

## **Implementing a digital workforce**

A single-case study investigating how robotic process automation affects the accounting function

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### **ABSTRACT**

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This paper aims to investigate how an implementation of a new technology affects the accounting function. By using a single-case study, an in-depth understanding has been reached of how a new technology, robotic process automation (RPA) is affecting the accounting function at the case company, TelCo. With several consultancy firms claiming that RPA has an effect on the accounting function, but with little research within the area, this study aims to bring light to what the effects of implementing RPA are. By using the technology power loop in combination with literature about digitalization within the accounting function, this study highlights the effects of implementing RPA and how the effects both contradict and confirm earlier findings of implementation of new technologies. The findings of the study are summarised into three central effects. This study finds that the implementation of RPA affects TelCo by bringing more analytical tasks to the accounting function, by creating a more centralised structure and a change in view of what is considered to be IT or accounting tasks. Further the implementation of RPA was considered successful by employees and generated positive financial effects for the company.

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**Keywords:** Digitalization, Change of Accounting Function, Control of Technology, Robotic Process Automation

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|   |           |
|---|-----------|
| <b>1. Introduction .....</b>                                | <b>4</b>  |
| <b>2. Theory .....</b>                                      | <b>6</b>  |
| 2.1 New technologies effect on the accounting function..... | 6         |
| 2.1.1 Digitalization within the accounting function.....    | 6         |
| 2.1.2 A new technology with unknown effects .....           | 9         |
| 2.2 Control of technology .....                             | 10        |
| 2.3 Theoretical framework.....                              | 13        |
| <b>3. Method.....</b>                                       | <b>15</b> |
| 3.1 Research design.....                                    | 15        |
| 3.1.1 Empirical method .....                                | 15        |
| 3.1.2 Research approach .....                               | 15        |
| 3.1.3 Selection of case company and division .....          | 16        |
| 3.2 Data collection.....                                    | 16        |
| 3.2.1 Primary data – Interviews.....                        | 16        |
| 3.2.2 Secondary data – Internal documents .....             | 18        |
| 3.3 Data analysis .....                                     | 19        |
| 3.4 Research quality .....                                  | 20        |
| 3.4.1 Validity .....  | 20        |
| 3.4.2 Reliability.....                                      | 21        |
| <b>4. Empirics .....</b>                                    | <b>22</b> |
| 4.1 Description of case company and context.....            | 22        |
| 4.2 Expectations of RPA .....                               | 23        |
| 4.2.1 The processes used for RPA .....                      | 23        |
| 4.2.2 Perceived advantages and disadvantages with RPA ..... | 24        |
| 4.2.3 Risks and challenges with RPA.....                    | 25        |
| 4.3 Implementation of RPA.....                              | 26        |
| 4.3.1 Centralisation vs decentralisation .....              | 27        |
| 4.3.2 KPIs and outspoken goals of RPA.....                  | 28        |
| 4.4 Implications of RPA .....                               | 29        |
| 4.4.1 FSS vs IT .....                                       | 29        |
| 4.4.2 Change in communication .....                         | 32        |
| 4.5 Concluding remarks of the empirics .....                | 33        |
| <b>5. Analysis .....</b>                                    | <b>34</b> |
| 5.1 Role of accountant.....                                 | 34        |
| 5.2. Degree of centralisation .....                         | 35        |
| 5.3 Relationship between IT and business .....              | 36        |
| 5.4 KPIs.....   | 38        |
| 5.5 A development of the technology power loop.....         | 38        |
| <b>6. Conclusion .....</b>                                  | <b>41</b> |
| 6.1 Summarisation of contributions.....                     | 41        |
| 6.2 Limitations and suggestion for future research .....    | 43        |
| <b>References .....</b>                                     | <b>44</b> |

## 1. Introduction

*“I truly believe automation of processes with RPA has potential not only for the finance or accounting function but for the company as a whole”* - Head of Financial Shared Services

Since the end of the last century companies have been relying on digital solutions in their everyday operations (Bhimani and Willcocks, 2014). One digital solution that the majority of large companies use is enterprise resource planning (ERP) system. ERP systems are used for cost reduction, improved efficiency and more easily accessed information (Fahy, 2001). During the last twenty years a lot of research regarding ERP systems have revealed multiple effects of ERP systems on organisations and in particular on the accounting function (Fahy, 2001; Newman and Westrup, 2005; Hyvönen *et al*, 2008).

A new technology is now being implemented in companies worldwide. This new technology, robotic process automation (RPA), is a software that can make work more efficient for the accounting function. Further, RPA can move between different systems and perform tasks that was earlier performed by humans. With this new technology, a digital workforce is being implemented to work side by side with humans (PwC, 2016).

RPA shares some similarities with ERP systems. Both have an effect on the accounting function and both save time by reducing the repetitive tasks of human employees (Deloitte, 2016; Fahy, 2001). However, one main difference is that while RPA is a software that move between several systems to execute the same tasks as a human would do (Deloitte, 2016), ERP is one company-wide system (Newman and Westrup, 2005). Further, while traditional ERP initiatives are usually large scale where the financial effects are obtained after a long period of time, RPA can be deployed on different scales where a small scale initiative can gain benefits within a few weeks (PwC, 2016). Thus both differences and similarities exist between ERP systems and RPA. Additionally, several consulting firms claim that RPA has an effect on the accounting function (PwC, 2016; Deloitte, 2016). With limited research about RPA it is still unknown whether the effects of implementing RPA are similar to the effects of implementing ERP systems or if they differ.

New technologies have historically proven to change the way the managers govern their organisations, the structure of organisations and the role of the employees (Newman and

Westrup, 2005; Bhimani and Willcocks, 2014). With the huge impacts that technologies have earlier proven to have on organisations (Hyvönen *et al*, 2008; Hendriks *et al*, 2007), there is no reason to believe that RPA will leave organisations untouched. It is hence imperative to understand the effects of the implementation of this new technology, RPA. In order to understand those effects, this study aims to answer the questions:

- *What are the effects of implementing a new technology, robotic process automation (RPA), on the accounting function?*
- *Are the effects of RPA in line with earlier findings from implementing ERP systems, or does this new technology affect the organisation in a different way?*

This study aims to contribute to the research of digitalization within the accounting function by investigating the effects of the implementation of RPA. In order to investigate the effects of RPA, this study builds on a single-case study. A qualitative research design has been used, where the data is collected by semi-structured interviews with employees, managers and senior managers at the case unit of this study. The case unit of this study is a back-end financial support function at a Swedish telecom company further referred to as TelCo. The case study comprises 18 interviews in combination with internal documents and the time period for the data collection span from September 15th to October 19th, 2017. The data collection followed a systematic combining approach (Dubois and Gadde, 2002) where the empirics were used as a guiding tool for choosing the relevant theory. In order to analyse the collected data a theoretical framework, built on previous literature regarding implementation of new technologies within the accounting function, was used.

This study finds that the implementation of RPA affects TelCo by bringing more analytical tasks to the accounting function, by creating a more centralised structure and a change in view of what is considered to be IT or accounting tasks. The implementation of RPA was considered successful by employees and generated positive financial effects for the company. This study also proposes a contextualised technology power loop where the effects of RPA can be linked to the initial factors included in the original technology power loop by Newman and Westrup (2005).

## **2. Theory**

The literature regarding RPA is at a nascent stage which implies that there is little or no previous theory within the subject (Edmondson and McManus, 2007). Since RPA share similarities with ERP systems, this section presents theory about digitalization within the accounting function and in particular implementations of ERP systems. The technology power loop theory, in combination with other relevant articles relating to how new technologies affect the control of the accounting function, is used to analyse the collected data. Finally, in the theoretical framework we integrate and synthesise the technology power loop with the previous literature of digitalization within the accounting function.

### **2.1 New technologies effect on the accounting function**

In this chapter previous literature regarding implementations of new technologies are discussed. In order to guide the reader through the theory-section, two relevant concepts need to be clarified. First, the definition of digitalization addresses the use of digital technologies incorporated to business operations in order to become more digital and automatic. Examples of digital technologies are big data, mobile technologies, ERP systems and RPA. Second, the definition of the accounting function refers to the business unit in an organisation that manages financial reporting, accounts receivable, accounts payable and financial control. The end-customer for the accounting function are thus other business units within the firm.

#### **2.1.1 Digitalization within the accounting function**

Traditionally the accounting function has been focused on monitoring the budget and providing information to other units within the firm. However, the accounting function has today developed to be of strategic importance for firms (Mouritsen, 1996). This shift has been possible by introducing various technologies within the accounting function (Bhimani and Willcocks, 2014).

##### *How to implement a new technology within the accounting function*

An implementation of a new technology can be either a success or a failure for a company (Bradford and Florin, 2003). Busco *et al* (2015) discuss how accounting innovations are hard to adopt since they are constantly changing and further there are conflicting interests between different business units' view of accounting innovations. Interests have to be aligned in order to successfully adopt a new accounting innovation (Busco *et al*, 2015). The challenge is

mainly occurring since both innovations and the accounting function are constantly changing throughout time (Revellino and Mouritsen, 2015).

In order to succeed with digital accounting innovation one important factor is to pay attention to the existing knowledge within a firm (Revellino and Mouritsen, 2015). This is in line with the contingency theory, which states that accounting tools create separate effects depending on firm characteristics (Otley, 1999). Further, how the management act, and in particular communicate the new system to its employees, is proven to be of great importance for a new system to be successful (Bradford and Florin, 2003; Hyvönen *et al*, 2008). If management give the employees the right support and training, a higher user satisfaction of a new system is attained. With support follows a consensus towards the organisation's objectives, which in turn generates an effective implementation of the new system (Bradford and Florin, 2003).

On the contrary, a failure of implementing a new technology can be explained by too much intervention from the top management (Bradford and Florin, 2003). Hyvönen *et al* (2008) explain the implementation of a new ERP system as a political process, where one way to introduce the new system is by using metaphors. Different metaphors can be used depending on who in the organisation the management speaks to. In order to know which metaphors to use it is important for the management to know the company's history, since this carries information about how earlier communication has occurred.

#### *How new technologies change the role of accountants*

Work performed at the accounting department has gone from more standardized tasks, such as reporting and recording (Järvinen, 2009), to include work that is more value-adding and involve decision-making (Järvenpää, 2007; Newman and Westrup, 2005). A reason for this can be explained by the deeper and faster analysis made possible by new technologies (Bhimani and Willcocks, 2014). Furthermore, implementation of new technologies indicate that accountants might see the possibility to expand their knowledge and expertise to other roles such as consultants and analysts (Kanellou and Spathis, 2013).

One type of systems that have changed the role of accountants in the past are ERP systems. ERP systems are used to replace functional systems with one standardised company-wide system (Newman and Westrup, 2005). Hyvönen *et al* (2008) discover that ERP systems shape the organisation by forcing the accountants to study the logic behind solutions and to

invent ways to combine control systems and accounting rationalities. With the implementation of ERP systems, accountants save time since they have to perform less routine activities and data entries (Granlund and Malmi, 2002). Granlund and Malmi (2002) find that even if accountants save time, personnel are not reduced since accountants now use their time to analyse data and reports. On the contrary Newman and Westrup (2005) state that the implementation of ERP systems reduce the number of accountants. Hence, there are different views in previous research whether time saving is used to reduce the number of accountants or not.

#### *How new technologies change the organisational structure*

Not only individual employees will be affected by the implementation of a new system since it also adjusts the structure of an organisation (Bhimani and Willcocks, 2014). ERP systems encourage questions about integration, standardization and centralisation since the use of ERP systems decrease multiple data sources (Granlund and Malmi, 2002). Centralisation and decentralisation refer to the amount of decision-making power that is on a central level and how much local autonomy that exists within the firm (Busco *et al*, 2008). There is no consensus in previous literature regarding how new technologies have changed the structure of organisations (Dechow *et al*, 2007; Taipaleenmäki and Ikäheimo, 2013; Newman and Westrup, 2005; Quattrone and Hopper, 2005).

Technologies can create more lateral and less hierarchical accountability, where the connection between different business units has increased and a more decentralised organisation has been created (Dechow *et al*, 2007; Taipaleenmäki and Ikäheimo, 2013). Further, digital technologies create an increased interactivity between the accounting function and other units of the organisation (Quattrone and Hopper, 2006; Kellett and Sweeting, 1991).

Newman and Westrup (2005) have a contrasting finding where ERP systems bring a higher degree of centralisation. Quattrone and Hopper (2005) analysed two multinational organisations where implementations of ERP systems took place. In one of the organisations the existing structures were kept and the control was still being central after the implementation of the new system. In the other organisation the ERP system created different, constantly changing, logics of control where everyone could control for a limited period of time and thus a flatter organisation was created.



### *IT and the accounting function*

In previous literature about digitalization, the relation between IT and accounting is discussed. Every generation of new technology is changing the relation between IT and the accounting function in one way or another (Dechow *et al*, 2007). Further, the relation between IT and accounting creates a complex organisation that can be controlled and governed by those who have access to information (Dechow *et al*, 2007).

IT has a role in shaping organisations, since technology can influence the interaction between humans and how they choose to use technologies (Orlikowski, 1992). Accounting today can not be pursued without IT as IT today creates the platform for accounting (Granlund and Mouritsen, 2003). However, Armstrong (1985) discusses that new technologies create a tension of what the domain of accounting actually should contain and that IT might be an area which should to some extent be included in accounting.

### *Financial effects of new technologies*

The implementations of technologies such as ERP systems have proven to have significant financial effects (Hendricks *et al*, 2007; Poston and Grabski, 2001). Hendricks *et al* (2007) describe the financial effect of implementing an ERP system to yield improvements in profitability. Further, Hendricks *et al* (2007) state that the improvements of profitability turn out to be higher for early adopters of ERP systems. Poston and Grabski (2001) examine how the implementations of ERP systems affect coordination and transaction costs. During each of the following three years after the implementation of ERP system there was a reduction in the ratio employees to revenues. After three years there was a significant decrease in the ratio between cost of goods sold to revenue. However, implementation of ERP systems can sometimes lead to contrasting effects in profitability where the costs of implementing the systems exceed the potential savings (Irani *et al*, 1997).

#### **2.1.2 A new technology with unknown effects**

As stated above there is a lot of research regarding the effects that ERP system have had on the accounting function. Today a new technology, Robotic Process Automation (RPA), has emerged and is used within the accounting function. RPA is used to automate tasks that have previously been done by employees, by letting a software robot perform tasks in the same way a human would (PwC, 2016). RPA shares some similarities with ERP systems. Both

have an effect on the accounting function and both RPA and ERP systems save time by letting the robots perform repetitive tasks, which in turn enable employees to have more time for analytical assignments (Deloitte, 2016; Fahy, 2001). However, while RPA is a software that moves between several systems to execute the same tasks in a similar way as a human would (Deloitte, 2016), ERP is one company-wide system (Newman and Westrup, 2005). Further, while traditional ERP initiatives are usually large scale where the financial effects are obtained after a long period of time, RPA can be deployed on different scales where a small scale initiative can gain benefits within a few weeks (PwC, 2016).

Thus both similarities and differences between ERP systems and RPA exist. Many consultancy firms claim that RPA has an effect on the accounting function (PwC, 2016; Deloitte, 2016) but with limited research within RPA, the effects of RPA remain unknown. Therefore, this study aims to contribute to the research of digitalization within the accounting function by investigating the effects of the implementation of RPA and incorporating the effects in the technology power loop framework by Newman and Westrup (2005). The following section will therefore investigate the control of technology and how it has changed by implementing new technologies.

## **2.2 Control of technology**

With limited previous research about RPA, our findings could be analysed from different angles. Therefore, in this study we let the empirics guide which theory could be relevant for examining the data in a structured way<sup>1</sup>. We found that a relevant theory should include the concepts of how technologies relate to both the accounting function and to organisational change. Those concepts are addressed in literature about control of technology. Further, theories about control of technology cover themes that correspond well with the purpose of this study, to examine the effects from new technologies. In this section theories regarding control of technology will therefore be discussed.

Numerous studies address how technologies affect the control and power in an organisation (Dechow and Mouritsen, 2005; Newman and Westrup, 2005; Caglio 2003; Bloomfield and Coombs, 1992). Both Newman and Westrup (2005) and Dechow and Mouritsen (2005) find that a new technology can marginalise accountants. In research by Dechow and Mouritsen

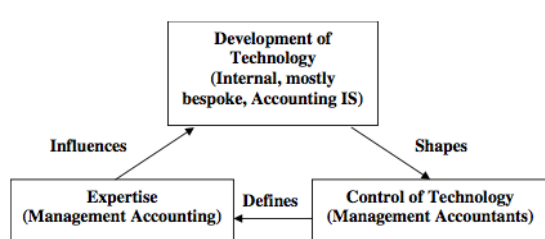
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<sup>1</sup> For further explanation about how empirics is used to guide the theory, see chapter 3.3.

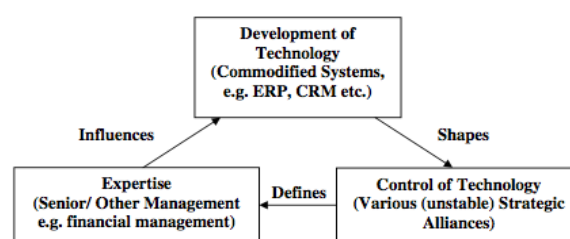
(2005) this marginalisation occurred due to the fact that the ERP system was driven from the logistic side of the company. Information could thus be extracted from the logistic structure of the ERP system and there was no need to involve the accounting department to receive information.

One central model within control of technology is the technology power loop, developed by Scarbrough and Corbett (1992). The model is based on three factors: development of technology, control of technology and expertise. Expertise influence the development of technology, which in turn shapes the control of technology, that subsequently defines the expertise. The relationship between those factors is dynamic with an ongoing rotation during time where expertise is seen as a dynamic view of knowledge that is constantly reproduced.

Newman and Westrup (2005) use the technology power loop to examine how control of technology changes when two companies implement ERP systems. The technology power loop is extended by Newman and Westrup (2005) to include factors that reveal the differences between pre-ERP era (Figure 1) and during the ERP era (Figure 2). We summarize Newman and Westrup's (2005) findings below (see Table 1).



**Figure 1.** Pre-ERP era (Newman and Westrup, 2005).



**Figure 2.** ERP era (Newman and Westrup, 2005).

|             | <b>Development of technology</b>                                    | <b>Control of technology</b>   | <b>Expertise</b>        |
|-------------|---|--|-------------------------|
| Pre-ERP era | Development occur in-house by employees at the accounting function. | Management accountants   | Management accounting   |
| ERP era     | Technology is developed outside the organisation.                   | Strategic alliances. A mix with employees from different backgrounds; accountants, vendors, consultants and IT-division. | Senior/other management |

**Table 1.** Summary over Newman and Westrup's (2005) findings.

Newman and Westrup (2005) state that to make an ERP system work is not only a technical issue, but also an ongoing interaction between the ERP system, internal and external groups. The strategic alliances that control the technology in the ERP era consist of employees with different backgrounds (Newman and Westrup, 2005). That other professions extend their fields to move into what was before the implementation of ERP systems the management accountant's role, is a common finding when implementation of ERP systems are studied (Kurunmäki, 2004; Jacobs, 2005). Jacobs (2005) finds this shift in professions where some medical practitioners got involved in administrative and financial tasks. This movement is called hybridisation (Kurunmäki, 2004), but hybridisation can also be defined as the shift when accountants change their roles to become more analytical (Burns and Baldvinsdottir, 2005).

Hyvönen *et al* (2009) define hybridisation as the situation where various professional groups either split their tasks or have a conflict over power. Hyvönen *et al* (2009) and Burns and Baldvinsdottir (2005) find that the hybridisation of management accounting is not directly linked to the implementation of ERP systems, but instead to the management accountants desire to expand their role. Caglio (2003) on the other hand finds that before the ERP era accountant practises were linked to specific positions in an organisation, but after the implementation of ERP systems hybrid accountants emerged. These hybrid accountants emerged due to an increased mobility between accountants and other groups of experts (Caglio, 2003). Thus, there seems to be a lack of consensus in previous research about if hybridisation emerged due to the implementation of new technologies or other institutional logics.

After investigating previous research on the effects of implementing new technologies, the research questions this study aims to answer are:

- *What are the effects of implementing a new technology, robotic process automation (RPA), on the accounting function?*
- *Are the effects of RPA in line with earlier findings from implementing ERP systems, or does this new technology affect the organisation in a different way?*

## 2.3 Theoretical framework

After conducting the above review of existing literature, within digitalization of the accounting function and the technology power loop, insight into how this thesis research questions could be answered is formed. By using the lens of Newman and Westrup's (2005) technology power loop, we want to investigate how and if the implementation of a new technology, RPA, is in line with findings from previous literature regarding implementation of new technologies in the accounting function or if it brings contrasting effects.

In previous literature we identify three central ways in which new technologies affect an organisation. The three changes that new technologies bring to an organisation are: a changed role of accountants, a change of organisational structure and a changed relation between affected business units. Following the explanation below, we propose that those three effects have to be examined together with the technology power loop in order to answer our research question and contribute to existing literature regarding the implementation of new technologies within the accounting function.

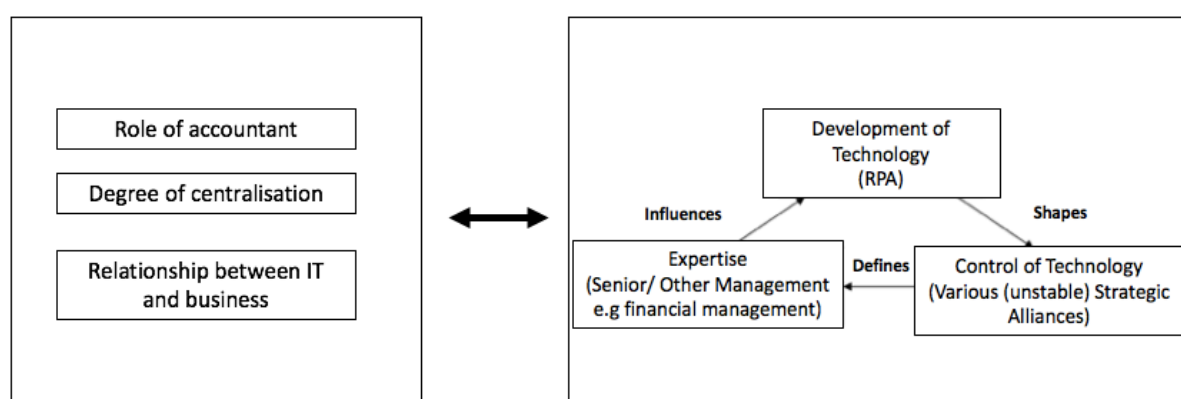
First, new technologies have proven to change the role of the accountants from book-keeping to more analytical roles (Järvenpää, 2007; Newman and Westrup, 2005; Hyvönen *et al*, 2008). The implementations of new technologies indicate that accountants have a possibility to expand their expertise (Kanellou and Spathis, 2013) and several authors raise the question whether accountants are likely to broaden their expertise to include both business and IT (Armstrong, 1985; Caglio, 2003). Expertise is a part of the technology power loop and existing literature has proven that implementations of new technologies have changed accountant's expertise. We hence believe that the role of accountants has to be studied together with the technology power loop in order to understand the effects of implementing RPA.

Second, with new technologies a flatter and more decentralised organisation is created (Quattrone and Hopper, 2005; Dechow *et al*, 2007; Taipaleenmäki and Ikäheimo, 2013). In a more decentralised organisation the accountants are expected to have more operational knowledge (Järvenpää, 2007) and the units have more autonomy regarding decision-making (Busco *et al*, 2008). Newman and Westrup (2005) have a contrasting finding where ERP systems bring a higher degree of centralisation. As new technologies historically have

brought different effects to the organisational structure we choose to study the organisational structure in relation to the technology power loop in order to map the effects of implementing RPA.

Third, new technologies change the relationship between different business units of a firm. Dechow *et al* (2007) discuss how the relation between IT and business changes when implementing new technologies. Further, the authors state that each generation of technology affects the relation in a certain way. Newman and Westrup (2005) find that employees with different roles are involved in the control of technology by forming strategic alliances within companies. Hyvönen *et al* (2009) describe the situation where various professional groups either split their tasks or have a conflict of power, as hybridisation. Since previous research discuss how new technologies affect the relation between IT and business (Dechow *et al* 2007; Armstrong, 1985), we choose to study the relationship between IT and business together with the technology power loop.

The model below (Figure 3) displays the guiding tool to analyse the empirics. The three changes will be viewed in collaboration with the technology power loop. Derived from the analysis a conceptualized technology power loop will be presented in chapter 5.5.



**Figure 3.** A theoretical framework where the role of accountants, the degree of centralisation and the relationship between IT and business will be examined together with the technology power loop.

### **3. Method**

*In section 3.1, the research design chosen to answer this study's research questions is presented. The selection of the empirical method and empirical approach is portrayed and motivated with references to relevant literature. In section 3.2, the methodology of data collection is presented. Further, in section 3.3, the procedure of the data analysis is described. Lastly, in section 3.4, a discussion about the reliability and validity of the study is presented.*

#### **3.1 Research design**

##### **3.1.1 Empirical method**

In order to determine a suitable research design, a consideration of the phenomenon we want to investigate needs to be completed (Alvesson and Skjoldberg, 1994). The phenomenon in this study is to examine the effects of implementing RPA. As mentioned earlier, a nascent stage implies that there is little or no previous theory within a subject (Edmondson and McManus, 2007). Within nascent research areas a qualitative research design is convenient as existing literature might be inadequate (Eisenhardt, 1989). It has been proven within nascent academic research that an open-ended research question is appropriate, as an open-ended research question shape the researcher's understanding of the area (Edmondson and McManus, 2007). To study RPA, we have chosen to answer two open-ended questions by performing a qualitative single-case study. One can argue that a multiple case-study could be suitable as it adds a strength of a cross-case analysis and thus lead to more generalizable results (Eisenhardt, 1989). However, since we want to conduct an in-depth analysis of RPA this is best achieved through a single-case study, where the complexities and underlying factors can be examined more closely (Yin, 2014).

##### **3.1.2 Research approach**

The two main research approaches within qualitative methods are deductive and inductive, where a deductive research approach develops propositions grounded in existing theory and an inductive research approach uses empirical findings to develop theory (Bryman, 2011). An abductive approach or systematic combining is a middle way between those two approaches where there is a movement back and forth between data and theory (Bryman and Bell, 2013; Dubois and Gadde, 2002). In this study we have chosen an abductive research method which is suitable when theorising is made from processing data (Langley, 1999).

The process of systematic combining is used where we let the empirical findings guide the theoretical framework that is suitable for our study, by continuously analysing the data throughout the time of the study (Dubois and Gadde, 2002). Data should not be fit to specific categories (Glaser, 1978) and with no previous knowledge about RPA we use systematic combining, instead of forcing our collected data to fit a predetermined theory. Hence, after the analysis of the initial interviews, relevant theory relating to effects of implementing new technologies were chosen as a tool to analyse the conducted data.

### **3.1.3 Selection of case company and division**

To study the effects of RPA we chose to make a single-case study of the financial shared services (FSS) division at the Swedish multinational company TelCo. With a research area at a nascent stage we need rich and detailed data (Edmondson and McManus, 2007). By studying mainly one division within TelCo we are able to collect in-depth data of the implementation of RPA. We have chosen TelCo as our study object for numerous reasons. First is the time span, where the chosen company has used RPA for a bit more than a year, thus RPA has passed its pilot stage. Second, TelCo is a large decentralised company which makes it interesting from an organisational viewpoint. A third reason for choosing TelCo as the case company is that we could obtain access to the company in an early stage.

## **3.2 Data collection**

### **3.2.1 Primary data - Interviews**

In order to collect data, we conducted 18 interviews with employees within or related to the FSS division at TelCo. All interviews were made in September and October 2017 and lasted between 35 to 60 minutes, the majority of them being 60 minutes. The interviewed candidates were guaranteed anonymity in the beginning of each interview. All the interviews were made face to face and all interviews were recorded. Both authors of this thesis were present during the interviews, but with different roles where one was asking the questions and the other was a note-taker. Hence, the interviews were viewed from different perspectives which can increase the objectiveness when later analysing the data (Eisenhardt, 1989).

Prior to conducting the interviews, a literature review over previous research about digitalization within the accounting function was made. Previous literature inspired and formed our initial, very general interview questions regarding RPA which is suitable for an abductive research design. Like other nascent theory studies (Barker, 1993; Gersick, 1988;



Maznevski and Chudoba, 2002) we used open-ended interview questions, which allowed the collected data to strongly shape the understanding of the object of the study (Edmondson and McManus, 2007). For the initial interviews our contact person at the company helped us to get in touch with three employees with different positions within FSS. Those three interviews provided us with some general information regarding the implementation of the RPA. The initial interviews were used to identify which themes needed further investigation, since a flexible data-collection method is a key feature within nascent research fields (Eisenhardt, 1989; Edmondson and McManus, 2007). Themes that emerged were about changing roles of employees after the implementation of RPA, the different views on RPA for the IT division and business division and to which degree decisions regarding RPA should be centralised. The questions asked were similar in nature to ensure volume and objectivity in the data collection (Bryman and Bell, 2013), but with some individual adjustments depending on the employee's position within the company. For examples of interview questions asked, see chapter 3.3 (Table 3).

To eliminate the risk of getting a biased study, which could be possible if our contact person at TelCo chose all our interviewees, the authors of this study chose the remaining 15 employees to interview. This was possible by looking at organisation charts received from the company (TelCo, 2017 FSS new organisation.) The idea with the chosen interviewees were to examine patterns of how RPA affects the accounting function, which is appropriate in a research field at a nascent stage (Edmondson and McManus, 2007). After the first interviews it was clear that several employees from the IT division were involved in RPA as well. Hence, both employees from FSS and from IT were participating in interviews since both units turned out to be highly involved in RPA. We interviewed both employees who governed the RPA and employees who worked within units where RPA had been implemented, for a full list of the interviews see Table 2.

| Number | Position                          | Length | Date       |
|--------|-----------------------------------|--------|------------|
| 1      | Technology Developer A            | 60 min | 2017-09-15 |
| 2      | Head of Financial Shared Services | 60 min | 2017-09-15 |
| 3      | Line Manager A                    | 50 min | 2017-09-18 |
| 4      | Line Manager B                    | 50 min | 2017-09-26 |
| 5      | IT Finance Manager                | 60 min | 2017-09-26 |
| 6      | Technology Developer B            | 60 min | 2017-09-27 |
| 7      | Senior Manager A                  | 50 min | 2017-10-03 |
| 8      | Head of RPA Hub                   | 60 min | 2017-10-04 |
| 9      | IT Finance Employee A             | 60 min | 2017-10-04 |
| 10     | IT Finance Employee B             | 50 min | 2017-10-04 |
| 11     | Line Manager C                    | 45 min | 2017-10-06 |
| 12     | Process Manager A                 | 60 min | 2017-10-12 |
| 13     | Process Manager B                 | 35 min | 2017-10-12 |
| 14     | Procurement Manager               | 60 min | 2017-10-12 |
| 15     | Technology Controller A           | 60 min | 2017-10-12 |
| 16     | Technology Controller B           | 60 min | 2017-10-16 |
| 17     | RPA Hub Employee                  | 60 min | 2017-10-18 |
| 18     | Process Manager C                 | 35 min | 2017-10-19 |

**Table 2.** Interviews at TelCo.

### 3.2.2 Secondary data - Internal documents

Using multiple sources of data, and to both collect and double check the findings, is called triangulation and is strongly recommended when performing case studies (Dubois and Gadde, 2002). One way to use multiple sources of data, in order to strengthen the findings in the qualitative part and ensure that the qualitative findings are not based on false impressions, is to complement qualitative data with quantitative data (Eisenhardt, 1989). The quantitative data collection in this study has been obtained from the interviewees and involve organisation charts, KPIs, internal presentations about RPA and process templates over how robots work in practise. Furthermore, during the time period of the study the authors have been in continuous interaction with our contact person at the case company and have hence obtained access to general information regarding RPA throughout the whole research process.

### **3.3 Data analysis**

All interviews were recorded and transcribed as soon as possible after they were completed. The transcriptions made it possible to analyse the data and direct the questions in the next interviews based on empirical findings. The ongoing process was to first find interesting themes in the interviews and then in a second step ask supplementary questions to the interviewed candidates that were interviewed at a later stage. When analysing qualitative data, it is important to be both systematic and open-minded during the analysis process. Glaser (1978) state that it is important to not force the data into pre-existing categories and instead let the data itself set the categories. To achieve this, we followed Glaser and Strauss (1967) approach of open-coding data by linking the answers received from the interviews to different categories.

The categories were based both on our experience from conducting and transcribing the interviews and from reading the transcriptions in order to find new categories. Following the constant comparative method (Glaser and Strauss, 1967) we read the transcriptions and asked ourselves whether we could identify anything that was similar in type between transcriptions, this would then be added as a new category. This resulted in nine subcategories, which are presented in Table 3. Subsequently, to structure our findings further we merged those nine subcategories into three main categories; “Expectations of RPA”, “Implementation of RPA” and “Implications of RPA” which are used to present the collected empirical data in chapter 4. In order to relate our findings to previous literature, we then used a systematic combining approach (Dubois and Gadde, 2002), see section 3.1.2. By using a systematic combining approach, we analysed and collected data simultaneously as revising literature and could therefore choose which theories were applicable.

| Main category:        | Description of sub category:         | Questions asked to generate answers within each category:   |
|-----------------------|--------------------------------------|---|
| Expectations of RPA   | Processes suitable for RPA           | How was it decided which processes that should be automated with RPA?   |
|                       | Risks and challenges with RPA        | What are the risks with RPA?<br>What are the challenges with RPA?   |
|                       | Advantages and disadvantages         | Can you mention three positive and three negative aspects of the implementation of RPA?   |
|                       | The future of RPA                    | How much do you believe that TelCo will use RPA in the future?<br>How do you believe that RPA will be affected by the IT division?  |
| Implementation of RPA | Centralisation vs Decentralisation   | What is your view of the central hub?<br>In general, is TelCo a more centralised or decentralised organisation?<br>Do you have any preference about whether the robots are monitored at a local or central level?                     |
|                       | Key Performance Indicators and goals | Are there any outspoken goals with RPA?<br>Do you know any KPIs of RPA?   |
|                       | Employees and RPA                    | What were your work tasks before the implementation of RPA?<br>What are your work tasks after the implementation of RPA?<br>How have you been affected by the implementation of RPA?<br>How has RPA been received from the employees? |
| Implications of RPA   | FSS vs IT                            | What are the advantages and disadvantages that RPA is driven by FSS and not IT?<br>How did IT get involved in RPA?<br>How is the collaboration between FSS and IT?<br>Do you believe that IT will be more involved in the future?     |
|                       | Changed communication                | Have you noticed any difference in communication between different units since the implementation of RPA?<br>How do you receive feedback from your employees regarding RPA?<br>What are the challenges with RPA?                      |

**Table 3.** Questions asked during the interviews. Categorized into sub categories and main categories.

## 3.4 Research quality

### 3.4.1 Validity

The validity of the study is a measure which is used to see how well the outcome of the study is reflecting the studied reality (Yin, 2014). When discussing the validity of a study, both

internal and external validity are necessary to identify. Internal validity is the risk of that the authors who conduct this study do a subjective interpretation of the data (Yin, 2014). In order to limit the risk of internal validity of the study the authors have conducted data not only by interviews but also by processing internal documents from the studied company. As this study is following an abductive research approach the authors have been open-minded for themes in the collected data. The external validity of the study is how well the results can be generalized. As the study is following a qualitative single-case research design the generalizability is therefore lowered (Yin, 2014). However, it does not need to be a disadvantage as Lee (2007) mentions that particularization in favour of generalization constitutes one of case studies biggest strengths. A risk with higher generalization is that the results might be trivial (Lee, 2007). Furthermore, in order to increase the external validity, we have conducted the analysis of the data in a systematic way.

### **3.4.2 Reliability**

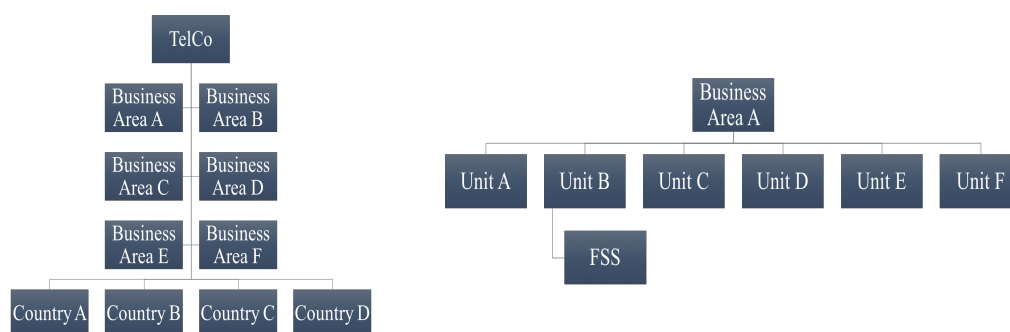
The measure of reliability is also branched into external reliability and internal reliability. The external reliability of the study is referring to the extent the study can be repeated by other researchers in the future or if it is affected by temporary and random conditions (Yin, 2014; Bryman and Bell, 2013). In order for other researchers to conduct a similar study in the future, a structured methodology is a necessity in order to enable a consistency of research procedures. In this study, the methodology is based on comprehensive research about method theory and thus a structured methodology is obtained. However, as the implementation of technology is based on contingent factors (Otley, 1999), the exact same results might not be obtained if the study was repeated on other firms, this is lowering the external reliability. The internal reliability is referring to how well all members of a research team agree on how to interpret what they see and hear (Bryman and Bell, 2013). Both the authors of this thesis have been involved in the data collection, the open coding and the analysis of the empirical data. This increases the internal reliability and decreases the risk of subjectivity. The collected data, both in terms of conducted interviews and additional internal documents have been managed carefully in order to triangulate the results and therefore increase the reliability of the study.

## 4. Empirics

*In this chapter findings from the case study are presented. Derived from the categories discussed in 3.3 Data Analysis, we have structured the findings within three different areas; Expectations of RPA, Implementation of RPA and Implications of RPA. Section 4.1 introduces a description of the case company and the context in which this case study was conducted. Section 4.2 outlines the expectations of RPA, including discussions about suitable processes, perceived advantages, perceived disadvantages and risks with RPA. Section 4.3 describes the implementation of RPA, where the degree of centralisation and goals with RPA are discussed. In section 4.4 the implications of RPA are presented in two subsections “FSS vs IT” and “Changed communication”. Finally, section 4.5 provides a concluding remark of our findings.*

### 4.1 Description of case company and context

TelCo is one of the largest telecom operators in Europe and provide telecommunications in the Nordic and Baltic countries where they offer mobile, fixed network and ISP services (TelCo’s Annual Report, 2016). The organisation is divided both between business areas and geographical areas.



**Figure 4.** Organisational chart of TelCo (TelCo, 2017 Organisational Chart).

The studied unit for this study, Financial Shared Services (FSS), is a central back-end financial function at TelCo. FSS is a service provider for other units within TelCo and include functions such as accounts receivable, accounts payable and financial reporting. FSS is located at TelCo's main office in Stockholm, Sweden, and is not outsourcing any of their work tasks.

TelCo's net income has been declining from over 20 billion 2012 to less than 10 billion during 2016 (TelCo's Annual Report, 2016). As the margins has decreased, several initiatives have been taken to reduce the costs in the company. One of those initiatives is robotic process automation (RPA), a computer software which perform manual work tasks that employees have managed before. Throughout the summer of 2016, RPA was run as a pilot on two processes from FSS at TelCo. During the pilot, an external consultancy firm was deployed to implement RPA at FSS. One prerequisite for employing the consultancy firm was that the internal employees at FSS should be taught how to develop RPA in-house. Today, above 40 processes at FSS are partly or wholly automated with RPA and the development is managed by internal employees at FSS. FSS is not the only unit at TelCo that has started an initiative regarding RPA and in a way to align the separate initiatives at different business areas, a RPA hub was created during spring 2017. The aim of the RPA hub is to create a common ground of best practises and to ensure that individual business units within TelCo are trained in an identical manner regarding RPA.

## 4.2 Expectations of RPA

In this section of the empirics, expectations, perceived advantages, disadvantages, perceived risk and challenges with RPA are described.

### 4.2.1 The processes used for RPA

In an internal presentation (TelCo 2017, RPA General Presentation), the processes that are most suitable for RPA are described with seven characteristics, see Table 3.

| Characteristics of suitable processes for RPA           |
|---|
| Rule-based  |
| Mid-to-high volume repetitive                           |
| Prone to human error                                    |
| Requiring out of office delivery                        |
| Seasonal or with unpredictable peaks                    |
| Lacking case for wider IT system renewal                |
| IT development is lower priority due limited IT budgets |

**Table 3.** Characteristics of suitable processes for RPA (TelCo, 2017 RPA General Presentation).

Those characteristics are the same characteristics that the interviewed employees describe as suitable processes for RPA. Further, the employees describe the processes that are being

automated as boring, monotone and repetitive. Regarding the question about which processes that are being automated with RPA, one of the developer states:

*“Earlier it was quick fixes, as we call it. Where we could earn the most the fastest. But now we have reached the point of having to do assessments.”* - Technology Developer A

An assessment tool is used where suggestions from employees of processes to automate with RPA are evaluated against certain criteria for RPA. The standardization of the processes puts pressure on the input data since robots are unable to handle exceptions. Before a potential process is launched with RPA, the developers need to test the process in order to guarantee the performance. Further, during an assessment the IT division has to be informed by FSS about which processes the robot is going to move between. After the robot is launched it sends monthly reports to the RPA controllers, with statistical data of the automated processes.

#### **4.2.2 Perceived advantages and disadvantages with RPA**

*“A robot works exactly as you have told it to do. You will not get any manual mistakes. Otherwise you can never completely avoid manual mistakes. If a person performs a repetitive task, he or she will become tired and make a mistake. The robot on the other hand does what it is told. The quality is of course increasing. In addition, it is faster. The robot will not take a break, will not go to the bathroom and will not have any coffee breaks.”* - Head of FSS

All interviewees agreed that the advantages with robots are their ability to perform tasks both faster and with higher quality than humans. One perceived disadvantage, raised by the IT division, is that robots are used on tasks that should not even exist. Instead those tasks should have been automated within the IT-system from the beginning. Process Manager B shared this view up until recently when she realised how flexible the robots are:

*“We want it to be right from the beginning. The systems should be automated and shortcomings should not be rebuilt with a robot. But at the same time, I have changed my mind after last week when I realized that robots are quite flexible. One can have the view that we will run this for half a year or a year because it saves a lot of time.”* - Process Manager B

With the above quote Process Manager B points at the fact that robots are not an investment that needs to be run for several years. Instead they could be used in the meantime, before IT



has done automations within the systems and can be shut down whenever a better solution becomes available. The RPA Hub Employee confirms this view by stating that he would do it the traditional IT way with automation in the source system if they had the money, resources and time for this. However, since the time, money and resources are never there something has to be done in the meantime and this is where RPA can be used.

Before the implementation of RPA, managers expected that the employees would react negatively out of fear of losing their jobs. However, there were no negative reaction and when RPA was implemented the employees welcomed the opportunity to perform more analytical tasks and remove the tasks that were seen as boring. Further, several employees within FSS have increased their expertise within IT since they now are developing and maintaining RPA. Because of a high employee turnover, TelCo has been able to limit the recruitment of new employees instead of reducing existing employees after the implementation of RPA. All interviewed employees were in general positive and satisfied with the implementation of RPA.

#### **4.2.3 Risks and challenges with RPA**

Both employees from the IT division and the FSS division mentioned the risk of losing knowledge about the underlying tasks that robots perform. In order to limit this risk, several interviewees stressed the importance of thorough documentation about the processes performed by robots.

*“Because of course people will quit and in the end there will be people knowing that the robot does something but not what and why. It is important to document because otherwise one might lose that knowledge forever.” - Process Manager C*

*“There is a risk that things are not documented thoroughly. “...” I have a colleague, who is from a consultancy firm, who explained what happened there. It was tons of coding but then the developers quit and suddenly no one knew what was there.” - Head of RPA Hub*

Another perceived risk that was discussed during the interviews was the risk of not choosing the right processes for RPA. This is important since robots cannot adjust as humans can, if something in the process or underlying system changes. As the robots are sensitive for

changes, all the possible outcomes need to be mapped thoroughly. If a step is changed within the process, the robots will react and pause until the process is properly redone.

*“You have to know that you perform it on processes that are quite stable. Maybe not get into processes that are being updated half a year later. Because then you have to redo it.”* - Head of FSS

*“If you view it from an IT-perspective, it is a ‘cheating solution’ where you build yourself into old systems even more. Since you have invested more in the old system, you might not renew the systems in the pace that is required.”* - IT Finance Manager

Above the IT Finance Manager is pointing on the risk of building yourself into old systems. Further, the IT Finance Manager mentions that if a lot of resources are spent on RPA, the willingness of changing or updating the systems might decrease. With a rule-based robot, those rules need to be rewritten when the underlying system that the robot operates in is changed. It will thus be more costly and time-consuming to change or renew systems after the implementation of RPA than before.

There is also the risk that the technical part does not work as planned. If there is something that has not been thought of when the robot is implemented, the robot might produce high volumes in a fast pace wrongly before anyone stops it. On the question about perceived risk with RPA one employee answered the following:

*“The risk is that the robot freaks out and sends in a lot of green accepted reconciliations. Even if it is wrong and have started wrong, the robot does not understand that it is sending it wrongly. It has happened that a file has been sent and reversed by the system. It was not the robots fault, but a human would have understood that it is zero and therefore not correct. But in this case it became accepted and we did not even get a notion about it.”* - Technology Controller B

### **4.3 Implementation of RPA**

This section investigates how the studied unit at TelCo has implemented RPA. The section is divided into two subsections: centralisation versus decentralisation, and outspoken goals and KPIs of RPA.

#### 4.3.1 Centralisation vs decentralisation

*“I like the idea of centralisation as I do believe in standardizing processes. But on an emotional level I would like to have the robot more local. I do believe in centralisation but it cannot come at the cost of efficiency... So in that way I believe in centralisation with flexibility.”* - Technology Controller B

All of the interviewees, except for one, agreed that RPA should be governed in a centralised way but with local adoption. The one exemption argued that RPA should be completely centralised. The interviewees stated that they like the decentralised structure since the people who work within the processes can be part of taking decisions relating to the processes. Further, as the overall structure at TelCo is decentralised, it is a natural way for RPA to follow this structure. However, as mentioned by Technology Developer B below and by several others during the interviews, it becomes very costly for TelCo if several business units build up the same competence.

*“I believe the RPA hub is great as we at TelCo today have too many local initiatives. One unit has contacted one consultancy firm while others have contacted a different one. Another unit is managing it internally and some wants the IT division to manage it. This creates synergy costs, not synergy savings.”* - Technology Developer B

*“I believe that when we are in an initial phase like this, during the first two years it is appropriate to run it on a local level. Then we need to evaluate it and see how much we can move to a more central level.”* - Line Manager C

As mentioned earlier, a central RPA hub was created during spring 2017 in an attempt to align local initiatives of RPA. In this hub employees from the IT division will be managing the RPA process, while the development will still be at a local business level. Within the RPA hub, the education of the employees, maintenance of RPA platform, supplier management, best practices guidelines, the budget for the platform and the licences of the RPA are managed.

*“The centralised, decentralised model is working for TelCo but if I’ll take my previous company, the centralised model would be the right one. Although I think the centralised,*

*decentralised model is fitting for TelCo, it might not be suitable for all companies. I believe TelCo will be more centralised in 5 years from now.*” - RPA Hub Employee

In internal documents over how centralised or decentralised RPA should be, a model with three different organisational structures is presented (TelCo, 2017, RPA General Presentation). The three organisational structures are; distributed, centralised and federated. In the distributed structure, every single business unit has their own RPA solution and therefore a loose corporate control. A centralised structure has in contrast everything regarding RPA centrally managed. Federated organisational structure is in between decentralisation and centralisation. It enables development within the business units but with central coordination. It is the federated model which is distributed to the employees at TelCo about how RPA should be governed. This organisational structure provides a knowledge base that will make it possible to implement robots in different parts of the company faster than if every unit would have to start from scratch, but it still keeps part of the local autonomy.

#### **4.3.2 KPIs and outspoken goals of RPA**

*“It is always dangerous to talk about cost savings. We are looking at how many FTEs (full time employees) we can save. We have saved hours from several employees which are summarizing to X FTEs in total. It is hard to say exact numbers but the initial investment we made in this RPA project reached break-even in the first quarter. I have emphasised to limit costs and increase efficiency. That is my way, to manage more work tasks but with less resources.”* - Head of FSS

Several managers mention that the employee turnover is relatively high at FSS. Hence, with the implementation of RPA the current employees will not be reduced, but rather FSS will limit the recruitment of employees in the future. Cost reduction and increased efficiency are mentioned as the underlying goals with RPA. Further, it was mentioned how the employees found more time for analytical tasks after the implementation of RPA.

*“We are trying to increase the qualitative work tasks for the employees and at the same time create efficiency by performing work tasks non-stop, 24/7.”* - Process Manager C

Not all of the interviewed employees were familiar with KPIs of RPA and on the question about KPIs for RPA, some of the interviewees discussed general KPIs for FSS.

*“We have financial KPIs. We work towards more standardized processes in general and then in the same time keep the quality, so standardized processes and quality.” - Senior Manager A*

*“I have not been informed regarding KPIs of RPA “...” I believe it is still quite immature and the knowledge is relatively low.” - IT Finance Manager*

As a conclusion, quality and reducing costs/increasing efficiency is mentioned most frequently throughout the interviews with the employees. Further, several internal documents relating to KPIs were studied. These documents were collected both from FSS but also from the RPA hub at TelCo. In the table below a summarization is made.

| <b>KPIs for FSS</b><br><i>(received from FSS)</i> | <b>KPIs for individual units</b><br><i>(received from RPA hub)</i> | <b>KPIs for the RPA hub</b><br><i>(received from RPA hub)</i> |
|---|--|---|
| RPA processes in production                       | Total number of automations in production                          | RPA availability  |
| Time saved  | Automation potential   | Number of trained employees                                   |
| Automation degree                                 | Savings  | Incidents   |
| Volumes and exceptions                            | Utilization of robots  | Assessments started   |
|   | Number of robots   | Assessments completed   |
|   |  | License cost avoidance  |
|   |  | RPA hub cost per robot  |
|   |  | Support to individual units                                   |
|   |  | Number of robots  |

**Table 4.** Summary over KPIs, based on internal documents  
(TelCo, 2017, FSS RPA 2017 KPI; TelCo, 2017 Hub KPI).

## 4.4 Implications of RPA

This section describes the implications of implementing RPA at FSS. It is divided into two subsections, FSS vs IT and change in communication.

### 4.4.1 FSS vs IT

Before the implementation of RPA, the interaction between the IT division and business was mainly that IT provided solutions to requirements sent by the business division. When RPA was first introduced at TelCo, IT employees were barely involved.

*“We have been forcing ourselves to get involved in this. It is IT-business they are conducting in the business part of TelCo and someone needs to take responsibility for the IT-solution. If it should be driven by the business side, there are numerous requirements based on external factors. Segregation, duties etc. You should not be able to implement something before you have a structured way of working with documentation. We are trying to communicate the requirements.”* - IT Finance Employee B

Due to TelCo's decentralised organisation it was possible for FSS to implement RPA without any initial discussion about whether RPA should be managed by FSS or IT. From the beginning of implementing RPA at TelCo, the head of FSS has emphasised the importance of building and maintaining the competence of RPA within the FSS division. In the initial phase of RPA, the IT division was not involved at all. This has changed over time and today there is a structure in which IT has to be informed about which processes that are used for robots. This change is due to the fact that robots cannot be running at the same time as systems are updated since robots are sensitive for changes in the systems they are manoeuvring within.

Even if the IT division at TelCo is in charge of the maintenance and development of the IT systems, RPA which is manoeuvring within different IT systems is controlled by FSS. Throughout the interviews some discussions regarding who should manage RPA emerged. During one of the first interviews, an employee from FSS explained how the IT division slowed down FSS in their implementation of new robots. In several interviews with employees from FSS similar comments were made. During the interviews it appears that FSS and IT have different views on RPA. While business view robots as a digital workforce that is very close to a human workforce, IT pointed out that robots should not be viewed in the same way as humans since there could be unknown characteristics that differentiates robots from human workers. Thus, IT believes that it is necessary to have more internal controls of robots which slows down the process of implementation.

Most interviewees agreed that RPA should be driven by FSS, since they know the processes that are going to be performed by robots. However, there is no consensus about to which degree the IT division should be involved in RPA.

*“It is extremely beneficial that FSS is managing RPA, the ones who work in the operations knows the operations.”* - Line Manager A

*“If the IT division is owning the RPA, they will develop it and in the end also own the process. Do they manage payments to customers? No, they are not allowed to. I believe it is better if the business owns the RPA, because we are in charge of the processes we are automating. It is however a technical process, so it might be performed by IT. But then business should own the process, because it is we who provide the service.”* - Technology Developer B

*“I believe it should have been easier if the technology developers were a part of the IT division, because then the communication would have been so much easier to uphold.”* - IT Finance Employee A

As Technology Developer B is reasoning, the process of RPA is technical and might be managed by the IT division but FSS should still own the business process. However, from the IT perspective there is a concern that RPA will create local IT units all over the company instead of having one IT division that is in control of everything regarding IT. Some of the IT-employees mention that it might be beneficial if RPA was managed by IT since RPA contains an IT-solution.

*“We talk so much about the fact that we do not want to build different local IT departments out in the business because it will create a form of sub optimization and it will be very unclear with roles and responsibilities etc. There is a thought about centralising IT, and what we usually say is that in the business they should focus on setting the requirements and we at IT will propose the solutions.”* - IT Finance Manager

Several employees are describing the lack of communication between the IT division and the financial division, but also how this communication has been improving and today there are regular meetings where both employees from IT and FSS are present.

*“I have attended a few meetings where we have been discussing roles and qualifications. The IT division has been clear to say that we have done wrong in the past. I have not attended so many meetings but the discussions have been intense. So in the past the collaboration has been lacking, but it is getting better. We have started to inform each other, and communication is really important.”* - Technology Controller A

In internal documents from FSS the question *“Who will build, run and maintain automations?”* is stated together with some potential alternatives: business people, IT people or a process improvement team. This internal documentation is used in presentations for employees both within FSS and other units at TelCo. Further, managers at FSS emphasize the increased importance for their employees to have knowledge about both accounting and IT-systems. Since all of the employees are managing their tasks in different IT-systems, knowledge not only for the accounting principles but also for IT-systems is desired.

*“When we recruit, we are almost only looking at people with both an IT and a business background. It is more important to understand the IT-systems than the accounting. With the automatisisation we lose people with the accounting perspective. It is a danger to lose that kind of competence.”* - Line Manager B

The employees at the RPA hub are from the IT division. The plan is that development and assessment will occur at local level within FSS, while the RPA hub with people from IT will manage licenses and training of RPA.

#### **4.4.2 Change in communication**

*“We have talked about the fact that we need to include the affected employees even if we are not working at the same unit. We need to create a cooperation in our work flow and a greater collaboration between the units.”* - Line Manager C

Regarding the communication, we can see a clear shift towards more communication both between subunits within FSS but also between other business units at TelCo. Instead of choosing outsourcing as an option for RPA, one line manager states that it is better for the communication to have it in-house.

*“TelCo has an IT division which is partly located outside of Sweden and it is really difficult to communicate any details if something goes wrong. Therefore, I strongly believe that the competence should be maintained here which will result in better communication and understanding.”* - Line Manager A



Several of the interviewees agreed on the fact that RPA has become a discussion-starter, mostly within FSS but also within other units of TelCo. The reason why the interest is so high around RPA is described to be mainly because of the simplicity of the software. Even if the employees do not have a technical background, the understanding of RPA is high. The top management at TelCo have several times mentioned the RPA initiative in their communication to the employees as it is seen to be a successful action to reduce costs.

*“So the collaboration has not been great before, but we are now getting better. Now people are starting to inform each other, so communication is very important.”* - Technology Controller A

During the interviews almost all of the interview candidates mention the lack of communication between FSS and IT division in the past. Throughout the time of RPA at TelCo, the IT division has become more involved in assessments and decisions regarding RPA. The interviewed employees at TelCo confirmed that the communication has improved between the different units.

#### **4.5 Concluding remarks of the empirics**

Throughout the interview process, in combination with internal documents relating to RPA, several interesting findings were collected. First, the most suitable processes for RPA are processes that are rule-based, repetitive, contain high volumes and are not maneuvered within systems that are frequently updated. We have found that employees in general are viewing RPA as beneficial albeit the risk of losing the knowledge of tasks performed by the robot was mentioned. Further, a federated organisation model is used with a centralised governance but with a local adoption. By implementing RPA, robots can perform time consuming tasks more efficiently, which enables employees to focus on analytical tasks. During the interviews we also found a split between how IT and business view RPA in terms of what RPA actually contains and what RPA can be used to. Lastly, the introduction of RPA has improved the communication within and between affected units at TelCo.

## 5. Analysis

In this chapter the analysis, following the procedure described in section 3.3 Data Analysis, is presented. The empirics were structured within the three categories “Expectations”, “Implementation” and “Implications” which were based on the open-coding methodology as a first step to present the collected data. In a second step in this chapter, the theoretical framework from section 2.3 is used to structure and analyse the data, in order to contribute to earlier literature. Section 5.1 investigates how new technologies change the role of accountants. Section 5.2 provides a discussion about how the degree of centralisation direct the development of technology. Section 5.3 addresses how the relationship between IT and business affects the control of technology. Since the reason of implementing RPA for TelCo is to reduce costs, a discussion about the financial effects and KPIs for RPA is discussed in section 5.4. Finally, in section 5.5 a contextualised technology power loop, based on our findings, is presented.

### 5.1 Role of accountant

After the implementation of RPA, the employees at TelCo welcomed the opportunity to perform more analytical tasks, which was possible since a robot took over time consuming tasks that were seen as boring and monotone. This shift for accountants towards more analytical roles at TelCo is in line with previous literature regarding how new technologies affect the accountant’s role where new technologies release time for the employees to use to perform other, less repetitive, tasks (Järvinen, 2009; Järvenpää, 2007; Newman and Westrup 2005; Hyvönen *et al*, 2008; Granlund and Malmi, 2002).

Furthermore, implementation of new technologies indicates that accountants might see the possibility to expand their expertise (Kanellou and Spathis, 2013). In the case of TelCo, introducing RPA did result in a greater knowledge and expertise of IT for several employees in the operational part of the firm. In the technology power loop expertise is reproduced (Newman and Westrup, 2005), which can be observed at TelCo since FSS is maintaining the highest competence about RPA.

Hybridisation is about shifting roles: both that other professions move into the accountant’s role (Kurunmäki, 2004) and that accountant’s role shifts toward a more analytical role (Burns and Baldvinsdottir, 2005). At TelCo we can observe the second shift, where accountant's role

becomes more analytical and where IT knowledge becomes more important at the accounting function. What triggers this shift is discussed in previous literature. Hyvönen *et al* (2009) and Burns and Baldvinsdottir (2005) found that the hybridisation of management accounting is not directly linked to the implementation of ERP systems, but instead to the management accountants desire to expand their role. However, our findings of RPA at TelCo are more in line with Caglio (2003) study of ERP system where it is the new technology that triggers the hybridisation of accountants. Caglio (2003) find that this hybridisation is because ERP systems increase the mobility between accountants and other groups of experts. However, we suggest that with RPA, it is the direct effect of time saving that enables employees to perform more analytical tasks. Another finding from our study is that the IT knowledge within the FSS division has expanded since FSS is managing RPA. With employees that perform more analytical tasks and are more involved in IT solutions, the expertise at FSS is impacted. Hence the changed role of accountants can be linked to expertise in the technology power loop.

## **5.2. Degree of centralisation**

Previous research states that not only individual employees will be affected by newly introduced technology but also the structure of an organisation (Bhimani and Willcocks, 2014; Quattrone and Hopper, 2005). This can be seen at TelCo since a federated organisation structure is created. Busco *et al* (2008) describe the level of centralisation as the decision-making power on a central level in relation to how much local autonomy that exists within the firm. Internal documents and answers during the interviews both describe TelCo as a decentralised organisation, with high autonomy for the business units.

RPA followed the decentralised structure of TelCo when it first was implemented. This resulted in many local initiatives of RPA throughout TelCo. The interviewees state that in order to align those initiatives and create positive synergy effects a federated organisation model, the RPA hub, has been created around RPA. Whether an organisation structure changes when an ERP system is implemented varies (Quattrone and Hopper, 2005; Dechow *et al*, 2007; Taipaleenmäki and Ikäheimo, 2013; Newman and Westrup, 2005) and with RPA TelCo became more centralised than before, which is in line with Newman and Westrup (2005) finding where new technologies increase the degree of centralisation. By using the federated model, it is decided that part of the development will occur on a central level, even if most of the development will still be at a local level. Hence, by studying the

implementation of RPA it can be concluded that the degree of centralisation can affect where the development of technology occurs. It is worth noting that TelCo as a company is taking several actions to reduce costs, hence it is quite hard to isolate the factor of implementing RPA as the only reason toward a more centralised organisation structure.

Scarborough and Corbett (1992) highlight the historically in-house development of firm-specific systems while Newman and Westrup (2005) find that with the implementation of ERP systems the development of technology moved outside the organisation. For TelCo, one can argue that by using external consultants, the development of RPA started outside the organisation. However, one prerequisite for employing the consultancy firm was that the internal employees at TelCo should be taught how to develop RPA in-house, which is where the development occur today. This indicates that with RPA there might be a higher degree of in-house development compared to what Newman and Westrup (2005) find in regard to ERP systems.

### **5.3 Relationship between IT and business**

Before the implementation of RPA, the interaction between IT and business was mainly that business sent the requirements and IT provided the solutions to those requirements. When RPA was first introduced at TelCo, IT employees were barely involved. Throughout the interviews, a clear tension regarding how much IT should be involved in RPA can be observed. Employees from FSS mention that the IT division slows down the process of implementing new robots, while employees from IT state that it is necessary to slow down the process in order to ensure that the implementations occur in a controlled way. One reason why IT and business think differently regarding how fast robots should be implemented can probably be found in the answers about how robots should be viewed. While business view robots as a digital workforce that is very close to a human workforce, IT pointed out that robots should not be viewed in the same way as humans since there could be unknown characteristics that differentiates robots from human workers. Thus, IT believe that there have to be more internal controls involved which slows down the implementation process.

As TelCo is a decentralised organisation it was possible for FSS to implement RPA without any initial discussion about whether RPA should be managed by FSS or IT. TelCo has thus extended the accounting function to involve RPA, which is in line with Bhimani and Willcocks (2014) who state that the accounting function changes with new technologies.

Armstrong (1985) claims that the introduction of a new technology creates a tension of what areas accounting should contain, and in the case of TelCo we can see a clear tension between what the business side and the IT division believe that the accounting function should include. The business side is convinced that RPA should be controlled by them, and thus RPA should be managed within the business side. IT on the other hand states that the company could have chosen to let RPA be managed by IT instead, since they do not want local IT initiatives in the business. However, during the time of RPA at TelCo both the interaction and communication have increased between IT and FSS.

Dechow *et al* (2007) state that every new technology affects the relation between IT and accounting in a different way. Since the implementation of RPA the collaboration between FSS and IT has increased. In internal documents from FSS, alternatives of who should be in charge of RPA is presented. The alternatives were stated as: business people, IT people or a process improvement team. At TelCo a process improvement team, the RPA hub, was introduced during the beginning of 2017. The process improvement team is in line with the strategic alliances Newman and Westrup (2005) address in their study, where employees with different backgrounds are brought together into one team to control the technology. In this RPA hub employees from the IT division will be managing the RPA process, while the development will still be at a local level within the business units. A hybridisation of the accountant function can hence be observed at TelCo as the development of the IT-solution will still be managed from FSS. This is similar to Caglio (2003) findings about ERP systems, where hybridisation of accountants occurred after implementations of ERP systems. Thus, this indicates that the accounting function in the future will consist of employees with various backgrounds, both IT and accounting.

Newman and Westrup (2005) highlight the ongoing spiral of who is in charge of the technology. Before the implementation of the central RPA hub, FSS had the absolute control of RPA which is in accordance with the technology power loop where control of technology is shaped by the development of technology (Newman and Westrup, 2005). With FSS as the developers of the technology, RPA was hence controlled by them. However, as the RPA hub is now involved in the development and therefore collecting a higher expertise regarding RPA, the control of RPA is lowered for FSS and partly shared with IT. By studying the implementation of RPA we as authors propose that the control of the technology is affected by the relationship between IT and business.

## 5.4 KPIs

With the implementation of RPA there are some newly introduced KPIs. In general, the interviewees mentioned how much time a robot can save and the increased quality that is reached with robots. All the interviewed employees agreed on the benefit of RPA for TelCo and one contributory factor might be the clear communication between management and the employees. Further, the clear communication lead to a consensus of TelCo's goals, which is in line with Bradford and Florin (2003) earlier research of how to generate an effective implementation of a new technology.

The common goal of implementing RPA at TelCo is to decrease costs and increase quality. At TelCo there are positive financial effects from implementing RPA, as the project reached its break-even in the first quarter. Those findings are in line with findings about implementation of ERP systems where positive financial effects were found (Hendricks *et al*, 2007; Poston and Grabski, 2001). Newman and Westrup (2005) state that the implementation of ERP systems reduces the number of accountants. However, our finding of implementing RPA is in contrast to Newman and Westrup (2005) but in line with the finding of Granlund and Malmi (2002), where the saved time from implementing ERP systems is filled with more analytical tasks for the accountants instead of a reduction of personnel. Still, as the employee turnover at TelCo is relative high, managers suggest that the number of recruited employees can be reduced in the future.

## 5.5 A development of the technology power loop

In our theoretical framework we identified three central ways of how new technologies can affect an organisation. Derived from the empirics and the analysis in the previous section, this section presents a suggestion of an extended technology power loop.

We identified that the three main effects of RPA at TelCo can be summarized to; a changed role of accountants, a changed degree of centralisation and a changed relation between IT and business, which is in line with previous literature regarding the effects of new technologies. Following the explanation below, we propose that those three effects can be linked to the structure of control within an organisation and hence we extend the technology power loop by Newman and Westrup (2005) to include those three effects.

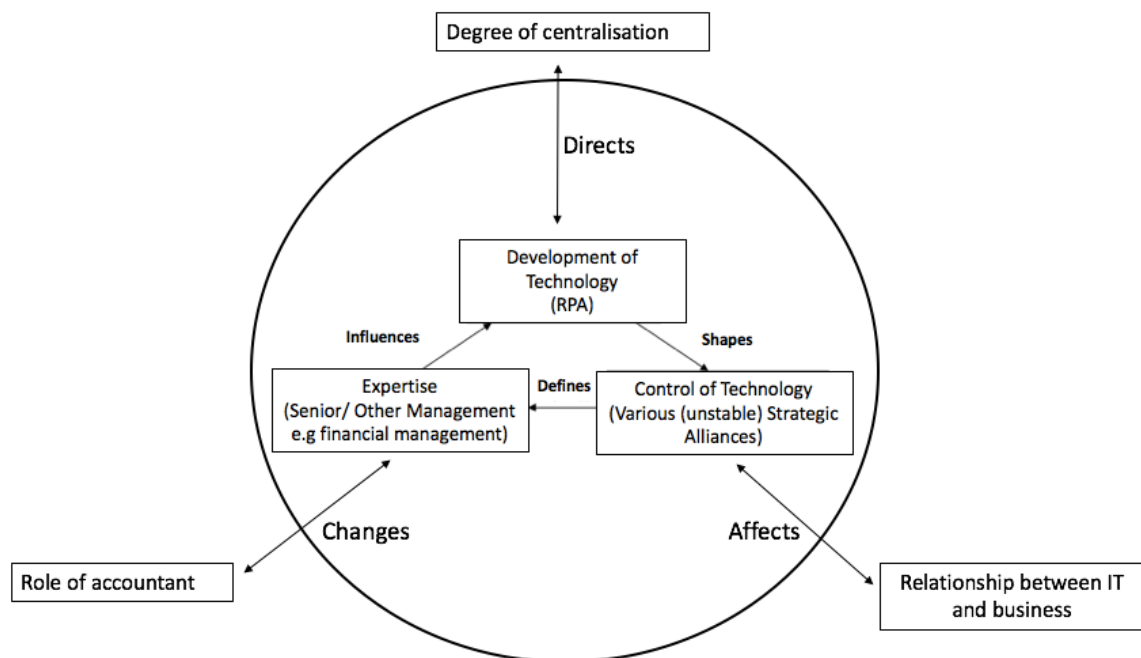
First, with RPA the accountant's role is changing and the employees perform more analytical and less repetitive tasks. This is in line with previous research where new technologies have proven to change the role of accountants from book-keeping to more analytical roles (Järvenpää, 2007; Newman and Westrup, 2005; Hyvönen *et al*, 2008). A result is that the expertise of accountants is expanding and more analytical tasks are performed. In the technology power loop one key area is expertise, which is defined as a more dynamic view of knowledge (Scarbrough and Corbett, 1992). At TelCo the expertise about RPA is mainly maintained at FSS due to the initial agreement to train internal employees at FSS. The internal employees at FSS increased their knowledge of RPA in combination with existing accounting knowledge. Subsequently, the changed role of accountants can be linked to the change of the expertise in the technology power loop.

Second, RPA will be governed through a federated organisation structure. In existing literature new technologies have proven to have different impacts on the organisation structure depending on the case company (Quattrone and Hopper, 2005; Dechow *et al*, 2007; Taipaleenmäki and Ikäheimo, 2013; Newman and Westrup, 2005). TelCo is a decentralised organisation but with cost inefficiencies and in order to align the local initiatives and reduce synergy costs, the federated organisation structure and RPA hub were created. With the RPA hub, part of the development of RPA will occur at a more central level than before and thus the degree of centralisation can be linked to the development of a new technology. Therefore, we incorporate the degree of centralisation in the extension of the technology power loop.

Third, RPA changes the relation between IT and business. Before the implementation of RPA, the interaction between IT and business was mainly that business sent the requirements and IT provided the solutions to those requirements. When RPA was implemented at TelCo it was managed from FSS which is in line with Bhimani and Willcocks (2014) finding that new technologies changes the accounting function. During the time period of RPA at TelCo, the IT division has increased its involvement, and attains more information about RPA. When RPA was governed from the business side both information and control were attained at FSS, which is in line with Newman and Westrup's (2005) technology power loop. Since the relationship between FSS and IT is changing, and IT becomes more involved, control over RPA is also changing. Dechow *et al* (2007) states that managers who control and restrain access to information are often the ones to govern organisations, with the new federated structure and RPA hub run by IT the control is no longer solely at FSS. Thus a logical

explanation is that the relationship between IT and business will affect the control of technology. Therefore, we incorporate the relationship between IT and business in our model and link this relationship with the control of technology.

This study argues that the degree of centralisation directs the development of technology, the relationship between IT and business affects the control of technology and the role of accountant changes the expertise of technology. In the below conceptualized model (Figure 5) the three central ways an organisation can be affected by implementing a new technology are incorporated with the different parts of the technology power loop.



**Figure 5.** RPA era. A conceptualized technology power loop.



## 6. Conclusion

### 6.1 Summarisation of contributions

This study aimed to answer the following questions:

- *What are the effects of implementing a new technology, robotic process automation (RPA), on the accounting function?*
- *Are the effects of RPA in line with earlier findings from implementing ERP systems, or does this new technology affect the organisation in a different way?*

To answer these research questions, we formed a theoretical framework by alternating between theory and empirics through a systematic combining approach (Dubois and Gadde, 2002). In the theoretical framework the three main effects of how new technologies affect an organisation were; a changed role of accountants, a changed degree of centralisation and a changed relation between IT and business, was combined with the technology power loop.

RPA turned out to have a similar effect on the role of accountant as ERP systems, where the role of accountants become more analytical with less time spent on repetitive tasks. Further, our case study demonstrates that RPA brings IT competence to the accounting function, which extends and exemplifies Kanellou and Spathis (2013) research about how new technologies expand the knowledge and expertise for accountants.

In existing literature there are contrasting findings regarding how implementation of a new technology influences the degree of centralisation (Dechow *et al*, 2007; Taipaleenmäki and Ikäheimo, 2013; Newman and Westrup, 2005; Quattrone and Hopper, 2005). Our case study discovers that with the introduction of RPA a federated organisation structure around RPA is created. Thus RPA shifts TelCo to become a bit more centralised than before, which in turn affects the development of RPA. However, it is worth noting that TelCo as a company is taking a lot of actions to reduce costs, thus the factor of implementing RPA might not be the only reason for a more centralised organisation structure.

This case study has shed light on some interesting dimensions regarding the relationship between IT and business. A tension between FSS and the IT division was observed relating to how involved the IT division should be in RPA. Further, a federated organisation model

where both IT and business were involved was created. This finding confirms Dechow *et al* (2007) finding that a new technology creates a more complex organisation. Another tension is between what the FSS and the IT division think that the accounting function at TelCo should include which is in line with Armstrong (1985) findings where new technologies create a tension of what accounting should contain. This study indicates that with increased knowledge about IT within the accounting department, organisations might not have absolute accounting and IT divisions in the future but instead incorporate those into hybrid units.

The financial effects from implementing RPA have been positive and break-even was reached during the first quarter after the implementation. KPI's on how much time a robot saves and the number of automated processes are tracked and communicated to the employees, who overall seemed satisfied with the implementation. To conclude, the implementation of RPA affects TelCo by bringing more analytical tasks to the accounting function, by creating a more centralised structure and a change in view over what is considered to be IT or accounting tasks. Further the implementation of RPA was considered successful by employees and generated positive financial effects for the company.

The effects of RPA from this study are summarized in the table below and contrasted to Newman and Westrup's (2005) earlier finding relating to effects of ERP systems.

|             | <b>Development of technology</b>   | <b>Control of technology</b>   | <b>Expertise</b>  |
|-------------|--|--|---|
| Pre-ERP era | Development occur in-house by employees at accounting function.                  | Management accountants   | Management accounting   |
| ERP era     | Technology is developed outside the organisation.                                | Strategic alliances. A mix with employees from different backgrounds; accountants, vendors, consultants and IT-division.   | Senior/other management   |
| RPA era     | Development occur in-house, influenced by the degree of centralisation of TelCo. | A federated organizational structure affects the control. The direct control is obtained in the different business units, but is shared with the IT organization due to RPA hub. | The employees broaden their expertise to become more hybrid with knowledge relating to the IT-solutions of RPA. More time for analytical tasks. |

**Table 5.** Summary of Newman and Westrup (2005) findings in combination with the findings from this study about RPA.

## **6.2 Limitations and suggestions for future research**

This study has examined the effects from implementing RPA at TelCo in order to contribute to an overall understanding about the effects that RPA brings to an organisation. By using the lens of the technology power loop the main effects have been observed and following are some limitations and suggestions for further research.

The first limitation with this study is that the results of the study are hard to generalise as this study is conducted through a single-case study. A single-case study creates depth and a greater understanding of a phenomenon but it is harder to generalise the results throughout different industries and companies. It is accordingly a suggestion for future research to conduct similar in-depth case studies, on organisations that rely on other circumstances, to see if the results are in line with this study or not.

Second, another limitation of this study is the manner of the collected data. As the primary data collection of this study were based on conducted interviews there can be a risk of subjectivity of the authors. In order to minimise this limitation, the authors have tried to be as open-minded as possible to limit the risk of asking leading questions at the interviews.

Furthermore, another limitation is that we did not contact and interview external vendors or involved management consultants to get an even better picture of the phenomenon. It is a limitation but we argue that within the scope of this thesis it was not possible to pursue due to the time limit. As Newman and Westrup (2005) also suggest, this is a very interesting area for future research.

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