). Several studies on software adoption and implementation have recognized a negative effect of firm size on the implementation stage (Nord & Tucker, 1987; Zhu et al. 2006). Zmud (1982) argued that a potential implementation could be that large firms need a larger decision body, which probably experience difficulties in making decisions in operationalizing adoption decisions. Following this line of reasoning, Zhu et al. (2006) recognized that structural inertia associated with larger firms when undertaking larger organizational transformation resulted in firm size having a negative effect on assimilation of e-business. Other studies emphasize that adoption is slower among smaller enterprises because they rarely possess economies of scale advantages (e.g., Hwang, Ku, Yen, & Cheng, 2004; Zhu & Kraemer, 2005). These inconsistencies in research on size has caused criticism, especially since a link between size and adoption has not been conclusively established (Baker, 2012). As pointed out by (Rogers, 2003, p. 411) “[Firm] size is probably a surrogate measure of several dimensions that lead to innovation: total resources, slack resources (defined as the degree which an organization has more resources than those required for its ongoing operations), employees’ technical expertise, organizational structure and so on”.

Organizational structures

Moreover, organizational structure has been widely studied to identify its relationship to the innovation adoption process. On the one hand, authors such as Rogers (2003) have recognized that organic and decentralized structures are preferred when initiating technological innovations, as they are less complex, have less formalization and a faster decision-making process. On the other hand, mechanistic structures have been recognized to facilitate the implementation process of technological innovations. The centralized decision-making, clearly defined roles and formal relationships associated with a mechanistic structure is thought to benefit the implementation stage (Rogers, 2003). Rogers further recognizes that a high degree of formalization inhibits the initiation of new technologies, although facilitates the implementation of them.

Grover and Goslar’s (1993) study on telecommunications technologies found significant differences between firms with centralized, and those with less concentrated decision levels. A decentralized structure was found to facilitate adoption, whereas a centralized structure facilitated implementation. This is explained by how the employees closest to the customers, suppliers and other stakeholders may have the most accurate view of what is needed to remain competitive, and thus favor adoption of new technologies. Instead, implementation is facilitated when standardization and expertise exist to ensure a smooth transition from one technology to another.

Top management support

Top management support has been found to be the most commonly studied variable within the IT adoption field and has been recognized as the main linkage between individual and organizational IT adoption. Moreover, it stands out as the most significant predictor of organizational IT adoption (Jeyaraj, Rottman & Lacity, 2006). For instance, Tushman and Nadler

(1986) recognized that top management may foster adoption by establishing an organizational context that welcomes changes. However, Jeyaraj, Rottman and Lacity (2006) emphasize the lack of clear evidence on the impact of top management support on innovation implementation . In contrast, in their study on RFID adoption and implementation, Chong and Chan (2012) found that top management support has significant effects on all stages of adoption and implementation.

Resources

Much research indicates that slack resources would promote adoption, especially for innovations that are higher in cost (e.g., Rogers, 2003). Slack resources may thus facilitate adoption, although it has been recognized to be neither necessary nor sufficient for adoption of technological innovations (Tornatzky & Fleischer, 1990). Moreover, the importance of human resources have been recognized in several studies. For instance, Roberts, Jarvenppa & Baxley (2003) recognize that a lack of managerial skills and know-how for change management may hinder firms to effectively manage organizational adaptations. Accordingly, the ability to combine managerial and IT skills is key to firms' ability to assimilate information technology (Mata, Fuerst & Barney, 1995). Moreover, technological knowledge has been found to have a significant importance during the whole adoption and implementation stage when implementing technologies such as RFID (Chong & Chan, 2012).

2.2.2.4 Environmental Factors

It has also been recognized within the literature that environmental factors have an important influence on the propensity to adopt and use technological innovation (Zhu et al., 2006). Not only may the environmental context be a determinant of actual adoption (Prekumar & Roberts, 1999), studies also confirm that implemented technologies could restructure industries and transform the competition (e.g., Porter & Millar, 1985). Still, many IT adoption models lack perspectives dealing with the environmental context (Oliveria & Martins, 2011).

As highlighted above, Roger's innovation of diffusion theory is conforming with the TOE framework, where IDT's external characteristics of the organization are said to be similar to TOE's environment context (Baker, 2012; Zhu et al. 2006). Rogers (2003) conceptualizes these external characteristics as *system openness*, where a higher degree of openness is said to have a positive impact on adoption. For instance, Kamien and Schwartz (1982) emphasize competition as a driver of adoption. The *environment context* in the TOE framework refers to the arena in which an organization conducts its business, i.e. its competitors, market elements and regulatory environment (Oliveira, Thomas & Espadanal, 2014; Zhu et al. 2006). Because of its generic character, the variables actually included in the environment context varies greatly. In terms of competition, variables such as “competition intensity” (Hsu, Kraemer & Dunkle, 2006; Zhu, Kraemer, Xu & Dedrick, 2004) and “competitive pressure” (Chong, Ooi, Lin & Raman, 2009; Oliveira & Martins, 2010; Wang, Wang & Yang, 2010) are often included. For instance, in their study on determinants of post-adoption stages of innovation diffusion, Zhu et al. (2006) added “competitive pressure” and emphasized the positive effects that competition could bring to the initiation and adoption of new technologies, in line with Kamien and Schwartz (1982). However, they also highlighted how too much competition could negatively impact the post-adoption process, as it may drive organizations to implement new technologies, without learning how to use their current ones effectively. This is further confirmed by Mata, Fuerst and Barney (1995), who argue that firms in competitive environments are not as likely to experience a sustained learning-by-doing process to develop skills for integrating existing technologies. To routinize complex technologies, Fichman and Kemerer (1999), point to the importance of managerial and technical competence, skills that can mainly be acquired through a learning-by-using process.

Turning to market elements and the regulatory environment, previous studies have chosen to include variables such as consumer and trading partner readiness (Zhu, Kraemer & Xu, 2003), expectations of market trends (Chong et al. 2009) as well as perceived industry pressure and perceived government pressure (Kuan & Chau, 2001). According to Baker (2012), governmental regulation may either encourage or discourage adoption. Moreover, studies such as the one by Zhu, Kraemer and Xu (2003) found that firms operating in environments with restrictive policies have low IT adoption.

Moreover, Chong and Chan (2012) found in their study on adoption and implementation of RFID technology in the health care sector that *expectations on market trends* was an important driver in the adoption decision, although had no significant effect during the later stages of implementation. The authors recognized that organizations solely implementing due to trends will not be successful at integrating the new technology since they lack the appropriate understanding and planning for the technology.

2.3 Tentative Theoretical Framework

Based on a synthesize of existing IT adoption literature, a tentative theoretical framework was developed to understand how firms' adopt and implement RPA in an attempt to create value (see Table 2.3). To fully understand the phenomenon it is proposed that technological attributes, normative and cognitive factors, as well as contextual factors should be considered at an organizational level. While previous research has placed much emphasis on the individual level of IT adoption, the contextual factors need to be acknowledged to overcome the limitations of existing models. While the Theory of Planned behavior (TPB), the various versions of the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) shows strength in explaining individual behavior, the Technology-Organization-Environment (TOE) framework is superior in explaining organizational behavior. Arguably, by integrating the various constructs of the IT adoption literature, the explanatory power in technology adoption is thought to be increased. As mentioned above, researchers have previously argued for various combinations of the theories within the IT adoption literature to reach a richer theoretical framework. This is thought to guide the understanding, explanations and prediction of adoption and user behavior of IT in an organizational setting (e.g., Baker, 2012; Zhu et al., 2006). Thus, by including a large number of constructs this paper aims to provide a richer theoretical lens and understanding of adoption behavior.

Five constructs are theorized to explain adoption and user behavior of RPA in an organizational context, namely: *performance expectancy, effort expectancy, social influence, organizational facilitating conditions* and *environmental facilitating conditions.* The first three constructs are adopted from IDT, TPB, the original and the extended versions of TAM and UTAUT, whereas organizational facilitating conditions and environmental facilitating conditions are partly adopted from TOE (see Table 2.3).

First, performance expectancy is defined as "the extent to which an individual believes that using the technology will help him or her attain gains in job performance" (Venkatesh et al. 2003, p.

447) and is emphasized as the strongest predictor of intention in both voluntary and mandatory contexts. This follows Venkatesh et al's (2003) synthetization in UTAUT, covering the constructs of *perceived usefulness* (TAM) and *relative advantage* (IDT). According to Rogers (2003, p. 15), relative advantage is "the degree to which an innovation is perceived as better than the idea it supersedes". RPA is suggested to generate advantages such as reduced cost, improved efficiency and reduced risk with regards to previous ways of working. Efficiency enhancements relative to human labour can be realised in a number of ways. One is that the technology automates highly repetitive, rule-based and structured data processes conducted by humans and thus saves time and cost since they are faster and avoid human error (Syed et al. 2020). In addition, if enough business processes are automated using the technology (i.e., the more software robots a firm implements), staff may be allowed to undertake other more value creating tasks. Hence, the firm's value-creating potential can be enhanced through scale (i.e., increasing the number of processes automated using the RPA). In addition, the construct of *communicability* (Tornatzky & Klein, 1982) was added since it has been acknowledged, both in previous studies on RPA (e.g., Syed et al. 2020) and in the pilot study of this paper, that the characteristics of RPA technology may cause human resistance. For instance, it has been acknowledged that RPA may cause fear of possible job loss and mistrust to the technology (Suri, Elia & van Hillegersberg, 2017). Thus, it is thought to be particularly important to make sure that the aspects of the innovation are transmitted and understood by important stakeholders and users in the organization to fully capture how value is created in the RPA implementation process.

Second, effort expectancy is defined as "the degree of ease associated with the use of the technology" (Venkatesh et al., 2003, p. 450). Venkatesh et al. (2003) does not recognize that *trialability* would fall under this construct. However, since RPA is relatively easy and fast to configure with current IT systems, testing at a small scale is made possible (Willocks, Lacity & Craig, 2015). Moreover, pilot testing of the software robot is considered an important part of the implementation process of RPA (Alberth & Mattern, 2017), especially as it enables stakeholder buy-in (Lacity & Willocks, 2018; Wright, Witherick, & Gordeeva, 2017). Consequently, the technology is thought to allow the user to experiment with the technology on a limited basis. That is why this study acknowledges that the sub-construct of trialability falls under this construct.

Third, the construct of *social influence* can be found in IDT, the later versions of TAM, TPB and UTAUT, and relate to the concept that behavior is determined by how individuals believe others will see them as a result of having used the technology. As initially pointed out by Venkatesh and Davis (2000), and later confirmed by Venkatesh et al. (2003), the constructs are less significant in voluntary settings, and most prominent in the early stages of experience in mandatory contexts (Venkatesh et al., 2003). To reach an understanding of the construct of social influence it is also relevant to investigate if the *individual* perceives the setting as voluntary or not. In relation to RPA, there are implications suggesting that the technology would be perceived as mandatory since broad scope systems or applications often are initiated and implemented top-down. In such cases, the context may not be perceived by the users as voluntary (Brown, Massey, Montoya-Weiss & Burkman, 2002). At the same time, RPA is often implemented with a bottom-up integration approach rather than a top-down standardisation approach, which is related to the fact that it is considered to be easier to configure the current IT system. This suggests that individual processes may be automated using RPA, without the support of the centralized IT department (Lacity & Willcocks, 2018). Indirectly, it is suggested that RPA may be implemented on local business units without top management initiation.

Fourth, the concept of *facilitating conditions* was originally defined by Venkatesh et al. (2003, p. 453) as "the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system". This construct synthesises the idea of *compatibility* as defined by Rogers (2003) and *perceived behavioral control* as described by Ajzen (1991) in TPB. In addition, *cost* and *organizational context* were added to the construct of this framework. Cost herin form IDT and have been found to have a significant effect on IT adoption (Tornatzky & Klein, 1982). Moreover, as recognized by both Rogers (2003) and Tornatzky and Fleischer (1990) in their perspectives on adoption and implementation of technological innovations in firms, the organizational context, or what Rogers refer to as internal characteristics of organizational context have important implications for IT adoption. The individual perception regarding the organizational facilitating conditions are important, although it needs also to be recognized that the facilitating conditions need to be there in the first place. That is why the framework incorporates both the organizational conditions and the individual's perceptions of those. In the case of RPA, conditions that may be particularly relevant would be descriptive characteristics of the firm (e.g., size and structure). As mentioned above, RPA distinguish from other technologies with a bottom-up integration, often by staff working in the business rather than IT-departments, suggesting that an individual's perception of the firm characteristics plays an important role.

Finally, the *environmental facilitating conditions* refers to how competitors, market elements, and regulatory environments facilitate the adoption and implementation of the technology. In the case of RPA, regulatory pressure to increase output quality and competitive pressure to lower costs may facilitate the implementation of the technology.

Table 2.3. Tentative theoretical framework

Constructs	Definition	Sub-Constructs	References
1. Performance expectancy	the degree to which an individual believes that using the system will help him or her to attain gains in job performance	*Perceived usefulness* (TAM/TAM2), *Relative advantage* (IDT) *Communicability* (IDT)	Davis (1989); Davis & Venkatesh (2000); Rogers (2003), Tornatzky & Klein (1982); Venkatesh et al. (2003)
2. Effort expectancy	the degree of ease associated with the use of the technology	*Complexity* (IDT), *Perceived ease of use* (TAM/TAM2), *Trialability* (IDT), *Communicability* (IDT)	Davis & Venkatesh, (2000); Rogers, (2003); Tornatzky & Klein (1982); Venkatesh et al. (2003)
3. Social influence	the degree to which an individual perceives that important others believe he or she should use the new system	*Image/Social approval* (TAM), *Subjective norm* (TAM2; TPB), *Voluntariness* (TAM2, TPB)	Davis & Venkatesh (2000); Ajzen (1991); Venkatesh et al. (2003)
4. Organizational facilitating conditions	the extent to which the organizational and technical infrastructure exists to support the use of the system, and the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system	*Compatibility* (IDT), *Perceived behavioral control* (TPB), *Organizational context* (TOE), *Cost* (IDT)	Rogers (2003); Ajzen (1991); Tornatzky & Klein (1982)
5. Environmental facilitating conditions	the degree to which the competitors, market elements, and regulatory environment facilitated the adoption and implementation of the technology	*Industry characteristics & market structure* (TOE), *Competitive pressure,& Perceived government pressure*	Tornatzky & Fleischer (1990); Zhu et al (2006); Kuan & Chau (2001)

3. Methodology

The following chapter describes and assesses the methodological approach and reflects upon the choices made to answer the research purpose of this study. First, the research approach is presented followed by a detailed discussion on the chosen research design. Third, the decisions concerning the data collection methodology and the data analysis process will be explained and discussed. A critical reflection of the study's reliability and validity will be provided. Later, the ethical considerations made will be described.

3.1 Research Approach

The empirical purpose of this study was to increase the understanding of how RPA is adopted and implemented in an attempt to create value. Many studies addressing value creation of new technologies have tried to assess the value that is brought to an organization and the causes behind it (e.g., Taylor & Todd, 1995; Tornatzky, Eveland, Boyland, Hetzner, Johnson, Roitman & Schneider, 1983), thus taking what Creswell (2014) describes as a postpositivist epistemological position. This view, however, puts less emphasis on how and why a new technology unfolds (Van de Ven & Poole, 1990). As value is said to be created with the actual usage of an adopted technology (Frambach & Schillewaert, 2002), this study aimed to rely on the individuals' views of the situation, i.e. their intention and usage behavior in an organizational context. Thus, in contrast to much previous research, we took a constructivist's perspective, with the aim to capture how and why RPA unfolds in an organization.

The epistemological stance also reflects the choice of research approach (Creswell, 2014). While a deductive approach often involves the production of hypotheses which are confirmed or rejected by testing an already existing theory, an inductive approach generates new theory from empirical experience (Bryman & Bell, 2003). Based on a tentative theoretical framework, this study has sought to develop theory on RPA implementation by building themes on the factors behind technology and IT adoption. Generating meaning from empirical data partially supports an inductive thinking but also provides a foundation for a deductive approach since it is based on existing theory and previous research. Thus, a combination of the two approaches, what Alvesson and Sköldberg (1994) refer to as an abductive research approach, was applied.

Accordingly, abductive thinking is an approach seeking to develop existing theory while at the same time discovering novel underlying patterns. To address the research problem, this study required an understanding of technology adoption, but in the process discovered new phenomena that current theories do not provide an explanation for.

3.2 Research Design

3.2.1 Qualitative Case Study

Much research within the IT adoption literature has used a cross-sectional methodology to investigate the characteristics of the studied technology to assess and determine the value it brings to an organization (e.g., Taylor & Todd, 1995; Tornatzky et al., 1983; Williams et al., 2009). This is indeed a valid method, providing insights on the antecedents to or consequences of technological innovations (Tornatzky et al., 1983). However, such studies do not directly examine how and why technological innovations emerge, advance, or terminate over time. Following Van de Ven and Poole (1990) reasoning, the temporal sequence of activities in developing and implementing new technological innovations is essential for the management of innovation. Bryman and Bell (2003) argue that a qualitative method is appropriate to reach a deeper understanding of how events and patterns unfold over time. We therefore recognize that a process perspective on IT adoption is needed to answer the purpose of this study.

Since the purpose of this study was to collect rich and descriptive data capturing the dynamic process of IT adoption and implementation, a qualitative research method was deemed appropriate. Especially, since the aim was to view the events from the perspective of the people involved in the implementation process and to reach a contextual understanding of social behavior. Qualitative research puts emphasis on increasing the understanding of social constructs by studying the interpretations and perceptions of participants, which makes it a suitable approach for collecting rich and descriptive data (Bryman & Bell, 2003). Moreover, the IT adoption and diffusion literature has been criticized for reaching a point of methodological homogeneity since most studies use quantitative methods and make use of only the constructs in the Technology Acceptance Model (TAM). This overrepresentation is thought to weaken the field of technology adoption (Williams et al., 2009). As a response to this criticism and as an effort to explore the construct of technology adoption as a social construct, a qualitative methodology was deemed suitable.

The intra-organizational adoption and implementation process of RPA was the unit of analysis. As described by Van de Ven and Poole (1990), such a process unfolds over time and involves complex interactions among multiple actors and a number of activities. The authors further highlight the importance of distinguishing between an *incident* and an *event* when undertaking process studies. An incident is an empirical observation, while an event is a theoretical construct and may not be directly observed. The latter is thus a conceptual construct in a model or framework that explains the pattern of incidents. Accordingly, the basic empirical unit is the incident. To develop a valuable model of the implementation process, the components of its events should not only be defined but also be tied together in a temporal order and sequence. This will explain how and why technologies unfold over time. Qualitative data will thus enable a rich understanding of incidents in relation to RPA and subsequently allow for a theoretical understanding of the process. We do however want to acknowledge that the process perspective is rather a methodological choice, and our empirical findings will not be presented in a chronological order.

A longitudinal case study methodology was chosen. Larsson (1993) argues that case study research benefits from longitudinal analysis of a certain organizational process and takes both processual and multiple stakeholders into consideration by using longitudinal, multisource data. He points to the fact that case studies are well-suited for studying more complex phenomena than more superficial cross-sectional surveys, as they have the ability to capture the organizational processes and the perspectives of multiple stakeholders. Authors such as Easterby-Smith, Thorpe, Jackson and Jaspersen (2018) further highlight how qualitative case methodology provides the researchers with an in-depth understanding of the case in its context. Case studies are also considered appropriate when investigating decisions, and the reasoning and implementation of these decisions (Yin, 2009). Adoption and implementation of IT is a consequence of decisions on both the individual and the organizational level (e.g., Frambach & Schillewaert, 2002), which implies that the reasoning and implementation of those decisions may be understood with such methodology.

Two levels of analysis were undertaken, where the first focused on the organizational members that have been part of the process, and the second addressed the organizational context. Seeking to understand the phenomenon of IT adoption and implementation, the contextual conditions were deemed particularly important (e.g., Tornatzky & Fleischer, 1990). Van de Ven & Poole (1990) further highlights that the context is one of the five constructs (apart from ideas, people, transactions, and outcomes) of the IT implementation process that should be acknowledged when studying the development of the process. When seeking to understand a real-life phenomenon in-depth that is encompassed by important contextual factors, the case study is considered particularly important (Yin, 2009). Yin argues that a survey could indeed cover both phenomenon and the context, but its ability to investigate the context is limited.

However, case studies have been criticized for letting biases influence the direction of the research, to perhaps a larger extent than in other research methods, since the interpretations of the findings are dependent on the subjective opinion of the researchers (Yin, 2009). Although these limitations cannot be fully resolved, this study aimed to overcome some of these challenges by following systematic procedures. A more detailed description of how the systematic procedures were undertaken is described in section 3.3 "Data Collection Method".

3.2.2 An Embedded Single-Case Study Design

When undertaking a case study, the researchers must carefully select between a single case or a multiple case design, with a holistic case or an embedded case strategy (Yin, 2009). As noted earlier, a longitudinal case study analysis was deemed appropriate to answer our research question. A single case study may be chosen with the rationale of understanding how the conditions unfold over time. This may also be achieved by undertaking a multiple-case study, although such study would require extensive resources and time (Yin, 2009). With regards to the time constraints of this project, this was deemed unsuitable. However, multiple case studies benefit from more observations, and is thus considered more robust (Yin, 2009). In addition, Yin further recognizes a potential vulnerability of undertaking a single-case study, since the researchers put "all the eggs in one basket". Thus, careful investigation and premature commitment to a single case study design should be avoided. In order to avoid such risk, careful investigation was undertaken before the method was selected so as to minimize the risk of misrepresentation and maximize access to data. A pilot study and various people within the selected case company were contacted in order to navigate and ensure access to individuals who have been involved in the adoption and implementation of RPA.

Identifying embedded cases within the same single-case study is considered an appropriate way of avoiding the disadvantages associated with conducting a single case study at a too abstract level without sufficiently clearing measures or data (Yin, 2009). Identifying and analyzing more than one unit of analysis will thus increase the robustness of the study. Consequently, an embedded case study design was chosen to maximize the potential of variety within the selected case.

3.2.3 Case Selection

When conducting this study, we undertook a theoretical sampling approach, which in this case meant that the selected firm had adopted and implemented RPA technology. In the pilot stage of this study, we initiated desktop studies and undertook pilot interviews to gain an understanding of the technology. It was confirmed that RPA is considered a viable option for businesses driven by cost reduction, efficiency, quality improvement and higher levels of regulatory compliance, and firms with many legacy systems (Syed et al. 2020). Moreover, it has been recognized that some of the earliest and most vigorous adopters of RPA have been within the financial services industry, which has been thought to be a consequence of their large cost reduction challenges, compliance pressures and rigid legacy systems (Chui, Manyika & Miremadi, 2016). This was further confirmed during an expert interview with a management consultant at Deloitte, specializing in RPA implementation. The consultancy firm was contacted since they have extensive experience of the adoption and implementation process of RPA and promote themselves as having “experience in successful RPA project delivery and have partnerships with the main software vendors” (Deloitte, 2020). Firms within financial services industries have thus come far in their RPA adoption process, making them a suitable case setting for this study. This was considered when the case setting was selected.

Sectors such as banking and insurance have traditionally been fast in the uptake of process-aware information technology (Syed et al., 2020). Comparing the digital intensity across industries, the financial sectors have been further recognized to have a particularly high digital intensity (OECD, 2019), making it a particularly suitable area to study. Furthermore, the Swedish banking sector is considered one of the most digitized sectors in Europe (Swedish Bankers' Association, 2019), why a Swedish bank is thought to be a representative case. The selected bank was carefully chosen based on two main factors. First, it can be considered a representative actor in its industry. Second, but perhaps most importantly, the selected bank has been a leading actor in implementing RPA, which we have discovered through industry press. The selected case company has thus invested heavily in the technology and has undertaken several adoption and implementation processes of RPA. The bank may thus be seen as what Yin (2009) describes as a typical case, both representative of the Swedish banking sector and at the same time constituting a unique case as a leading RPA implementor.

The case firm is a universal bank, which offers banking services and insurance solutions both in Sweden and in other international markets. The Swedish banking sector is dominated by large universal banks, which have evolved into financial groups with extensive activities both in Sweden and internationally. Alongside traditional banking, offers such as mortgage lending, fund management and life insurance, which are becoming increasingly important parts of the financial group's business activities (Swedish Bankers' Association, 2019). The case firm and the respondents asked to be anonymous. Thus, the case will hereafter be referred to as "the Banking Group".

Two embedded cases were deliberately chosen since they offer contrasting situations. The two embedded cases represent two divisions within the Banking Group and will be referred to as Case Insurance (or "Case I") and Case Banking (or "Case B"). For legal reasons, the Insurance division is a subsidiary of the Banking Group. When selecting the embedded cases we aspired to maximize the variation within the case company, while still controlling for extraneous variation. Following our theoretical sampling approach it should be recognized that both divisions have adopted and implemented RPA. These adoption and implementation processes emerged in parallel, although in isolation. Interestingly, the two cases show great variances in size, where

Case I is significantly smaller than Case B in terms of number of employees. At the same time the two cases share many important similarities, such as strategic intent, governance structure and resource base, thus competing for the same resources.

3.3 Data Collection Method

The empirical purpose of this study was to generate a case story, describing the adoption and implementation process of RPA in a firm, which enabled subsequent analysis by using the concepts and constructs in the tentative framework. The objects to study were the processes and micro processes of decisions and actions to accept and use the RPA technology. When taking a perspective emphasizing the process, longitudinal data is necessary to observe how the process unfolds over time (Langley, Smallman, Tsoukas & Van de Ven, 2013). The data was collected through interviews and documentation, where the tentative theoretical framework was used as a foundation to develop relevant and informative interview questions. The types of questions asked when approaching the sources of information (both documentation and respondents) can be divided into two distinct clusters; mapping questions and framing questions. The mapping questions aimed to capture the history of RPA as perceived by the people in contact with the process, without much focus on particular constructs or sub-constructs from the tentative framework. In contrast, the framing questions aimed to clarify the features of the case in relation to theory. By doing so we aimed to create a narrative to describe the dynamic process of the adoption and implementation process of RPA from the tentative framework. As earlier noted, we set out to understand the committed use of RPA at a multilevel. Thus, some adjustments were made in the questionnaire based on users and non-users. The topic guides are presented in Appendix A and B.

Throughout the work of this study, a clearer focus on the different aspects of the tentative framework was developed. If only the mapping approach had been used, the data would have been less valid. However, the reason for separating these two types of questions was to have an open approach to the data at the initial stages, while still having a strong focus on IT adoption and implementation. This was essential to allow for a higher degree of exploration. The tentative framework was developed to give a tentative answer to the purpose of this study, although it should not be considered a complete model of IT adoption and implementation. The ambition was to obtain empirical data contradicting, verifying, and extending theory in order to propose a more valid framework, i.e. a framework that is more relevant, explanatory and integrated.

Unlike highly structured and unstructured interviews, the semi-structured interview method should be used when the research is guided but open (Easterby-Smith et al. 2018). All interviews followed a semi-structured interview guide, which was based on the tentative framework. Easterby-Smith, Thorpe, Jackson and Jaspersen (2015) suggest that that semi-structured interviews are particularly appropriate when (1) the aim is to understand the respondents world-view, (2) when it is necessary to understand the constructs that the respondents use as a foundation to build their opinions and beliefs, and (3) when the situation or topic are confidential or commercially sensitive. With the aim of obtaining descriptive and personal answers regarding the respondents perception of the implementation process, semi-structured interviews were deemed as a suitable option. Moreover, the semi-structured interview design enabled us to ask follow-up questions regarding the adoption and implementation process. Thus, the follow up questions enabled the results to be developed (Easterby-Smith et al. 2015).

Moreover, a pilot study was conducted with three respondents at another large bank operating at the Swedish market, which gave us further insights on the technology and the contextual factors relevant for the banking sector. The respondents were carefully selected based on their titles and similar roles with the respondents who would be interviewed at the Banking Group. Pilot studies prior to the main case studies are considered important since it enables testing, revising and sharpening the interview guides and protocols (Goffin, Åhlström, Bianchi & Richtnér, 2019).

The collected data dates back from 2015, and covers the time period up until spring of 2020. The respondents were chosen based on their involvement in the adoption and implementation process of RPA and data were sourced from three different types of staff: managers, operational employees and members of different units aimed to support the implementation. Managers and operational employees were chosen as they were thought to contribute with information and different perspectives on using the robot, whereas members from the supporting units were chosen to provide information on the organizational context. Being a retrospective case study, respondents were selected in order to provide a broad representation. Leonard-Barton (1990) argues that a variety of perspectives and information sources is favourable over a large number of informants representing the same perspective, even though this forces the interviews to become less structured. Thus, the respondents were chosen to represent different fields in the case company. In addition, following a theoretical sampling approach the respondents were chosen based on their involvement in the adoption and implementation process of RPA. The case company had no direct influence on the interviewees sampled. The Table 3.1 summarises the respondents.

Table 3.1 Information about the interviews and the respondents

#	Embedded case	Respondents	Length
1	B	Robotics Relationship Manager, Robotics Supporting Unit	60 min
2	B	Manager 1	45 min
3	B	Manager 2	90 min
4	B	Operational Employee 1	45 min
5	B	Operational Employee 2	90 min
6	B	Risk Manager, Supporting Unit	50 min
7	B	Manager 1, Robotics Supporting Unit - CoE	70 min
8	B	Manager 2, Robotics Supporting Unit - CoE	70 min
9	B	Product Owner, Supporting Unit - CoE	30 min
10	I	Robotics Relationship Manager, Robotics Supporting Unit	50 min
11	I	Operational Employee	60 min
12	I	Robotics Development Manager, Robotics Supporting Unit	80 min
13	I	Former Group Head of Robotics Strategy	90 min

All 13 interviews were conducted individually. The interviews lasted between 30 and 90 minutes, and the average length was 63 minutes. Most of the interviews were conducted over video or phone call due to geographical distance and the extraordinary circumstances associated with COVID-19. Notably, remote interviewing lacks some of the immediate contextualization, depth and nonverbal communication that may be captured during face-to-face interviews (Easterby-Smith et al., 2018). However, synchronous mediated interviews such as phone and video resemble face-to-face interviews since the researchers and the respondent are able to converse in real-time. In addition, remote interviewing allows for flexibility and efficiency, which makes it suitable for process-based research (Easterby-Smith et al., 2018). Since it was not possible to fully capture the body language of the interviewees during the video and phone call, emphasis was put on the wording of the interviewees' descriptions rather than body language. Both researchers were present during the interviews, which enabled the researchers to take notes and ask follow-up questions. If something was unclear we summarized and presented what had been said. This enabled clarification of the situation (Easterby-Smith et al. 2015). When undertaking interviews there is a risk of projecting the researchers opinions into the situation (Charmaz, 2014). Thus, conscious efforts were undertaken to listen and refrain from doing so.

Apart from the semi-structured interviews, secondary textual data was collected and analysed. The data was obtained from publicly available sources or handed by the case company. Examples of such documentation mainly include internal documents, describing how the RPA organization is structured, external sources such as news articles, and articles published on the Banking Group's web page. Organizational documents are created for other purposes than research, why it is important to recognise that these documents may entail certain biases (Easterby-Smith et al, 2015). This was acknowledged, and that is why the documents were used mainly to confirm information provided during the interviews. This follows Leonard-Barton (1990) recommendation to undertake efforts of enhanced awareness and more critical approach to both documents and respondents when undertaking retro-perspective research. According to Lenord-Barton, this is critical since there is always a challenge associated with conducting retro-perspective research on managerial issues, since personal beliefs may 'colour' the individual's version of the events and incidents. This risk is particularly evident when the matter concerns the respondent's own feelings or actions, and when a long time has passed since the discussed event took place. As a consequence, events might be post-rationalised or even inaccurate. Additional efforts were thus made to focus on events and incidents rather than personal viewpoints, and to ask clarifying questions during the interviews. Moreover, efforts were made to consult other sources to further validate the data. The use of multiple sources of data is considered both beneficial and essential for case study research (Yin, 2009). Thus, internal documents and secondary data was used to complement the interviews.

3.4 Data Analysis

In contrast to quantitative research designs, there are few rules for the analysis of qualitative data (Bryman & Bell, 2003). Rather, it is characterized by broad guidelines and to a large extent depends on the theoretical propositions as well as the researcher's approach on how to ensure accurate analysis (Yin, 2009). Being an exploratory case study, with the aim of developing theory on how RPA is adopted and implemented in an attempt to create value, data was analysed using a "pattern matching logic", were empirical patterns were compared with the constructs and concepts formulated in the tentative framework (Yin, 2009). Following the recommendation suggested by Creswell (2014), the analysis of data proceeded conjointly with the data collection and review of findings.

3.5 Research Quality and Ethical Considerations

Validity and Reliability are commonly used evaluation criteria within business and management research (Bryman & Bell, 2003). However, it has been discussed extensively among scholars if these terms are appropriate criterias to assess the quality in qualitative research. A similar debate is highlighted by Easterby-Smith et al. (2018), who illustrates the debate concerning constructionist research designs and how to demonstrate and assure its validity. While Bryman and Bell (2003) claim that these criteria are more suitable for quantitative research, others do however view the criteria relevant, even though they argue that the meaning of the terms needs adjustments. Thus, a number of different stances and adjusted forms of these two criteria have been taken by researchers to assess the quality.

One such suggestion was made by Yin (2009), who emphasizes four categories to evaluate the research quality in case studies: (1) construct validity, (2) internal validity, (3) external validity, and (4) reliability. Yin (2009, p. 40) refers to construct validity as "identifying correct operational measures for the concepts being studied". In particular, it is the concepts "measures" or "measurement" that have caused concerns among case study researchers, who claim that data collection are based on subjective judgements (e.g., Bryman & Bell, 2003; Yin, 2009). Internal validity seeks to establish causal relationships in which various conditions are believed to result in others. While testing internal validity is vital when conducting causal and explanatory studies, it is not an appropriate test for explanatory or descriptive research (Yin, 2009). Thus, being an exploratory case study, efforts to ensure internal validity was not considered. External validity is defined as “the domain to which a study’s findings can be generalized” (Yin, 2009, p. 40) and case studies are often criticised for their limited generalizability and external validity (Yin, 2009). The intention of this study was not to generate generalisable findings to a larger population, but rather to highlight constructs in relation to existing theory regarding the ways in which IT may be adopted and implemented and how this unfolds over time. Importantly, the aim was to achieve analytic generalizability (i.e., to expand and generalize theories) and not statistical generalizability (i.e., enumerate frequencies) (Yin, 2009). Thus, we recognize that the findings from the embedded cases in this study are not generalizable to all adoption and implementation processes. Finally, reliability is a test demonstrating that the same results can be achieved when repeated in another study. Efforts undertaken to strengthen construct validity, external validity and reliability are summarized in Table 3.2.

In addition to aforementioned efforts, several strategies were employed to address the ethical considerations associated with chosen research design. Prior to data collection, written information regarding research objectives and usage of data was sent to the respondents. The respondents were thus given sufficient information to assess whether or not they wanted to participate in the study, in line with what Bryman and Bell (2003) refer to as establishing an informed consent. All respondents were also informed about anonymity. With the exception of one respondent, all agreed upon being recorded when interviews were conducted. During the unrecorded interview we made sure to make more careful and extensive notes. Some respondents were also contacted a second time in order to get supplementary answers if something was unclear from the first interview. To ensure quality and credibility, all respondents also had to approve quotations and had the chance to review the analysis of the project before the final submission, which validated the findings.

Table 3.2 A presentation of efforts undertaken to strengthen research quality

Criterion	Strategies	Applied method
Construct validity	Use multiple sources of evidence (Yin, 2009). More specifically, use different data sources of information to coherently justify the themes (Creswell, 2014). The involvement of multiple investigators in the data analysis process creates a type of triangulation, since it enables a better handling of the richness of the contextual data and gives more confidence to the findings (Benbasat et al., 1987; Eisenhardt, 1989)	Our abductive approach provides general theoretical support from the very beginning. In addition, our tentative framework, built on a theoretically sampled case that further sheds light on the model and contributes to general validity. Primary data was collected from semi-structured interviews, and secondary data was collected from organizational documents and public information such as the Banking Group's website and news articles. In addition, industry magazines, company webpage and LinkedIn profiles. Insights obtained from the interviews were compared with secondary data on that same topic. The two of us were involved in the data analysis process to ensure a better handling of the collected data. Final quotes were sent to the interviewees and checked for missing information and/or misinterpretations of the data.
	Conduct pilot study to ensure valid data collection (Dubé and Paré, 2003).	An industry expert was contacted to ensure valid data collection A minor pilot study was undertaken with another firm operating in the Swedish banking and insurance sector to test, revisit and improve the research protocols and interview questions to ensure valid data collection. The three respondents were carefully selected based on their involvement in Robotics implementation and similar titles to those who would later be interviewed in the Banking Group.
External validity	Use replication logic (Yin, 2003).	By undertaking a single case study we make no claims of being able to generalise these findings into a larger population, but rather in relation to theory.

Reliability	Establish a case study protocol (Goffin et al, 2019). Establish a case study database (Yin, 2009) Respondent validation (Van de Ven & Poole, 1990)	To increase the transparency, an interview guide and research protocol was used during data collection, coding and analysis and included in the thesis. Circumstances regarding the data collection, such as information about the characteristics of the interviewees and the sessions for data collection, was also documented and included in the thesis (Yin, 2009). A case study database including audio file and transcriptions was established. In certain cases, for instance regarding accounts of events, we used respondent validation .

4. Empirical Interpretations

The presentation of the empirical findings is based on the five theoretical constructs, as outlined in the tentative framework (see Table 2.3). This section will begin with a description of the adoption and implementation process at the Banking Group, followed by an analysis of our five theoretical constructs. The section will end with an analysis of an important external observation, namely the concept of the user. Since a case study runs the risk of being extremely rich in content, each construct is further subdivided into aspects most relevant to understand this case and to discuss the tentative framework. The sub-headings aim to highlight the most important empirical findings of each construct.

4.1 The Adoption and Implementation Process

Having the process perspective in mind, the adoption and implementation process may be seen at two levels. First, the adoption and implementation process of a single software robot may be viewed in isolation, recognizing the individual operational staff's intention and usage of a software robot in their daily tasks. Second, from a broader perspective these individual software robots are part of a greater adoption and implementation process of RPA. This is related to how the technology may be configured and scaled up. As seen in the Banking Group, the distinction may be drawn between the adoption and implementation process of Case I and Case B, which have taken slightly different approaches when scaling up their RPA efforts. Together these efforts may be seen as the adoption and implementation of RPA at a firm level. Here it is about recognizing how the individual's usage intention and behavior are influenced by the various members and the organizational context. As seen in the Banking Group, a few local robotization initiatives instigated its efforts to scale up its robotization efforts. This process was initiated with a few software robots, and has currently reached the scale of a few hundred. These software robots vary in terms of purpose and functionality.

4.2 Performance Expectancy

The following section presents some of the key attributes and benefits highlighted by the respondents. All respondents seemed to agree upon the idea that the technology would increase productivity. Other aspects were also highlighted such as increased job satisfaction and reduced operational risk. Some perceptions seem to have been constant throughout the adoption and implementation period, while others seem to have changed over time.

4.2.1 Productivity Gains

A constant theme throughout the adoption and implementation process was how the technology was seen by members of the business function as a means to increase productivity. However, not all employees within the Banking Group were as positive towards the technology, particularly not within the IT-function. As pointed out by the former Group Head of Robotics Strategy, there were some IT-managers who expressed skepticism towards the technology:

> At the early stages I had a close dialogue with IT managers, and they used the metaphor: 'It is like putting lipstick on a pig. The pig becomes more beautiful, but your real problems are only hidden.' For this reason, robotics was not seen as a first choice by the IT managers, but was considered to be something you do if you do not have any better alternatives (Former Group Head of Robotics Strategy - Insurance).

Among employees within the business function it was considered to have great potential for increasing productivity if applied appropriately. The productivity gains were thought to be realized in various ways. RPA was expected to be cheaper than human labor and reduce the time spent on performing manual tasks. Software robots would not only be a cheaper alternative to human labor, it would also be able to work 24 hours, seven days a week. It was also seen as a way of handling peak periods, since it minimizes costs in terms of hiring short-time staff and overtime hours and part-timers during busier periods. Others highlighted reduced lead times, since it would enable faster responses to customers. Furthermore, the respondents recognized early on that the productivity gains would increase with the number of processes included. RPA was also seen as a cost efficient alternative to outsourcing. Processes that are rule-based, well-documented, stable and repetitive would otherwise have been moved to low cost countries. To robotize such a process would be achieved within a shorter time frame and it would be cheaper once it was up and running.

> We realised that robotics covered almost exactly the same scope as outsourcing, almost 100 % of what you robotize is what you otherwise would move to a low cost country. [...] The business case was obvious, it was a huge cost advantage (Former Group Head of Robotics Strategy - Insurance).

In an attempt to ensure that these productivity gains were realized, a business case was presented for each robotized process. These business cases have varied based on the type of process, although all cases seem to include an evaluation of potential productivity gains measured in "Full-time equivalents" (FTE). The aspired FTE gain differed between the software robots. Importantly, for these productivity gains to fully materialize, the freed time needs to be spent on other value creating activities or result in a termination of the workforce. In this case none of the respondents gave any indications suggesting that the Banking Group has reduced the number of employees as a direct result of the implemented robots. Instead, the respondents mainly highlighted that there has been gains as employees are undertaking other tasks today and the number of newly recruited have been reduced. One respondent recognized how RPA has resulted in productivity gains during a period of growth, when the workforce has been able to handle increased volumes. Thus, most respondents seem to perceive that there have been productivity gains as the robots have been implemented, although the follow-up on these gains seems to have been varied.

> You don't look so much at the details surrounding the time saved or what monetary value is created. Rather we see robotics as a tool to support the business when dealing with increased volumes now that the company is switching to a new insurance system with many small processes here and there (Robotics Development Manager, Robotics Supporting Unit - Insurance).

> I hold a performance review with the manager for a robot to see how it is going (Robotics Relationship Manager, Robotics Supporting Unit - Banking).

> There has not been that much of a follow-up on this particular robot. There is another department called robotics that is involved, and I am sure that they know more about the robot's performance (Manager 1 - Banking).

In some exceptional cases, the robots have not been functioning as initially intended due to issues in production. This has caused some respondents to question the productivity gains as too much time is spent on reporting and documenting issues related to the software robot. This does not seem to have affected the intention to use the robot, although it has been recognized to cause great amounts of frustration among users. In cases when the software robots work as intended, users seem to recognize that the saved time has enabled more value creating activities, such as customer care.

4.2.2 Increased Job Satisfaction

Proponents of robotics at managerial levels and supporting units seemed to anticipate that there would be some initial resistance or fear among the operational employees, especially since the technology was heavily associated with productivity gains. None of the respondents expressed that they expected that the adopted technology would replace them, although members of the supporting units indicated that there was some initial fear among managers and employees. Interestingly, the perception of robotics as something threatening seems to have changed over time, as indicated by the following quote:

> In the beginning managers were more like ‘Oh, I don’t want to have a robot, because we don’t want to fire people since the robot is able to do the work that people are doing’. Today the perception is different, they are saying ‘Okey, we want to have a robot to let our people do more complex tasks or to develop our people in a different area, so let the robots do this simple job (Manager 1, Robotics Supporting Unit - CoE).

A lack of knowledge and understanding of the technological limitations of RPA was considered to be the main reasons for this fear, and communication was considered to be an important aspect of overcoming these misconceptions. Managers and operational employees recognized that RPA was not a full-on automation. Instead, all respondents seemed to believe that RPA would make time for more knowledge intensive and value creating activities, creating a more developing work environment and increased job satisfaction. In addition, it was seen to create a less stressful environment during peak periods.

> With this new solution I never saw that my team and I would face a new reality where we would loaf around without anything to do, not at all. I would have more time to do the things I enjoy the most with my job (Operational Employee - Insurance).

Respondents within both cases further recognized that the technology would reduce the uncertainty related to undertaking the tasks manually, i.e. the robot would eliminate human errors.

> When you are undertaking this task manually you cannot be 100 % sure that you have captured everything. [...] The volumes are so large that when done manually I am only able to make a random sampling, put my name on it and hope for the best” (Operational Employee 2 - Banking).

4.2.3 A Competitive Edge in Digitalization

In the early stages, it was recognized by respondents within both cases that RPA would enable the Banking Group to build digital competence and keep up with technological development. As indicated by the former Group Head of Robotics:

> To me one of the major benefits with a software robot was how it would become a stepping-stone into AI. This was the first step to digitalize the personnel, by doing so they would start thinking in a more digital way (Former Group Head of Robotics Strategy - Insurance).

This view was somewhat confirmed also after RPA was implemented. With new roles such as RPA developers and project leaders, new skills have been developed, both at an individual and organizational level. In addition, one of the respondents expressed how the technology has enabled the Banking Group to keep up with competitors, strengthen its position in the market and retain competent personnel.

> The entry barriers have become incredibly high if you would want to start a large scale bank. You would need to have robots to collect data, robots that can process data while I am sleeping and you need to have the whole compliance aspect in place. I would therefore say that it has and will become even more concentrated in the market. There are fewer players serving a larger group of customers (Operational Employee 1 - Banking).

4.2.4 Reduced Operational Risk

In addition, a majority of the respondents highlighted that the technology would reduce the operational risk and make the processes more compliant with regulations. Considering the importance of being compliant within the banking sector this was considered particularly important.

> The advantage of the robots is that they do what they're told. A person can make a mistake but a robot does not (Robotics Relationship Manager, Robotics Supporting Unit - Banking).

> In the bank there are many processes not undertaken very often, which could lead you to forget how the process is done. A robot does not forget, it does as it is told, and works even if that is only once a year (Robotics Relationship Manager, Robotics Supporting Unit - Banking).

4.2.5 Increased Customer Satisfaction

Furthermore, with the implementation of RPA, respondents in both cases witnessed a positive correlation between increased response rates resulting in higher customer satisfaction. In general, it has been hard to measure the benefits retrieved from robotics in terms of customer satisfaction. However, front-end employees have expressed how they with the new technology are able to spend more time undertaking customer care efforts. In addition, increased satisfaction has been confirmed by surveys. "Some robots enable faster response time to customers, but it is hard to measure the effects of that as it is related to customer satisfaction" (Former Group Head of Robotics Strategy

4.3 Effort Expectancy

Expectations on effort in the Banking Group can be organized into four categories: how respondents understand the technology, how they apply and maintain the technology, how they use the technology and how they test the technology.

4.3.1 Understanding the Technology

The initial impression of the RPA technology among managers and operational employees was that RPA was easy to understand. Interestingly, members of the supporting units expressed concerns that managers could not see the complexity of the technology. One of the managers at the Centre of Excellence ("CoE") supporting units expressed that unlike many managers, she sees the technology as very complex. She highlighted the fact that processes perceived as very simple by a manager can be difficult for a robot to imitate, which has caused misunderstanding between the units. This was also confirmed by another manager at the robotics supporting unit, who claimed that: "A robot is very sensitive to the stability of the user interface layer, but the users rarely understand the extent of the dependency". The perceived level of complexity also seems to have increased as the RPA efforts were scaled up within the Banking Group.

4.3.2 Applying and Maintaining the Technology

Many of the respondents considered RPA a short-term solution that was less resource intensive than a change in the IT infrastructure. At a managerial level some respondents recognized that the technology would be an appropriate solution to support the business, while the IT department is working in their new core IT platform. As stated by one of the managers: “Implementing a robot was and is a short-term solution until we have the new core IT platform in place, a solution that is available now and saves time” (Manager 1 - Banking). It is evident that this expectation has been shared by many, including some of the operational employees. This could perhaps explain why most respondents have a positive view of the technology before and after the implementation of the software robots.

However, implementing the technology seemed to have been more complicated than initially expected. It may be recognized that the Banking Group faced two challenges in relation to applying and maintaining the technology. This was highlighted by respondents from both cases. The first issue relates to the selection of the individual process to robotize. If a large and complicated process is selected it will slow down the implementation and cause unexpected costs. The following quotes indicate this:

> We initially made the mistake of robotizing the process that was most urgent and suitable from a business perspective, which for us meant a difficult start. [...] It would have been easier if we had chosen a smaller process (Robotics Relationship Manager, Robotics Supporting Unit - Banking).

> From my perspective, I believe that the costs related to the maintenance of the robots have been higher than originally thought (Operational Employee 1 - Banking).

The second issue came at a later stage and was a consequence of the desire to scale up the number of robots rapidly, without recognizing the maintenance cost of those. This issue was seen in both cases, indicated by the following statements:

> We prioritised creation of new robots, occasionally at the cost of production.The initial intention was to get it going, create many robots and learn on the go. All of the sudden, we ended up having many robots and not really a standardized way of working in production. So my lesson learned: think about production earlier. Standardisation, reporting, communication etc. It is important to do this before you get too many software robots (Manager 2, Robotics Supporting Unit - CoE).

> If you have many processes, it will require a lot of maintenance. And to be honest I don't think it was particularly highlighted when the consultants sold this to us at an early stage in the process. But that's just how it is (Robotics Relationship Manager, Robotics Supporting Unit - Insurance).

4.3.3 Using the Technology

Overall, the software robots were perceived as easy to use, providing a relatively simple tool for end users such as advisors, analysts and back-office personnel. However, some operational employees and managers in Case B perceived the technology quite demanding in the initial stage. There were two main reasons for this. First, the technology did not work properly and was difficult to use as many received incorrect or incomplete information. Second, the technology required some change in workflow, which left people with no option but to adjust their ways of working. As indicated by one of the managers:

> In the beginning, it [the robot] either gave the wrong output or the output was incomplete, which meant that we could not use this robot as we had intended. We had to spend quite a lot of time together with IT developers and analysts making adjustments so that the robot produced the information we actually needed (Manager 1 - Banking).
>
> [As a credit analyst] you had to change the workflow slightly. In an ordinary process you may not have chosen to begin by developing the basis for the collateral in credit analyzes. [...] It was perhaps a more natural workflow earlier (Manager 1 - Banking).

Eventually, many found the technology simple to use. The following quotes emphasize that the technology seemed uncomplicated to use:

> Today I see it as a natural part of my everyday work, which is basically the best rating a robot can get (Operational Employee - Insurance).
>
> I must say it has simplified my everyday work. It is easy to use (Operational Employee 1- Banking).

4.3.4 Testing the Technology

Common to all implementation processes in both Case B and Case I was that the technology was tested. As described by many respondents, it was considered an important aspect that the technology allowed for testing as it served as a basis for further adjustments to fit the needs of the user. In most cases this was done by involving so-called “super users” or Subject Matter Experts (SMEs’), which are described as operational employees with particularly good knowledge on the process that was supposed to be robotized.

Two issues related to testing were mentioned by respondents, which resulted in a lack of confidence in the technology and whether or not it would fill its purpose. For instance, one manager highlighted the issue of involving super users in the testing too early in the process.

> We put together a test group pretty early in the process. [...] When we presented 1.0 to the test group it performed so badly that many in the test group thought it would never be useful. This spread quickly and became an uphill battle as people had negative expectations toward an upcoming robot that wasn't going to work. In this case we were perhaps a bit too early in involving a test group (Manager 1 - Banking)

A second issue was related to the fact that the technology was not properly tested. As pointed out by one implementation manager:

> In the implementation of the second version of the robot, it had simply not been tested enough before it was communicated and sent into production. The robot crashed and we had to restart and rebuild. The importance of testing system on real cases is crucial (Risk Manager, Supporting Unit - Banking)

4.4 Social Influence

Two interesting aspects of social influence were identified within the case, namely influencers and the relevance of image. These will be described below.

4.4.1 Key Influencers

From the Banking Group, three important actors seem to have influenced the intention and usage behavior of RPA among operational employees, namely super users and managers. First, peers and the so-called super users seem to have had an important role in communicating the benefits, and creating legitimacy and acceptance towards the technology. This was seen in both cases. The following statements give such indications:

> Involving super users is usually a good way to communicate and support the implementation when we are implementing something that is a little more technical. So we selected a couple of employees from each region who are talented and whom many had confidence in (Manager 1 - Banking).

> The guy who did this process [that was robotized] probably spent about 6-8 hours on this a month, but it was the process he hated most of all. So when we managed to get this robot up and running, he was so incredibly grateful. This made him an ambassador (Robotics Relationship Manager, Robotics Supporting Unit - Insurance).

Second, the supporting units seem to have had some influence in usage, as they were involved in demonstrating the robots and providing support during the implementation stage. Third, management seemed to have an important role. A majority of the respondents agreed that the decision to implement a software robot in their unit came from the hierarchy. This view was evident in both cases and was shared among respondents at various levels within the organization. The following statements indicates this:

> It [the decision] was made at the top (Operational Employee 1 - Banking).

> I did have an influence on how it would be operationalised, but whether we should do it or not was beyond my pay-grade (Robotics Relationship Manager, Robotics Supporting Unit - Insurance).

This suggests that using the software robot was perceived as mandatory. As indicated by one of the respondents: “We have a structured way of working, and using the robot is part of our work instruction” (Operational Employee - Insurance). This was further highlighted by one of the managers.

However, in some cases usage of the software robots does not seem to have been completely mandatory. As noted by one of the project managers at the robotics supporting units, there is a two-part dialogue between the managers and the supporting units when adopting and implementing RPA. For instance, some of the members of the supporting unit highlighted that operational managers have great influence in the decision. As indicated by the product owner: “In most cases I would say that we work closely with the various team leaders and operational managers, giving them the opportunity to come with inputs.” (Product owner, Supporting Unit - CoE). One of the responding managers supported this by saying that she probably would have been able to prevent the implementation if she would not have believed in the technology.

4.4.2 Image and Status

Image and status may be recognized on several levels within an organization. On the individual level, respondents did not give any indication that the individual implemented robots per sé were associated with any status or image. The following quotes may support this: “I wouldn’t say that this specific robot was that cool really” (Manager 2 - Banking) and “Well, they [the managers] don't seem to consider RPA to be something really fancy, they just want to include it in their portfolio” (Manager 1, Robotics Supporting Unit - CoE).

However, on an organizational level, there are implications suggesting that RPA would enhance the status as the Banking Group has been striving to become more digital. A common perception among the respondents was that the Banking Group’s renomé partly is based on its ability to be digital. Efforts to enforce that image are favoured at an organizational, functional and individual level. It was noted by several of the respondents that there was prestige associated with being an innovative bank group, and RPA was perceived as a technology that would enable the Banking Group to reach that goal. This seems to have been a driving force when adopting the initial robots within the Banking Group.

In addition, there are some indications suggesting that status may have had an indirect effect on the perception of the technology among organizational members. As previously noted, the technology allows for operational employees to do more qualified tasks, which may improve the status of the profession, on both employee and management level.

> I would say that financial advice is increasingly becoming a high-end product. It has moved higher up in the segments now that the bulk product so to say, the standardized advice may be done by a robot. In cases when there is complexity, the role of the financial adviser becomes particularly important. (Operational Employee 1 - Banking)

Implicitly, this suggests that status may have had an impact on the decision of adopting the technology and may also support the continued usage of the robots within the Banking Group, both on an individual and a functional level.

4.5 Organizational Facilitating Conditions

The following section presents key conditions highlighted by the respondents. In general, all respondents seemed to agree that organizational conditions had an impact on the adoption and implementation of RPA.

4.5.1 Organizational Size

The case of the Banking Group highlights how size may have both hamperend and facilitated the adoption and implementation process. Overall, it was recognized that many of the gains associated with implementing RPA came with the size of the Banking Group, such as having many standardised manual processes, a complex legacy system and many employees performing the same tasks. However, some of these factors also seemed to impede the value creation efforts of implementing RPA.

However, the potential of reaping value was also seen to be hampered by the coordination issues that came with the complexity of the legacy systems of the firm. The technology is very sensitive to changes in the IT environment. As seen in Case B, there have been coordination issues which have resulted in a more troublesome implementation process:

> There have been several incidents when the robot has had a breakdown. It was a huge challenge for us since the robot was shutting down whenever there was a small update in one of the [IT] systems. (Risk Manager Supporting Unit - Banking).

Moreover, one of the managers from Case B emphasized how she perceived an organizational distance between her unit and the robotics units, causing difficulties in implementing the technology. She described how she found it troublesome to navigate within the organization to know who was responsible for the robot and how to report issues. As earlier noted, Case I is smaller in terms of number of employees, which according to the respondents seems to have facilitated the handling of incidents in many cases

4.5.2 Organizational Structure

The Banking Group has been recognized to have a centralized structure, although all RPA initiatives originated at various local units. These initiatives were at first not coordinated, and were at the time perceived as essential to get things started. As one manager put it: “You can say that several initiatives began in parallel. We usually refer to them as “mushrooms” as they popped up everywhere.” (Product Owner, Supporting Unit - CoE). It was recognized in hindsight that the size of the bank thus enabled these initiatives to rise locally. As the same manager put it: “It is a fairly large bank, [...] and nobody is really aware of everything that is really going on.”

Furthermore, the Robotics Relationship Manager within Case B noted that some of the local initiatives were successful, although they mainly solved minor problems. Consequently, the Banking Group sought to scale up the RPA efforts to reach greater potential. When scaling up their RPA efforts, both Case B and Case I were facing a situation where they had to make a decision on how to proceed. On the one end they could choose a decentralized model, letting each business area run its own robotics agenda with minimal involvement from the central organization, and thus letting the business own and realize the benefits. At the other end, they had the option of a fully centralized model with the aim of creating synergies by establishing the so-called Centre of Excellence, running the robotics efforts within the firm. While Case B choosed the centralized model, Case I adopted a hybrid model, combining the two. The following quote support this:

> Today there is a large robotics factory that runs a lot of the group common functions. Then there are still those business areas that have their own little robotics ability. Some of the robots develop more centrally and some of them run more locally. And I believe that the hybrid model is pretty good (Former Group Head of Robotics Strategy - Insurance)

Based on the two embedded cases it is hard to distinguish if one of the models would be more beneficial than the other. However, on a group level it was perceived as a necessity to reap the full potential and to fulfil regulatory requirements. The process of centralizing the robotics efforts was by some perceived as effortful, as the local initiatives were fragmented and had different views on how to document and coordinate RPA. With the centralized model they were able to ensure standardised ways of working that are compliant with the legal requirements of the banking sector. This in turn has enabled the larger Case B to reach scale effect and perhaps a more strategic view on what processes to robotize. Moreover, it seems as if case Insurance may have been able to cover the best of two worlds. With a hybrid structure the robotics unit of Case I has been able to benefit from these standardized guidelines, as they do not have the capacity to develop them on their own, and when necessary act on local needs.

> I mean if we had been for ourselves then we would never have been able to reach the capacity we have today. [With this hybrid model] we do not have to build everything from scratch and can use what they [the Group Centre of Excellence] have built. They can build this much faster and more efficiently than we are able to, so that is a huge advantage (Robotics Development Manager, Robotics Supporting Unit - Insurance).

4.5.3 Business and IT Collaboration

Other organizational aspects that may have affected the implementation process was the degree of IT involvement in the work with robotics. As stated in the introduction, RPA allows for quick process automation without involvement from a centralized IT department. When implementing the first robots within the Banking Group there was some controversy between IT and the business concerning different views on the technology and allocation of responsibilities, which slowed down the implementation. As the former Group Head of Robotics Strategy put it:

> IT didn't think the business function would be able to design and deploy these robots as they lacked the knowledge and experience. It is IT that has the skill to deploy new systems, not the business. (Former Group Head of Robotics Strategy - Insurance)

In the end they reached an agreement of letting the business function run RPA as they saw the value of having it closely connected to units who had better knowledge and also handled the processes that the robots were to acquire. A robot could be built much quicker if, for example, a new regulatory framework was introduced which meant significantly increased volumes. To gain value speed was important. As the Robotics Relationship Manager said:

> Robotics can easily and quickly put together a process much faster than building a new IT solution, where it takes at least 6 months to get something into production. A robot can be up and running in two weeks. (Robotics Relationship Manager, Robotics Supporting Unit - Banking)

Despite the choice of putting robotics into business, Case I seems to have had a closer contact with the IT department from the start compared to Case B. As the Robotics Relationship Manager said:

> We worked a lot with IT and asked for their assistance. We wanted to follow the same procedures as they do, even though we changed it a little bit. We did this to harmonize work and utilize synergies, etc. It was primarily about ensuring quality. (Robotics Relationship Manager, Robotics Supporting Unit - Insurance)

Case B did not appear to have had as close dialogues with IT from start, but quickly realized the value of having their support. They have therefore made sure to strengthen this relationship and collaboration. The following quotes support this:

> There were some internal problems in the beginning of getting them [IT] to inform us when they made changes in the production. Now we have a corresponding department on the IT side that helps us in the production, which has improved the situation a lot (Robotics Relationship Manager, Robotics Supporting Unit - Banking).

> We have kind of satellites also in IT, that are now fully allocated only to support robotization processes in the Banking Group. So this is also something new because in the beginning, it was only us (Manager 1, Robotics Supporting Unit - CoE).

4.5.4 Top Management Support and Engagement

Respondents from both cases stressed how the initial idea of adopting and implementing RPA was a bottom-up initiative. As earlier mentioned, these were local initiatives emerging in parallel at various units within the Banking Group. The local need was perceived as high, and it was recognized that the decision-making process at the top management level was too slow and expensive. This seems to have been particularly evident in Case B, which may have been a consequence of the fact that the bank is larger, adding the hierarchical levels and making the decision process slower. In this way, they tried to emulate the characteristics of a smaller company and test themselves. Top management engagement was thus in the initial stages perceived as low. Perhaps suggested by this quote:

> It [the decision to robotize] was made where you suffered, where you saw the need for robots. [...] As a large company, you start further down, the decision is made faster. At the top you have to make big decisions, it costs money and you wait (Robotics Relationship Manager, Robotics Supporting Unit - Banking).

Despite a perceived absence of top management engagement, there are some indications that the top management was however supporting the idea. After all, top management has an important role in guiding employees by setting a vision and strategy, which may be seen in a firm's value system. Most of the respondents seemed to be aware of the Banking Group's outspoken ambition of becoming a leading digital actor, by providing their customers with more digitized solutions and automating processes internally. The following quote may support this:

> The investments we have made to digitize during the last 10 years have been considerably larger than those made by many of our competitors (Operational Employee 1 - Banking).

Respondents also highlighted that the Banking Group had an outspoken cost-cutting agenda. Members at various levels of the organization express how the need of cutting costs have been pronounced, especially in terms of cutting administrative labor costs. These quotes may indicate this:

> Management has been very clear about the fact that labour is expensive. You have probably read about this in the annual reports and such. So it is no secret, and we hear it quite a lot. I mean, in the end I feel like the processes that are put in place are based on a thought of making more efficient flows (Operational Employee 2 - Banking)

> Already in back 2015, there was a pronounced strategy to reduce costs (Former Group Head of Robotics Strategy - Insurance).

These ambitions have been communicated internally, and laid the foundation to the Banking Group's current value system. Several of the respondents have acknowledged that the Banking Group over the years have undertaken efforts to facilitate such mind-set.

> We have moved towards a more agile way of working, which I believe have facilitated the implementation. We are no longer waiting for the large transformation to happen, instead we are to a greater extent trying to implement smaller solutions that we are content with but perhaps not perfect (Risk Manager, Supporting Unit - Banking).

Thus, it seems to have been awareness among operational employees and managers that solutions that would help support cost saving and facilitate the efforts of becoming a leading digital actor were welcomed by top management. Based on these values robotics seemed to fit well with this agenda. Perhaps suggested by this quote:

> We are to be a more leading bank in IT and technology. We are to save money and utilize and make it more fun for people to work. With the right incentives, the robots can provide all this (Robotics Relationship Manager, Robotics Supporting Unit - Banking)

Top management was supporting these local initiatives to some extent, although there does not seem to have been any clear engagement. Interestingly, there are indications suggesting that the lack of initial engagement from top management could both have facilitated and hampered the implementation process. They were given more freedom to explore the technology at the local level, which opened up faster decision-making processes and building of the competence. Consequently, the local units were able to test the technology and create a proof of concept to persuade top management to allocate more resources to support adoption and implementation of the technology. However, the lack of initial management engagement seems to have caused difficulties in coordinating and scaling up the initiatives at later stages.

Some implications suggest that top management engagement increased once the proof of concept was realized. Respondents within both cases highlighted how top management came to realise the benefits of using the technology, which was considered important to scale up the RPA efforts as suggested by this quote:

> All country heads participated and paid for this. They had to sign the contract that now we would do this and so it became. It was important, it created a "forced crowd"-attitude, everyone understood that we would do this” (Former Group Head of Robotics Strategy - Insurance).

Consequently, the RPA efforts within both cases became more centralized, which caused a clear majority of the respondents to stress that they perceived that the decision of implementing robots at their units was a decision from the hierarchy.

Despite additional support, it has been indicated that RPA still seems to be less prioritized by top management than other IT solutions, which often has resulted in issues related to RPA have been perceived as less urgent. According to one of the respondents, this is a consequence of the fact that the tasks replaced by the software robots may be performed manually. In addition, a fully-automated solution is seen as superior to RPA. Consequently, the robotics units receive less resources and attention by the top management.

4.5.5 User Engagement

User engagement has been highlighted as crucial when scaling up RPA efforts. Several respondents stressed the importance of establishing a proactive mindset among employees, where robotics is seen as a tool to solve current and upcoming problems within the bank. Perhaps indicated by the following quotes:

> To find these processes everybody at the company has to have a mindset and be aware that this is something that could eventually lead to a robotics process (Robotics Development Manager, Robotics Supporting Unit - Insurance).

> If you are to robotise a process, you must think differently and above all, you should not only think about robotics, you must think of it as one of several tools (Former Group Head of Robotics Strategy - Insurance).

Some respondents have highlighted the difficulty of creating such a mind-set and stressed that it may be a result of the Banking Group’s operations. For instance, the former Group Head of Robotics Strategy drew comparisons to start-ups and fintechs, and claimed that large traditional banks have rather reactive ways of thinking and solving problems.

> Whenever there has been a problem - we have always called the consultants who get paid to solve problems. We don't have that many people getting paid to solve problems within the bank. In contrast, start-ups are built and driven by problem solvers, and that is why they come up with new ways of doing things (Former Group Head of Robotics Strategy - Insurance).

There might be a second reason causing this difficulty in creating a proactive mindset. The middle-manager has an important role in establishing this and communicating within the hierarchy, which indicates that this role might be particularly important during the adoption and implementation of RPA. The following quote could further highlight the importance of middle-management and operational managers.

> They [the managers] must also be engaged in what the robot actually does. And that is what we have been working on for a while now (Robotics Development Manager, Robotics Supporting Unit - Insurance)

Moreover, as one of the respondents acknowledged there were some difficulties establishing the division of responsibility in regards to the robots. This was particularly evident in the early stages of the bank's initiative to robotize processes.

4.5.6 Human Resources

Despite talking about a technology that could potentially replace employees, it was recognized among the respondents that human resources may be even more important than previously thought. To capture the full potential of the technology it was acknowledged that skilled personnel is an important asset. As pointed out by the former Group Head of Robotics Strategy: “It is even more about humans than before, which may sound a little contradictory since it is about technologies and robots”. Several of the respondents also acknowledged the importance of highly skilled developers.

> I think you can say that the difference between an ok robotics developer and a damn good robotics developer is a factor 10. I would say that it takes half a year's experience to become a really good one (Former Group Head of Robotics Strategy - Insurance).

When the bank initially adopted the technology, respondents from both Case B and I recognized that the firm was lacking the required competence in-house.

> We hired external IT consultants to help us. They trained us and helped us to build up the methodology itself and also the organizational structure and operations strategy itself. The leading consultant was employed by us (Robotics Relationship Manager, Robotics Supporting Unit - Banking)

The first years of experimenting with the technology and implementing the first robots were considered important for both organizations in order to learn how to build robotics scripts and to enable a process. This realization was acknowledged early on, although strengthened over time. This was seen as an important skill-set when RPA was scaled up within the organization.

Apart from highly-skilled developers, it was also recognized that an understanding of the operations is a key skill to reap the full value of the technology. As indicated by one of the supporting managers: “It is incredibly important to have knowledge of the business to be able to understand and troubleshoot the processes in which they work.” (Robotics Relationship Manager, Robotics Supporting Unit - Insurance). Consequently, personnel from the business and IT department were hired within both case B and I to the robotics units. Two types of operational knowledge were highlighted as particularly important in order to capture the value. First, detailed knowledge about the process to be robotized. Such knowledge is mainly provided by a subject matter expert. Second, a general understanding of the operations in terms of strategy, level of investment and need of change. This kind of understanding is usually held and provided by an operational manager. As highlighted by one of the managers from the centralized robotics Centre of Excellence, the manager needs to contribute with such knowledge.

> When we have started the dialogue with the unit seeking to robotize a process, the managers have said 'okay, it is really good that we are emphasizing this process for this team, although I think it would be good to involve other units as well'. We [the robotics team] do not make such assessments ourselves, although we involve others to the project if needed. (Manager 1, Robotics Supporting Unit - CoE)

It was also recognized by some of the respondents that the required skill-set changed slightly as RPA was scaled up within the organization. The importance of developers ability to design high-quality software robots were still important, although skills related to maintenance, i.e. handling of errors in the software robots were now crucial. Respondents from the robotics units in both Case B and Case I recognized the importance of establishing routines and skills related to maintenance before there are too many robots up and running to reduce costs. For instance, one of the CoE managers indicated that the bank was perhaps too eager at creating new robots, which caused additional maintenance costs.

4.5.7 Processes for Knowledge Transfer

The technology is subject to a lot of dependencies that can make the robot stop working, and is thus considered less reliable than other applications such as the Microsoft Office package . Due to the robot's sensitivity to changes in its environment, successful adoption and implementation process of RPA requires efficient knowledge transfer from various units such as operations, robotics, IT and legal. Based on our findings we recognize that there have been several issues related to this. First, coordination problems have caused insufficient knowledge transfer. Second, there have been issues related to misunderstandings both among individuals and units. This has in turn been seen as impediments in the Banking Group's efforts to capture the value of RPA.

All respondents seem to agree that communication between the various units has been incredibly important throughout the implementation process. At the very early stages the misconceptions about the technology seemed to cause some initial fear or scepticism among employees. Thus, formal and informal communication channels were established to transfer knowledge about the technology in order to reduce fear. Efforts were undertaken to involve managers and the end users early on to tap into their knowledge about the business operations. For instance, in both cases the robotics units informed users about the technology during meetings and workshops, and asked the employees for potential processes to robotize. This was considered important knowledge when the robots were later designed. Comparing the two cases it seems as if the respondents in Case B have found it slightly more challenging to tap into the knowledge from the operational units. For instance, one of managers at the group's robotics unit described how he noticed some resistance among managers and users.

> [I noticed that there was an] unwillingness to help and provide us with suggestions for new robots. Most often, the managers have good ideas and suggestions, but it is the employees who have the knowledge. They are doing the real work and that is why we want the suggestions to come from them. (Robotics Relationship Manager, Robotics Supporting Unit - Banking)

A way of closing the distance between the robotics unit and the business was to establish new roles such as Robotics Relationship Manager, who were set to have close dialogue with the operational managers. Moreover, respondents from Case B and supporting units also described how the implementation of RPA has been associated with some challenges due to communication and coordination issues.

> Much of the supporting staff, mainly within IT, are positioned far from the daily operations and scattered across various countries. This means that we do not always understand each other correctly. For instance, there have been situations where the knowledge barriers have made coordination efforts effortful [during the implementation process of our latest robot] (Risk Manager, Supporting Unit - Banking).

> There have been cases when the managers have gotten back to us, dissatisfied with the performance of the robot. A lack of understanding on the business side sometimes creates additional challenges. The business side could say the same thing about us, that we at the robotics unit do not have the sufficient understanding of business processes. That is true as well. We are all in a constant learning cycle, where communication is key (Manager 2, Robotics Supporting Unit - CoE).

Highlighting this issue further was one of the users who acknowledge that she have perceived issues in coordination among the various units during almost two years now:

> We have understood that it is two different teams who develop the tool and who develop the robot, so sometimes they develop the tool without considering that it might affect the robot in some way. [...] We have been at it since 2018 with this robot and it's the same problem still, so I don't really know why these teams haven't learned to communicate with each other. (Operational Employee 2 - Banking)

However, there seems to have been various efforts to support knowledge transfer within the organization, which seems to have facilitated the adoption and implementation process of RPA. For instance, respondents at the supporting units described how they undertake efforts to close the distance between the various units in order to keep maintenance costs low.

> [I would say that] we are close to the business. We try to improve the relationship wherever we can. We are not an anonymous group of people or some remote service desk. We are available to help, discuss and work on improvements, new solutions etc.. With robots being a combination of business process and technology, we know that collaborating very closely with the business is crucial at all stages of automation: pipeline, project and production [i.e. when the robots are up and running] (Manager 2, Robotics Supporting Unit - CoE)

> Today we have more people involved from the very beginning, which allows us to predict many things and change the way we behave. Like I mentioned before, many things are constantly changing and we need to be updated on that. It's more sufficient to work in this way, from an RPA perspective (Manager 1, Robotics Supporting Unit - CoE)

One of the respondents from the robotics unit further highlighted the importance of having the right skillset, by explaining how rotation of staff internally has caused problems in the later stages of implementation. She highlighted how there must be employees close to the operations that are educated on how the technology works and when the robotics team needs to be involved in order to ensure that the robot is running smoothly and thus minimize costs. The following quote tries to highlight this:

> One month we could have one Subject Matter Expert, but in the next month this person could have moved to another department or just simply left the bank. When this has happened we don't have a point of entry - a person that knows the robot and how it behaves. The business needs to find a new person that we can educate to enable essential communication (Manager 1, Robotics Supporting Unit - CoE)

Moreover, one of the respondents from Case I further highlighted how they have come to realize that the unit initially put too little time and effort into ensuring that the developed skill-set was spread and retained within the organization.

> In hindsight, it would have been beneficial if we had established formal processes from the start, to spread and retain the competence about robotics within the business, but perhaps most importantly to establish formal roles and responsibilities. (Robotics Development Manager, Robotics Supporting Unit - Insurance)

This was considered important in order to capture the full value of RPA in future implementation processes. In order to overcome this challenge processes were put in place.

4.5.8 Cost Allocation

It was acknowledged in both cases that initial investments of RPA were reported as overhead costs. The costs were thus distributed among several units, not shown in the budget. None of the respondents perceived that the distribution of costs have affected the implementation process. However, a cost that seems to be noticeable and of great importance among the respondents was the maintenance cost. Within both units it seems to be an agreement that such costs were initially neglected. The business case of adopting and implementing one or a few software robots seems to have been obvious initially, although the burden of the maintenance costs may actually hamper the attempts of creating value.

4.6 External Conditions

The Banking Group highlighted factors in the external environment that may have affected intention and usage behavior of robotics and thus the adoption and implementation of RPA, These factors may be summarized under the two concepts industry characteristics and legal requirements.

4.6.1 Industry Characteristics

In terms of industry characteristics, some respondents claimed that the initial decision of implementing RPA was hastened by a prevailing digitalization trend and increased market competition. The Swedish banking sector has been recognized to be highly concentrated, but has in recent years experienced increased competition by smaller fintech companies providing highly digitized solutions to the market, putting pressure on market incumbents such as the Banking Group. As indicated by the former Group Head of Robotics Strategy:

> We could feel the external pressure, especially as we were seeing a digitalization trend was putting pressure on the market. This in turn put pressure on the bank to become more digital and RPA was seen as a way of increasing our skill-set within that area (Former Group Head of Robotics Strategy - Insurance).

From a strategic point of view, some respondents acknowledged that RPA was a means for the Banking Group to fend off smaller competitors in favour of the Banking Group's position as a market incumbent.

> I would say that the entry barriers are increasing. With the robots we are able to collect and process data in a more efficient manner. They can collect data while I (as an advisor) am sleeping. I would say that the market has and will become even more concentrated (Manager 2 - Banking)

Combined, the digitalization trend and increased competition seems to have caused pressure on adopting and implementing RPA. Thus, one may argue that RPA was not only seen as a tool that would prevent the Banking Group from falling behind, but also a strategic tool to act on future competitors.

4.6.2 Legal Requirements

In addition, perceived governmental pressure was also seen among some of the respondents as a facilitating condition. Over the last decade the banking sector has faced increasing pressure from governments and media to undertake efforts to counteract financial crime. As one of the respondents noted, the damage of not following such regulations is threatening the existence of actors within the industry. As earlier noted, RPA may reduce the operational risk and be configured to respond to regulatory requirements. Thus, some of the respondents noted that the governmental regulation has facilitated the adoption and implementation.

> As a bank we are heavily regulated and policy driven, which by definition is almost the opposite of data driven. Robotics on the other hand is rule-based, and that is why it suits banks very well. (Former Group Head of Robotics Strategy - Insurance)

Moreover, common within the banking sector is the imposement of new regulations that require a collection of large sets of data. As noted by several of the respondents, the perceived regulatory pressure has facilitated the implementation of individual software robots.

> There have been cases when initiatives from the government and other authorities have put pressure on us to deliver information by a certain date. In such cases we have been able to develop software robots to satisfy that need quickly (Robotics Relationship Manager, Robotics Supporting Unit - Banking).

However, the regulatory environment of the banking sector has also been recognized among the respondents as an impediment of scaling up the RPA efforts within the bank. For instance, one of the respondents highlighted how there are major differences in the regulatory environment across geographical markets, which hinders standardisation of processes across countries. This becomes an impediment of RPA, since the technology requires a high degree of standardisation in the processes.

> We have harmonized it [IT and regulations] in Sweden, but it differs between countries and that has led to the robots being calibrated in different ways. That is why we've had a project group in every country for this, which makes it a little more complex (Manager 1 - Banking).

4.7 The Multifaceted Concept of the User

An interesting finding was how respondents did not seem to reach consensus on who the user of RPA is. In our tentative framework we did not include the user as a construct per se, although our findings bring attention to the question. Here, we initially thought that both operational staff and managers were users of the technology, as both seem to come in direct contact with the robot in their daily work. The remaining respondents were not thought of as users, although important actors in the adoption and implementation process that would enable us to gain a deeper understanding of the organizational context. However, the user construct may be slightly more complicated in the case of RPA. Based on our findings we recognize that the concept of the user may be understood at three levels: the individual operational employee using the output data, the customer and the business function.

Many of the respondents perceived the user to be the individual employee, who uses the output provided by the software robot. This was a common notion among operational employees at various hierarchical levels. Such individuals could be for instance back-office staff, analysts and advisers, that in their daily work send requests and/or use the information provided by the robot. What tasks the robots perform may differ. For instance, one of the respondents described how the robot used in the back-office function collects information about a customer, in this case it could be a retail group, and then transforms it into a document that serves as a basis for a risk assessment. When done manually, this process entailed searching through various data systems and compiling the information, which was a very tedious task especially as it entailed matching various references with a large number of transactions. Based on this information an anti-money laundering risk assessment was made. With the robot in place a request is sent to the robot that collects and summarizes the data in an excel-file, which is used to make the assessment. Another example is how the insurance adviser uses it as a support in their daily tasks:

> I would say that in our case, [the users] there are mainly insurance agents working in customer service. [...] What they [the insurance officers] do is, above all, to use this output, i.e. these different reports that the robot produces. The main task of the insurance officer is to take care of everything that the robot cannot handle, we call these business exceptions. This mainly entails checking an excel file to get an overview of the case. Based on this information the insurance officer takes action. In some cases, they also have to make sure that the input data is available to the robot. Although, most often this is also automated but in some cases they need to make sure that there is an input file for the robot to handle. (Robotics Development Manager, Robotics Supporting Unit - Insurance)

In some cases the respondents recognized how the end-customer may be a user of RPA. This follows the notion of viewing the individual using the output from a robot as the user. Here some of the respondents referred to a specific robot, that provides digital advising services to customers on the Banking Group's web page. However, this was rather the exception since most robots are used internally without any handling or contact with the customer.

> Apart from our robot adviser [available at the webpage] there is no robot that the end-customer comes in direct contact with. (Robotics Relationship Manager, Robotics Supporting Unit - Banking)

This is indeed an important finding since the adoption and implementation of both internal and external robots has been made in attempts to create value for the organization. However, it also adds complexity to the user concept, as the characteristics of an employee and a customer in this context differ. The employee is part of the organization adopting and implementing the robot, and is getting paid to behave in relation to it. This is not the case with the customer, which implies that there may be differences in how they use and behave in relation to the software robot. Considering the intra-organizational perspective of this thesis, we will take an internal view and explore the perspectives of organizational members. Further investigation of the differences in the characteristics of the internal and external user of RPA is a topic for another thesis. Thus the notion of an external user, i.e. the customer, will not be covered any further.

This leads us to the third level of the user concept, namely the business function. Some respondents recognized the business function as the user of the technology, which indicates that conceptualizing the user as an individual employee may be too narrow. As pointed out by one of the managers at the supporting unit: “I would say that the business function is the user. We [the robotics unit] do not benefit from using the robot” (Manager 2, Robotics Supporting Unit - CoE). The following statement further indicates this:

> The business function is the user, and it is the business that should run it. When the business has a problem and discusses how to solve it, RPA should be seen as a potential tool to solve that problem. (Robotics Relationship Manager, Robotics Supporting Unit - Insurance)

This perspective is based on the idea that the business is undertaking the processes that the robot will replace, and depending on what process is robotized, the user might differ. It is thus a tool that supports the business, and may be applied and solve various problems.

> We [the robotics unit] provide our services to various business units within the bank, such as Personal Banking, Business Banking, Financial Crime, Wealth Management etc. The variety when it comes to processes or user interfaces is huge (Manager 2, Robotics Supporting Unit - CoE).

Adding another layer of complexity to the user concept is the manager's role. Even though the manager may not him- or herself use the data collected from the robot, the manager is a benefitter of the robot. A common way of understanding the technology and how it may be used is to compare it with an employee that performs a certain task. The manager has an important role in the usage of the robot.

> You can compare the robot to a regular employee really. That is you have a role, a task, a standard operating procedure or work description that you run (Former Group Head of Robotics Strategy - Insurance).

> It mimics a human, it's a virtual machine, it's not a physical thing at all. (Manager 1, Robotics Supporting Unit - CoE)

As noted, the technology may be seen as an application or a tool which may be configured to perform various tasks. Thus, one could argue that RPA is an additional resource that the manager could directly benefit from. This is indicated by the former Former Group Head of Robotics Strategy, who claims that:

> You could imagine having 100 summer interns allocated to our unit and then what would you do? Well, they could perform many simple tasks that are rule-based. These are the types of tasks that the robot can perform and with simple instruction you can free up time. And then what do you do with all the extra time the employees gain? Well, then they are free to do other things (Former Group Head of Robotics Strategy - Insurance)

Moreover, the manager has an important role in specifying the requirements in terms of functionality and output goals of the robot. The following quote is further highlighting the role of the manager:

> Thanks to this new role that I have as relationship manager, we have started to have performance reviews just like with the co-workers. I hold a performance review with the manager for a robot to see how it is going. The review is done through the manager, as it must be a manager who owns the robot. It has to do with every robot having a user-ID. In this way it could be that a unit has 10 co-workers and 2 robots (Robotics Relationship Manager, Robotics Supporting Unit - Banking)

Apart from the individual user and the manager, there are other supporting units within the business function that may indirectly benefit from RPA adoption and implementation. Such units are for example the various robotics teams. Within those teams there are developers, controllers, analysts and other supporting staff who participate and contribute to the design, implementation and maintenance of the software robots within the Banking Group. Consequently, they have an important role in the adoption and implementation process of RPA. As argued above, the individual employee may directly benefit from the technology in terms of increased job satisfaction and productivity gains. However, both managers and employees within the business functions do not directly use the technology, although they indirectly benefit from the value that is created for the business function as a whole.

Consequently, the user concept should in this case be seen as a collective of various stakeholders. As noted, there is an important distinction to be made. First, there are members of this collective that could directly benefit from the output if the robot is successfully implemented. These are individual operational staff and in some cases the managers. The individual operational employees send a request to the robot and benefit from the output provided by the robot in their daily tasks, whereas the managers could contact the robotics unit to configure a robot that will solve a particular problem at hand. In this way it may be seen as a tool that the manager has to handle for instance peak periods. The manager could also be seen as an indirect benefitter when his/her team members are using the output of the robot and thus reaching performance gains for the department or business function. There are also other members of this collective that benefit from the robots in such indirect manner, such as the supporting units of the business function. Together these various stakeholders may create a new concept, a so-called collective-user.

5. Discussion

In this section, we will discuss our empirical observations listed above in relation to theory on IT adoption, the objective being to match empirical patterns with the theoretical patterns (Yin, 2009). First, the user concept will be discussed, comparing empirical findings with existing literature. The concept of the collective-user will be established. This will be followed by a discussion of the constructs making up our final framework. The chapter will end with an illustration of the revised adoption and implementation framework of RPA.

5.1 The Concept of the User

As recognized at the outline of this thesis the committed use of a new technology is essential to capture the value of IT investments. Previous researchers have long recognized that the impact of information systems on the firm's value creation is depending on the degree to which users directly interact with the system at hand (e.g., Davis, 1989; Devaraj & Kohli, 2003; Venkatesh et al. 2003), making it the dominant logic in the literature. As explained in the method section, we set out to study adoption and implementation at multiple-levels, by both recognizing the committed use at the individual level and organizational level. Thus, the contextual factors were added to bring further attention and capture the phenomenon at multiple levels. When initiating this study we recognized that the aggregated individual usage behavior would play an important role in the adoption and implementation process of RPA and thus also the firm's ability to create value. We thought that both individual operational staff and managers would directly use the output of RPA in their daily tasks. This follows Devaraj and Kohli's (2003) conceptualization, suggesting that usage at an organizational level is the aggregation of individuals' direct usage of the system. However, the Banking Group has helped us realize that the user concept may be more complicated than initially thought and that RPA technology does not follow such conceptualization. Thus, our tentative framework did not fully capture the importance of the user concept and how it may affect how value is created in a firm.

Importantly, by studying the adoption and implementation process we have come to recognize the importance of indirect use. As recognized in the case, members across the whole business function may benefit from RPA without direct usage of the output provided by the software robot. For instance, RPA may be seen as a tool that the business function may configure to solve current challenges, such as peak periods or imposed regulations on the collection of customer data. A manager may thus benefit from the information collected by the robot, without ever coming in direct contact with the technology. The indirect use of information systems is not a new phenomenon as it has previously been identified within the literature. For instance, Kramer, Danziger, Dunkle and King (1993) define direct users as one that makes decisions based on system output and an indirect user as one that uses the technology through other people. This follows the idea that information is valuable to the degree that it can be transferred and applied to a specific situation (e.g, Choudhury & Sampler 1997; Grant 1996). Information may thus be transferred from a system to those who need it by other mechanisms than direct use. Since users interact both with each other and with non-users to undertake their work related tasks, the interpersonal relationships are important for information transfer. These relationships are used to transfer information to, from and/or about the system they use and interact with (Lamb & Kling, 2003). Thus, the influence of the adopted technology on organizational outcomes may be a consequence of more than the direct interactions between users and information systems.

The impact of organizational outcomes is thus not only depending on the dyadic interaction between an individual and a single system. Leaving it at only recognizing indirect use does not fully capture the concept of the user. Instead, the impact of RPA on organizational outcomes is dependent on the interplay between both digital and social networks. Thus, if the full value of the system is to be captured, the members of the whole collective needs to be structured to benefit from the system, not only direct users. This notion of a network of users has been recognized by authors such as Kane and Alavi (2008), who recognize that usage should be seen as the network of multiple users and multiple systems (including both communication support such as email and instant messaging, and information management support systems). This conceptualization is powerful, although for the purpose of this study we leave it to the interaction between direct or indirect usage of one or several software robots. It should further be noted that the idea of the individual user does still have some explanatory power and is not necessarily wrong. The direct user still plays an important role in how value is created in firms. Although, it is indeed a too narrow conceptualisation when seeking to understand the committed use of RPA.

Thus, before revising our tentative framework we want to establish the concept of the *collective-user* of RPA. We define it as the collective of direct and indirect users that benefit from the direct or indirect usage of a single or a cluster of software robots. A direct user is one that directly interacts with the technology and its outcome, whereas an indirect user is one that uses RPA through other people. This conceptualization is illustrated in Figure 5.1.

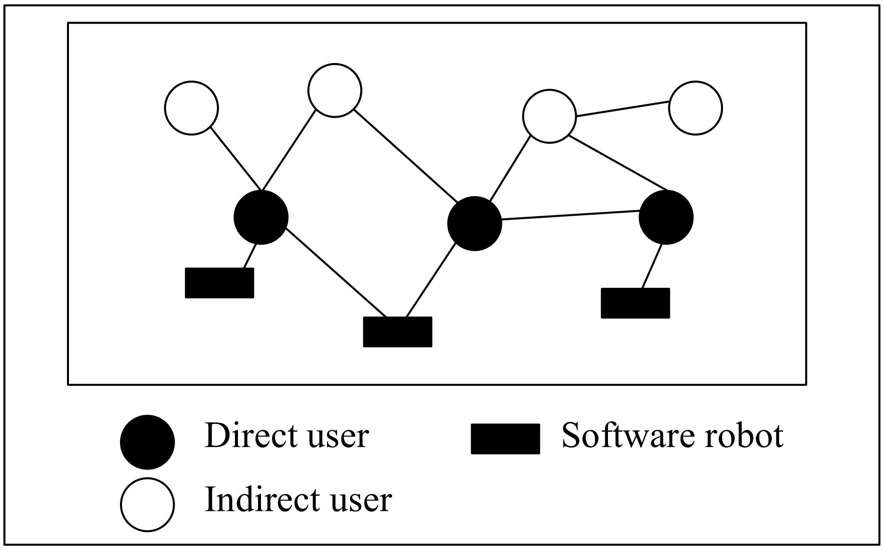

Figure 5.1 An illustration of the collective user.

With this conceptualization in mind we will now revisit our tentative framework. We will thus both recognize if the function of each construct will be the same at a direct user-level and at the collective-user level. This has been recognized as important when seeking to theorize a multi-level construct such as the one highlighted here (Morgeson & Hofmann, 1999).

5.2 Performance Expectancy

The construct *performance expectancy*, i.e. "the degree to which an individual believes that using the system will help him or her to attain gains in job performance" (Venkatesh et al., 2003, p. 447), has helped us realise the perceived benefits of using the technology. More specifically, the Banking Group showed us that productivity gains, increased job satisfaction, a competitive edge in digitalization, reduced operational risk and increased customer satisfaction were perceived as important performance gains that contributed to the intention and usage behavior of RPA. Thus, the intended function of the construct is the same for the user and the business function, that is to attain performance gains. At least on a general level. However, having the collective-user concept in mind, the expectations seem to have varied slightly between the various respondents. Perhaps unsurprisingly, benefits in terms of job satisfaction seems to have been more important for the direct users (i.e. operational employees), whereas the indirect user in the business function seemed to have cared more about the other gains. Thus, even though the structure of the construct differs, one could argue that the function of it is the same at multiple levels. In order to adapt the definition of the construct to fit a multiple level, we propose it be refined to "the degree to which the *collective-user* believes that using the system will help attain gains in job performance".

In our tentative framework, we assumed that the sub-construct of *communicability,* i.e. "the degree to which aspects of an innovation may be conveyed to others" (Tornatzky & Klein, 1982, p. 36) would be particularly important in the case of RPA, as we recognized that there might be some initial fear associated with the technology in terms of job loss. As seen in the case, it seems as if the users understanding of the limitations of RPA has overcome some initial fear and facilitated the committed use of the technology. However, based on our findings it is difficult to distinguish if it was the sub-construct *communicatibility* or rather *relative advantage,* i.e. "the degree to which an innovation is perceived as better then the idea it supersedes" (Rogers, 2003, p. 15) that resulted in committed use. In this case, it seems as if it did not help us to divide the concept of performance expectancy into smaller constructs. Thus, we recognize that Venkatesh et al.'s (2003) synthesisation into the construct of performance expectancy is appropriate.
Performance expectancy was found by Venkatesh et al. (2003) to be the most important predictor of intention and usage behavior. As a result of our method selection, we have not been able to ascertain whether performance expectancy was the most important factor. However, there are some clear indications that the expectations of the technology have been important. According to Venkatesh et al. (2003), performance expectancy is a direct determinant of intention to use a technology and that intention combined with facilitating conditions will result in usage behavior. In this case, expectations on performance appear to have resulted in continuous usage. Even though some robots did not work properly, respondents expressed that they wanted to continue using the robot because of the many benefits it could bring. Thus, the construct of performance

expectancy has indeed been important in both the adoption decision and the implementation process of RPA.

5.3 Effort Expectancy

Among direct users, the complexity of the technology was perceived as low, which seems to have facilitated the intention and usage behavior. Consequently, the construct *effort expectancy* (Venkatesh et al. 2003) seems to explain usage at the direct user-level when analysing the adoption and implementation process of an isolated software robot. However, as noted in the Banking Group, RPA is not only limited to the adoption and implementation of a single software robot, but should also be seen as a group of software robots or applications that may be configured to perform various tasks. This adds complexity to the technology, which was not evident from the direct user's perspective, but highlighted by indirect users from the business function. This complexity seems to have impeded usage, and thus value creation, due to unexpected maintenance costs when RPA was scaled up. This leads us to believe that when seeking to understand how value is created in the adoption and implementation process of RPA, the effort expectancy construct cannot be applied only to the direct-user.

Moreover, in our tentative framework we thought that the sub-construct of *trialability* (Rogers, 2003) would help us understand the committed use of RPA, since the technology was recognized to allow for small scale testing before implementation. This was in turn thought to enhance the intention to use and thus also committed usage of software robots. The RPA technology does indeed allow for testing, although our findings made it clear that it is rather if and how the tests were undertaken that matters. We thus argue that in the case of RPA, testing is rather an organizational facilitating condition, than a sub-construct of effort expectancy. As noted in the case, there were large discrepancies in how testing of the technology was undertaken, which has affected the firm's ability to create value. It should thus be recognized in the framework as an organizational facilitating condition closely related to experience. Again, we recognize that Venkatesh et al. (2003) synthesisation and conceptualization holds, after adjustments for the user-construct have been made.

5.4 Social Influence

This study gives some indication suggesting that the construct of *social influence*, i.e. “the degree to which an individual perceives that important others believe he or she should use the new system” (Venkatesh et al., 2003, p. 451) has been of some importance. The construct of social influence has been recognized by Venkatesh et al. (2003) to be of importance in a mandatory setting. Based on our findings, the usage of RPA was perceived as mandatory among direct users. Furthermore, Venkatesh et al. (2003) suggest that in a perceived mandatory setting, such as the one seen in the Banking Group, social influence should be recognized as particularly important in the early stages of experiencing the technology.

As seen in the case, top management and peers (appointed as so-called super-users or subject matter experts), seemed to have had an important role influencing the intention and usage behavior at the direct user-level. Top management seemed to have an important role in providing legitimacy for implementing RPA, while the super-users had an important role in both highlighting the benefits of the technology (i.e. providing legitimacy) and providing support on its various functions during continued usage. In addition, the supporting units also demonstrated the software robots and provided support, which seemed to have facilitated adoption and committed use. The empirical findings of this study seem to go somewhat in line with the findings of Karahanna, Straub and Chervany (1999), suggesting that top management had an important role in influencing potential adopters, whereas peers and local computer specialists are perhaps more important influencing continued usage.

Moreover, our empirical findings on the importance of image and status in relation to RPA seems to be less evident. The decision to adopt the technology among operational staff and managers does not seem to enhance the status or image at the individual level. Although, image may have had some effect on the continued usage of the technology as it enables the employee to undertake more complex and advanced tasks. Indirectly, this would suggest that the image of an adviser, back-office personnel or other would be enhanced. As noted by Venkatesh et al. (2003), image had an impact on usage, not intention to use. This would imply that the construct of image may be applicable when seeking to understand how value is created when adopting and implementing RPA.

Recognizing the indirect usage of RPA does however add complexity to the construct of social influence. For instance, Venkatesh et al. (2003) conceptualization of social influence only recognizes the construct at an individual level, but doesn't deal with collectively exerted influence. Following this way of reasoning, it is of importance to understand how social influence is exercised in the whole social network of direct and indirect users. Another aspect adding more complexity is how some individuals among the collective-user may find it voluntary (e.g., managers) while others will not (users). Within the scope of this study, we recognize that this is a topic for further studies. Taking a social network perspective on human resource management may be a fruitful area for further research (e.g., Brass, 1995). The construct of the collective-user has helped us shed light on the fact that Venkatesh et al.'s (2003) conceptualization of social influence may be too narrow. Thus, we propose the current definition to be refined to "the degree to which the individuals making up the *collective-user* perceives that important others believe he or she should use the new system".

5.5 Organizational Facilitating Conditions

As anticipated at the outset of this thesis, the organizational conditions have both facilitated and impeded the adoption and implementation process of RPA. As noted in our tentative framework, the organizational and technical infrastructure supporting the process is important. This followed Venkatesh et al. (2003)'s conceptualization, suggesting that it exists to support usage. In the case it was recognized that the IT infrastructure had an important role. Above all, it created a need for the technology and was an important aspect in supporting usage. This implies that IT infrastructure should remain in the framework, as it is an organizational factor that helps understand how value is created. Based on our empirical findings we also recognize that processes for knowledge transfer, top management support, support from operational managers, organizational size, structure, and resources were the most important organizational facilitating conditions.

5.5.1 Top management support

Top management support has been one of the most used predictors of IT adoption by organization (e.g., Jeyaraj, Rottman & Lacity, 2006). As earlier noted, top management seemed to have had an important role in providing legitimacy towards RPA. However, top management did not seem to have had an active role in the implementation process. Authors such as Jarvenpaa and Ives (1991) made the distinction of *executive participation* and *executive involvement*. Accordingly, executive participation refers to senior management's personal interventions in the management of IT, which involve for instance information system planning, development, and implementation. Executive involvement is rather reflecting the degree of importance placed on IT. In such cases, senior management will not take a hands-on role in managing IT. Instead, senior management views IT as contributing to the firm's success. Following this line of reasoning, we found in the case of the Banking Group that executive involvement was sufficient to create value in the adoption and implementation process of RPA. We thus want to add executive participation to our framework, although we also recognize that this calls for further research since we cannot fully clarify to what degree executive involvement would be necessary.

5.5.2 Middle-management and Operational-management Support

The empirical findings also suggest that managers at all hierarchical levels have an important role in creating value during the adoption and implementation process of RPA. Managers seem to have an important role in recognizing the potential areas for applying RPA, providing a strategic perspective when developing the software robots and ensuring that the software robots meet the expectations. As noted by Ciborra (1994), change progresses within an organization as a response to senior management's induced behavior and as a response to changes in the local environment, which further confirms their importance. Managers have an important role in translating board corporate objectives so that operational managers may operationalize them and provide top management with an overview of what the operational business may achieve (e.g Burgelman, 1983; Ciborra, 1994). In particular, middle-management's role in the adoption and implementation of IT has not been a well researched area within the IT-adoption litterature, although it has been recognized as a promising stream for future research (Jeyaraj, Rottman & Lacity, 2006). We thus want to add this concept to our framework.

5.5.3 Structure and process for knowledge management

The Banking Group highlighted the importance of knowledge transfer during the adoption and implementation process of RPA. To fully capture the value of RPA, there need to be processes and structures in place to tap into the knowledge from various units and individuals, in an ambition to learn from each other. As seen in the case, the IT function, robotics units and operational units need to cooperate and share knowledge in order to optimize the RPA efforts. When recognizing the collective-user, the importance of establishing processes and structures for knowledge transfer becomes perhaps even greater. We therefore suggest that processes for knowledge transfer should be added to the final framework.

To gain further insight in this, knowledge transfer theory is a promising field since it seeks to explain factors that drive or impede transfer of knowledge, and commonly recognizes cognitive factors (e.g., tacitness, causal ambiguity and absorptive capacity), organizational factors (e.g., structure and corporate management control routines) (e.g., Szulanski, 1996; von Hippel, 1994) and to some extent also motivation (e.g., aspirations to transfer) (Kalling, 2003). Our findings implies that all three factors have been of importance. For instance, RPA seems to be associated with some complexity, which seems to have increased the difficulty of communicating between the robotics units and operational staff. First, clearly established communication channels and cross-functional teams seem to have been important to increase knowledge sharing and learning. Second, the motivation among members of the operational staff and middle managers to engage in efforts of knowledge transfer seems to some extent have affected the implementation process. How these factors interrelate and affect the knowledge transfer during the implementation process of RPA is indeed a topic for further research.

5.5.3 Resources

When developing the tentative framework we recognized the importance of knowledge and competence. We did however not clearly specify what resources would be of particular importance. Among practitioners, RPA has been described as easy to apply, not requiring highly specialized IT skills (Lacity & Willocks, 2018). However, to capture the full potential of RPA, the Banking Group indicated the importance of technical knowledge and an understanding of the operations, throughout the entire process. Similar to the findings of Fichman and Kemerer

(1999), the case showed the importance of managerial and technical skills at the implementation of technologies, which was achieved through a learning process. Moreover, as seen in the case, user involvement enabled better designed robots, which was seen to reduce maintenance costs and increase the level of acceptance among direct users. This highlights the importance of time as a resource. Thus, the importance of resources, particularly human resources and time, is something we want to strengthen in our final framework.

5.5.4 Organizational Size and Structure

Within the literature there is an ongoing debate on how size affects the adoption and implementation of new technologies. While some suggest that adoption and implementation would be easier in larger firms (e.g., Zhu, Kraemer & Xu, 2003), others suggest that it would be more difficult (e.g., Nord & Tucker, 1987; Zhu et al., 2006; Zmud, 1982). Our findings are inconclusive, and we cannot provide any certain answers to this question. As noted by Rogers (2003, p. 411), size may be recognized as a "surrogate measure" in the sense that it is unclear what is actually included. This was also the case here, as we find it difficult to discern how the firm size has affected value creation. We did see indications that it did not affect the decision to adopt the technology as both the embedded cases adopted the technology despite large variances in size. This finding goes in line with what Chong and Chan (2012) noted in their study. The potential gains of adopting RPA and thus opportunities for value creation are greater the more manual processes the firm has, which often is a consequence of being a large firm. However, a larger company may also come with a higher degree of coordination issues, which could have a negative effect on implementation. Successful implementation thus requires coordination among many subunits and systems, which became more challenging in the larger division of the Banking Group. Thus, it is hard to see the total effect of this. These findings are similar to other studies on IT adoption and implementation, such as Zmud's (1982) study on software practices and Zhu et al. (2006) study on e-business, who argue that the implementation becomes more difficult since large firms to a greater extent experience fragmented legacy systems and entrenched organizational structures. In addition, the findings shed light on the importance of a structure with close ties between the IT and business function.

On a related note, structure has been recognized as having an impact on the adoption and implementation process. The Banking Group helped us realize that the decision to adopt RPA is facilitated with a decentralized structure, although the implementation stage rather benefits from a more centralized structure. The findings are similar to other studies such as the one by Grover and Goslar (1993), who found that a decentralised structure facilitates adoption whereas a centralized structure facilitates the implementation. This also seems to have been evident in the case of the Banking Group as they scaled up their RPA efforts and sought to make robotics a more integrated technology within the firm. However, the case also highlighted that an implementation of RPA may not benefit from a completely centralized structure. The dynamic nature of the technology, and importance of engaged users in the whole collective-user system would imply that some degree of decentralization may be beneficial during the implementation process. To sum up, our findings in terms of size are inconclusive, although we recognize its effect on implementation and adoption process. We thus want to highlight its importance in our final framework, although further investigation is needed to assess to what extent. Also, the degree of centralization seems to have implications for the adoption and implementation, why it is included in the framework.

5.5.5 Cost

In our tentative framework we recognized that cost would be an important construct, as IT investments often are associated with large capital investments. Tornatzky and Klein (1982) deemed the construct as one of the most important factors when studying IT adoption and implementation, and recognized it to be negatively related to the adoption and implementation of the innovation. As seen in the case, the RPA technology could be acquired at an incremental cost, allowing the adoption and implementation of RPA emerge at local units. This was recognized as an important facilitating condition when adopting and implementing the technology.

5.6 External Facilitating Conditions

The Banking Group helped us realize that there are two main factors in the external environment that seems to have affected the adoption and implementation process of RPA, namely industry characteristics and legal requirements. Other studies on IT adoption seem to show similar results (e.g., Chong & Chan, 2012; Kamien & Schwartz, 1982).

Legal requirements seem to have facilitated the adoption of RPA, but in many cases hampered the implementation and upscaling of robots in the business. This is particularly interesting considering it goes against Zhu, Kraemer and Xu (2003) who point to the fact that companies operating in strictly regulated areas have low IT adoption. This could indicate that adoption of RPA is positively affected by governmental regulation. The technology does however seem sensitive to the rapid changes in legal requirements which makes implementation more difficult.

5.7 The Adoption and Implementation Framework of RPA

The discussion above leads to a revised framework of adoption and implementation of RPA, summarized in Table 5.1. When necessary the definitions have been adjusted to incorporate the collective-user.

Table 5.1 The adoption and implementation framework of RPA

Constructs	Definition	Examples
Performance expectancy	the degree to which the *collective* believes that using the system will help attain gains in job performance	- Productivity gains - Increased job satisfaction - A competitive edge in digitalization - Reduced operational risk - Increased customer satisfaction
Effort expectancy	the degree of ease associated with the *collective* use of the system	
Social influence	the degree to which the individuals making up the *collective-user* perceives that important others believe he or she should use the new system	
Organizational facilitating conditions	the extent to which the organizational and technical infrastructure exists to support the *collective* use of the system, and the degree to which the *collective-user* believes that an organizational and technical infrastructure exists to support use of the system	- Top management support (executive participation) - Operational/middle-management support - Resources (human resources such as IT-skills, managerial-skills, time) - Processes and structures for knowledge transfer - Testing/Experience - Size - Structure (degree of centralization, interconnectedness with IT function) - Cost
Environmental facilitating conditions	the degree to which the competitors, market elements, and regulatory environment facilitated the adoption and implementation of the technology	- Industry characteristics - Legal requirements

6. Conclusion

This chapter aims to conclude this thesis. First, it provides a reflection on the contributions, followed by a validity assessment of the findings, including practical and theoretical implications. The chapter ends with suggestions for future research.

6.1 Contribution

The purpose of this study is to increase the understanding of how RPA is adopted and implemented in an attempt to create value. Value creation was recognized as a consequence of the acceptance and use of RPA. We argue that the adoption and implementation of RPA cannot be understood solely by investigating the individual direct user. Instead, we propose that the user of RPA should be conceptualized as a collective of both indirect and direct users. Together this collective of users need to accept and use RPA for the firm to create value. Building on this conceptualization, an RPA adoption and implementation framework is presented, which is described and illustrated above. In addition, we see that the contribution of this thesis is threefold. First, it provides a rich description of one organization adopting and implementing RPA, a technology that has gained much attention among practitioners and not yet been described extensively within the literature. Second, it takes an initial step towards an increased understanding of the user-concept when applied to RPA. Third, it provides an integrative framework grounded in existing literature, which will be central to studies on the IT of the future, with technologies such as robotics, AI and machine learning.

6.2 Validity Assessment

It has been stated that the validity of a theoretical framework is dependent on the validity of its constructs (Yin, 2009). As the framework is based on multiple concepts suggested by previous studies on IT-adoption and the coherence of the model has been described and elaborated on in previous sections, construct validity will not be highlighted any further. In general, the theoretical framework does not contradict previous approaches to IT adoption, but the contribution rather lies in the longitudinal outline of how RPA is adopted and implemented and a discussion of the user as collective rather than an individual. However, as some of the original definitions of the constructs have been adjusted to apply to the collective-user, this calls for further validation of these constructs.

Turning to external validity, we first want to highlight the relative explanatory power of the framework. First, it incorporates both direct and indirect users, which previously have not been recognized in traditional models of user acceptance such as TAM (Davis, 1989; Venkatesh & Davis, 2000) and UTAUT (Venkatesh et al. 2003). These models have shown great explanatory power when seeking to understand usage of systems such as the Microsoft Office package or the Internet with a clear dyadic user-system relationship. However, they seem to provide a limited understanding when they are to be applied on new technologies such as RPA when the end-user is not as clearly defined. This does not by any means suggest that the dyadic relationship between a system and a direct user is unimportant. The rigorous research stream has shown these relationships to be valid at an individual level (e.g., Venkatesh et al. 2003). We thus recognize that the relationship is not only dependent on that relationship, but that the collective-user construct together with the synthesised framework provides a greater understanding of RPA adoption and implementation. As mentioned in the method section, by undertaking a single case study we make no claims of being able to generalise these findings into a larger population, but rather in relation to theory (Yin, 2009). We do however want to discuss its practical and academic relevance, which will be covered below.

6.2.1 Practical Implications

The framework describes factors that may affect successful RPA implementation, why the following implications could appear important to practitioners such as managers, consultants or others who seek to utilize the potential of RPA. First, we encourage practitioners to recognize the dynamic nature of the technology, where coordination is key. RPA may provide a promising tool to create value if managed appropriately. This involves recognizing that close ties between supporting units, operational staff and IT are essential, especially at the early stages of the adoption and implementation process. Practitioners should also ensure that communication channels are in place between important units. Second, managers at all hierarchical levels should recognize their important role in highlighting the benefits of RPA, encouraging participation among operational staff and setting aside time for testing. A successful implementation requires a well-designed robot and involvement from the operations at an early stage of the implementation process. Third, the potential of reaping value comes with experience and managers should therefore view it as a way to build IT skills. Previous experience form IT transformation projects and RPA implementations facilitates implementation. Also, engaging in RPA-implementations may thus be seen as a tool to build IT skills and bridge the gap between the business function and the IT department.

6.2.3 Theoretical Implications

The Banking Group is a typical representative of a fairly mature banking industry. The framework appears to provide a useful foundation to understand the constructs related to committed use of RPA of a large actor in the banking industry. However, in terms of theoretical relevance, we also believe that our findings could be applicable to (1) other industries, especially those with a similar organizational or environmental context (e.g., centralization, size, legal pressure) and (2) other technologies, where it is likely that the user construct is unclearly defined (e.g., AI and Machine Learning). We do however also recognize that the framework has some limitations. Researchers seeking to understand the underlying factors of how RPA is managed in an attempt to create value, should recognize that our framework can provide valuable insights. However, it may be seen as guidelines and a lens of understanding value creation when applying RPA as it cannot provide insights to what extent these factors are important or which factors are more important than others. Nor does it take into account that certain factors may have been more or less important during certain periods in the adoption and implementation process. This would require further research. Furthermore, our findings on size, structure, knowledge transfer and external environment may not be exhaustive and therefore requires further investigation. Last, the concept of the collective-user seems to have implications on the constructs of the framework, but does not give any insights on to what degree the relationship between the direct and indirect users affects each other and, in turn, also its use.

6.3 Future Research

Based on the results of this study, we suggest four implications for future research. First, we encourage researchers to further investigate the concept of the collective-user, and bring further insights on its applicability on RPA in particular, and on other technologies in general. Further understanding of the strengths of these relationships is needed. It is likely that some of the relationships in the collective are more important than others. It should thus be fruitful to further investigate and measure those relationships. Kane and Alavi (2008) have taken some initial steps towards such understanding, although its applicability on RPA has not yet been confirmed. Second, our findings clearly implies that some of the underlying constructs are more or less important during certain periods in the adoption and implementation process. Further research would thus benefit from clarifying when these factors are of importance. Third, future research could benefit from investigating the customers role in the adoption and implementation process of RPA. As highlighted in section 4.7, the end-customer was not investigated. It would thus be interesting to further recognize their role as users and how they fit into the construct of the collective-user. Finally, we encourage researchers to verify if the constructs presented in our framework also are applicable to other emerging technologies, such as AI.

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Appendix A. Semi-structured interview guide, Users

BACKGROUND

- Could you in general terms describe the software robot and its functions?
- When was the decision regarding software robot implementation made?
- Would you say that the implementation process is finished? If so, when was it considered implemented? When did you get involved in the process?
- Could you describe the implementation process of that specific software robot? What were the most important stages?
- What was the outspoken purpose with the implementation process?

PHASE 1: PRE IMPLEMENTATION

Decision making

- How was the decision to adopt the robot made? Who was involved in the decision?
- Who was the driving force behind the decision?
- Did you experience any social pressure during the decision-making process? If so, how?
- What factors were considered in the cost-benefit assessment? Which ones were most important for you? Why?

Expectations

- What was communicated about the robots prior to implementation? How was it communicated?
- Before implementation - what were your expectations for the 'bot'?
- Prior to implementation, how did you feel the program robots would affect your job performance? Why?
- What did you perceive as the major benefits of the 'bot' in comparison with your previous way of working?
- What did you perceive as the major disadvantages of the 'bot' in comparison with previous solutions/way of working?
- Was the technology tested before it was implemented on a full scale? If yes, how?

Costs/complexity

- Could you describe how costs were divided during the implementation? What costs did your unit bear?
- When you started using the technology, how complex did you find the robots? Did you find them hard to handle/use? Why/Why not?
- Were there any additional/unforeseen costs during implementation?

Communication/resistance

- What units or individuals did you communicate with during the implementation process? (vertical or horizontal communication?)
- What was communicated with regards to the bots leading up to the implementation?
  Did you perceive any internal resistance during the implementation? If yes, how did it play out? How did you handle it?
- Did your perception regarding the 'bots' complexity change during the implementation? If yes, how?

IT infrastructure

- How do you perceive that the current IT infrastructure has facilitated or hindered the implementation? Could you give an example of how that played out?

PHASE 2: DURING/POST IMPLEMENTATION

- What effects have you seen of the bots? (e.g., scale, increased productivity, first mover advantage etc.)
- Did your expectations on the robots change during implementation? If so, how?
- Did you find that your work performance improved or deteriorated?

Internal factors

- Do you believe that the size of the firm has facilitated or made the implementation process harder in any way? Could you give an example?
- How has the organizational structure facilitated or hampered the implementation? Could you give an example?

External factors

- Do you recognize any external factors that have hampered the process? If yes, how?
- Do you recognize any external factors that have facilitated the process? If yes, how?

Appendix B. Semi-structured interview guide, Supporting units

BACKGROUND

- Could you in general terms describe the software robot and its functions?
- When was the decision regarding software robot implementation made?
- When was the implementation process finished?
- Could you describe the implementation process of that specific software robot? What were the most important stages?
- What was the outspoken purpose with the implementation process?

PHASE 1: PRE IMPLEMENTATION

- How was the decision to adopt the robot made? Who was involved in the decision? Who was the driving force behind the decision?
- Did you experience any social pressure during the decision-making process?
- What factors were considered in the cost-benefit assessment? Which ones were most important for you? Why?
- What did you perceive as the major benefits of the 'bot' in comparison with previous solutions/way of working?
- What did you perceive as the major disadvantages of the 'bot' in comparison with previous solutions/way of working?
- Who was the end user of the 'bot'? How complex was the bot for the user in your view?
- Was the technology tested before it was implemented on a full scale? If yes, how?

Communication/resistance

- What units or individuals did you communicate with during the implementation process? (vertical or horizontal communication?)
- What was communicated with regards to the bots leading up to the implementation? Why?
- Did you experience any internal resistance during the implementation? If yes, how did it play out? How did you handle it?
- Did your perception regarding the 'bots' complexity change during the implementation? If yes, how?

IT infrastructure

- How do you perceive that the current IT infrastructure has facilitated or hindered the implementation? Could you give an example of how that played out?

Costs

- Could you describe how costs were divided during the implementation? What costs did your unit bear?
- Do you believe that the cost distribution affected the implementation process in any way? If yes, could you provide us with an example?
- Did any unforeseen/additional costs arise during the implementation process?

PHASE 2: DURING/POST IMPLEMENTATION

- What effects have you seen of the bots? (e.g., scale, increased productivity, first mover advantage)

Internal factors

- Do you believe that the size of the firm has facilitated or made the implementation process harder in any way? Could you give an example?
- How has the organizational structure facilitated or hampered the implementation? Could you give an example?

External factors

- Do you recognize any external factors that have hampered the process? If yes, how?
- Do you recognize any external factors that have facilitated the process? If yes, how?