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**ROBOTIC PROCESS AUTOMATION IN FINNISH FINANCIAL ADMINISTRATION**

Master's Thesis

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Abstract			
<p>Automation has been a part of the discussion regarding accounting already from the 1950's (Keenoy 1958). Since then, the topic has evolved from physical automation to software-based solutions, often referred to as Robotic Process Automation, or RPA. Digitalization has laid the groundwork for companies to build automation on top of various processes. Companies are often seeing the most amount of data driven processes in their financial departments as argued by Kaarlejärvi &amp; Salminen (2018). The vast amount of data has sparked a shift from old ways of working towards more smart processes through automation. The increase on the discussion around the topic of RPA in the context of financial administration has sparked an interest for this master's thesis. This thesis aims to research the effects Finnish companies have encountered after implementing RPA in their financial processes. The thesis will explain, in detail, the state of the current level of academic research and why financial processes are potential for automation now, and in the future.</p> <p>The thesis uses qualitative research methodology in the form of three semi-structured interviews to look at three subject companies varied in size and operations on how RPA has benefited the financial processes. The empirical data of the thesis was gathered through remote interviews held with relevant personnel who have experience of RPA implementation. Once the data was gathered, it was transcribed and further coded to find out the most significant impacts RPA has had on the financial processes of companies. The results of the thesis will look at the net benefits achieved by the subject companies to answer the research question as suggested by DeLone &amp; McLean 2003 theory to measure IS success. As presented by the 2003 theory, RPA implementation is looked from different points of view, being quality, usability &amp; use, and the net benefits achieved.</p> <p>The results of the study show how RPA can be used in different size companies to the advantage of accountants and other financial employees. The net benefits achieved through RPA are found positive, yet this study provides further considerations for RPA implementation in financial administration. The benefits of RPA can be found through in-house development of RPA as well as outsourcing software capable of running automated tasks. The key findings of this thesis are in line with existing studies, suggesting RPA is found to be most beneficial in the most routinized and laborious tasks. The results also pursue the importance of employee participation in the development process of RPA and the importance of change management by company manager's when ramping up RPA usage. Ultimately, the thesis finds RPA implementation is net positive for both the organization and the individual the RPA influences.</p>			
Keywords <b>Robotic process automation, RPA, financial administration</b>			
Additional information			

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## 1 INTRODUCTION

Financial administration as an industry has continuously been shifting towards an increased level of digitalization and automation in Finland, and elsewhere. This master's thesis aims to seek out the benefits of Robotic Process Automation, or RPA, and how it has impacted the administrative processes of companies based in Finland. The thesis also seeks to form a picture of the past and present state of RPA, presenting how automation has been impacting the financial administration as an industry in general over the past decades.

The accounting industry has been a part of the automation ever since the late 1950's. Keenoy (1958, p. 236) wrote about the importance of change in accounting, and how progress can be only made through change. The 1958 paper writes about the importance of cash registers in accounting development and further outlines a then new technology called "the electro-mechanical accounting machine", sort of a sophisticated typewriter meant for accounting purposes. The accounting machine was meant to assist in accounting processes, limiting the need of a pen and a paper and help in the accounting data collection and processing. This thesis is not looking to focus on the historical points of automation and accounting in such detail, but it is important to understand the issue has been discussed in academia for quite some time. Seemingly, automation in the field of accounting has stimulated discussion from the very early stages of computing, as presented by Keenoy in his 1958 paper.

Proceeding to more recent times, the importance of automation in accounting seems to be provoked by the increased amount of accounting data itself. Lahti & Salminen (2014, p. 15-33) outline the significance of digitalization and how the digital ways of working are impacting the entirety of financial administrative processes within companies. The general increase in the level of digitalization is presented as the main reason behind automation in financial administration. When the trend of automation is viewed, it is quite clear that automation in financial administrative processes follow a linear line of progression, all the way from the 1990's when paperless financial administration begun, to the digital ways of working of the 2010's (Kaarlejärvi & Salminen 2018, p. 16). The 2018 book theorize that the natural progression is towards

automation and so-called *smart financial administration*. The smart processes are where RPA is needed.

This thesis differentiates accounting departments from so-called financial administration. The thesis is looking to discuss the impact of RPA in financial administration as a whole and pursue that RPA can be a significant topic for the financial administration, rather than just for the accounting processes themselves. The 2014 book (Kaarlejärvi & Salminen 2014, p. 16) differentiates financial administration from accounting by explaining that financial administration is a broader concept when comparing to an accounting department. Financial administration is specified to consist of the entire system, which an organization uses to monitor its financial occurrences in a way which is further used for stakeholder reporting. The financial administration therefore consists of all the processes within both financial and management accounting, and all possible supporting processes they might use (Lahti & Salminen 2014, p. 16). In short, financial administration can be viewed as the department, or function, which is responsible for any financial reports an organization might produce. Financial administration and its relation to automation will be discussed later in the thesis.

## **1.1 Motivation of the research**

As mentioned in the very beginning of the thesis, RPA is a current topic in the field of financial administration. This thesis is motivated by the lack of research of RPA success found by Finnish companies in their RPA implementation.

Prior research in Finland regarding the topic of RPA consists of often very general view to the issue at hand. Firstly, publications such as Kaarlejärvi & Salminen (2018), Lahti & Salminen (2008 & 2014) give valuable insight to the prior and current state of RPA in the Finnish context but lacks focus on the empirical part. Secondly, prior master's level thesis such as Astola (2020), Saurus (2020), and Vanhanen (2020) has given important empirical insight for the purpose of subsequent research, such as this thesis. The prior theses published have found significant results when considering the topic of RPA, creating the motivation behind this thesis. This thesis aims to take prior research done regarding RPA and fit it in the context of Finnish financial

administration. The underline aim is to seek out the net effects of RPA in financial administration.

## **1.2 Research objective & research question**

The objective of this thesis is to research the effects Finnish companies have encountered after implementing RPA in their financial processes. As described by the motivation behind this thesis, the lack of prior research on the RPA success found by Finnish companies and more specifically Finnish financial administrations is strongly behind the purpose of this thesis. The objective is to find out the kind of effects, whether positive or negative, which have been found after RPA has been implemented.

To reach the objective of the research, the initial step is to conduct a comprehensive theoretical research of Robotic Process Automation. The theoretical knowledge base is acquired by introducing prior literature and by finding key concepts related to RPA. The thesis will use prior theory, constructed for Information System success measurement (DeLone & McLean, 2003), to measure the benefits or drawbacks of RPA implementation. Ultimately, the main research objective of this thesis is to focus on the results achieved by already implemented RPA projects within financial administration in Finland and carefully present them to the reader.

The main objective of this thesis is to find out results of implemented RPA projects in Finnish financial departments. Based on the objective of the thesis, the following research question has been formulated:

*What are the net effects of implemented RPA technology in financial administration?*

The thesis aims to answer the research question using appropriate methodology and a comprehensive look into prior literature. The initial research question is used to research the possible effects found after RPA implementation within financial administration. By net effects the thesis pursues the sum of benefits and drawbacks of RPA implementation.



### 1.3 Frame & structure of the research

The framing of the study stem from the accessibility of information relating to the topic. Even when companies can be viewed to implement more and more automation in their financial processes (Kaarlejärvi & Salminen, 2018), the thesis is done based on the assumption that larger companies and, companies providing financial services, benefit more from RPA as they are dealing with larger quantities of financial data overall. The prior literature (Kaarlejärvi & Salminen, 2018; Lahti & Salminen, 2014; Bhimani & Willcocks, 2014; Lamberton, Brigo & Hoy, 2017) regarding the topic further emphasizes the significance of large amounts of data and the potential of RPA usage in cases where repetitive tasks are present. The significance of data will be introduced later, in chapter 2.4 of this study, where key concepts to the topic are presented. As the amount of data and level of laborious repetitive tasks is important to the topic of RPA, this thesis focuses mainly on companies operating under an increased amount of financial data. The thesis focuses exclusively on financial administrations based in Finland, and more critically operating under the Finnish Accounting Standards or FAS. This study does not exclude companies who have operations on top of domestic ones outside of the Finnish jurisdiction. The study aims to find companies from various backgrounds regarding financial operations, in order to find out how RPA is implemented in various financial contexts.

The thesis is divided in to 6 separate parts. After the first introductory chapter, in the 2<sup>nd</sup> chapter, key concepts and context is presented to the reader. The 3<sup>rd</sup> part of the thesis focuses on prior literature and theory from the point of view of RPA. The 3<sup>rd</sup> part also outlines how this thesis will use prior theory. Research methodology will be presented in the 4<sup>th</sup> chapter, followed by the 5<sup>th</sup> chapter, where empirical research done for the thesis is presented. The last chapter is meant to conclude the thesis. Possible limitations and suggestions for future research are also discussed at the end of the thesis.

## 1.4 Research design

The purpose of this sub-chapter is to describe, in brief, the methods this research follows and how the choices assist in answering the research question. The research methodology of this thesis is discussed in detail in the 4<sup>th</sup> chapter of the thesis.

This thesis uses qualitative research methodology to answer the research question. The research will be carried by holding in-depth semi-structured interview methodology, as described by Halperin & Heath (2012, pp. 253-286). The topic of RPA success can be viewed as vague enough, where qualitative methodology can be seen justified. RPA projects, and the success of the projects themselves largely are dependent on the implication itself, and therefore it is difficult to collect data on a standardized matter, by for example questionnaires. As further explained by Asatiani & Penttinen (2016, p. 3), the measurement of RPA projects is left on the responsibility of the companies where RPA is implemented, and therefore, differences between metrics can be expected. Semi-structured interviews allow the interviewer to lead the discussion based on the specific points of interest brought into the interview by the interviewee themselves. Therefore, the methodology chosen allows the interviewer to find out the most relevant information possible, when concerning this thesis.

The analysis is done based on the data collected in the semi-structured interviews. Data reduction methodology is used (Halperin & Heath, 2012 pp. 279-280) to handle to acquired data in a standardized matter. The reduced data is further coded to find differences in the data structure, ultimately leading up the data analysis itself. The data analysis will be discussed more in detail later. The reasoning behind the use of data reduction, and data coding, as a tool in data analysis is due for it allowing the research to focus on the very issues which are found as most compelling in relation to the topic.

## 2 CONTEXTUAL BACKGROUND OF RPA

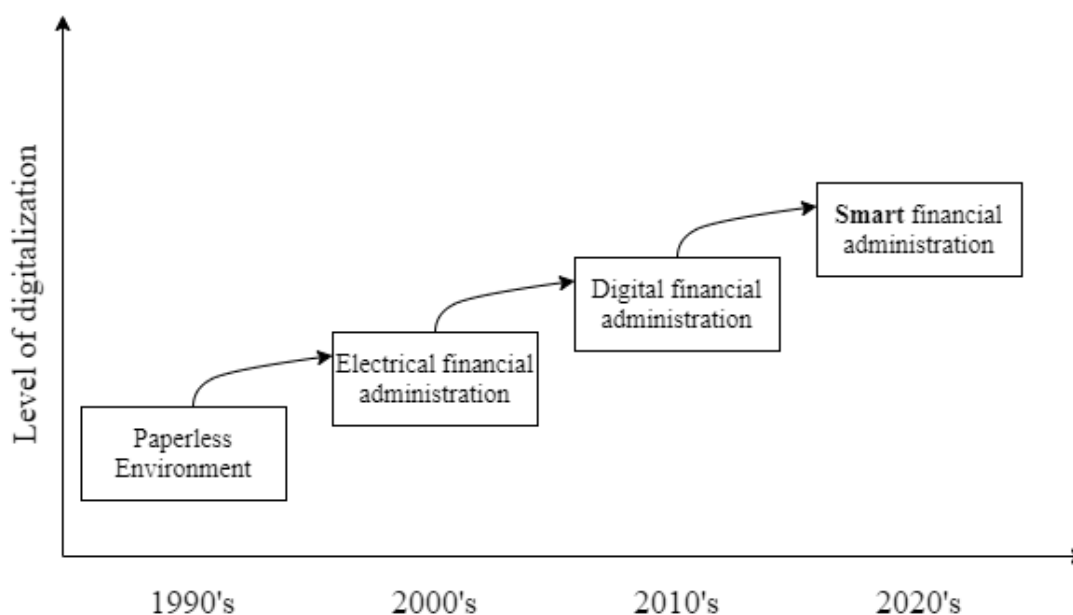
The contextual background of this research stems from the development of processes within financial administration. Ever since companies begun to move from accounting processes consisting of physical paper copies towards a more computerized ways of working, Robotic Process Automation has had a place in the software used in financial administration. The second chapter of this research focuses on concept of financial administration itself and further explains key terms such as Robotic Process Automation and big data and how they are related to financial administration.

### 2.1 Financial administration in Finland

To understand the context behind this research, it is crucial to define what is meant by financial administration. It is also important to understand how financial administration has developed to be one of the more potential areas to be automated in the present as well as in the future. Lahti & Salminen (2014 p. 16) define financial administration to include the whole system, which an organization uses to monitor its financial occurrences in a way which is further used for stakeholder reporting. Generally, the financial administration refers to the department in an organization which is responsible for both the financial accounting and the management accounting. Financial administrations are usually operating as a supporting function in an organization.

According to the Kaarlejärvi & Salminen 2018 book (p. 16), financial administration has started its shift during the early 1990's from companies moving from paper to electrical. Figure 1 showcases the steps Finnish financial administrative has taken to reach its current state. The development of financial administration in Finland will be in the very center of the topic at hand. Based on the 2018 book (p. 11) Finland was the first country globally allowing for the shift from physical accounting material towards an electrical financial administration, creating an optimal environment for RPA to be implemented. The evolution in financial processes has allowed for companies to start developing digital ways of working, which is crucial to RPA. This shift from digital to automated financial administration is described by Kaarlejärvi & Salminen (2018, p. 16) as *smart financial administration*, as seen on the very last step of the figure 1,

below. Smart financial administration can be achieved through automation, which is possible only after a significant part of the processes are in a digital form. Companies can face problems in achieving an increased level of digital financial data, as the data is often dependent from outside stakeholders, such as suppliers, banks, and creditors (accounts payable processes, bank statements, etc.). Kaarlejärvi & Salminen (2018) have described this trend to consist of steps following subsequent milestones. The steps leading up towards the so-called smart financial administration are trying to explain the increased amount of RPA implementation by companies. Kaarlejärvi & Salminen divides the Finnish financial administration in to seven independent parts: accounts payable, accounts receivable, travel invoicing, treasury, fixed asset accounting, general ledger accounting and internal control.



**Figure 1.** The digitalization of financial administration: The transformation from paperless bookkeeping to a smart financial administration. Adapted from Kaarlejärvi & Salminen (2018, p. 16).

The act of automating various financial processes has a direct impact on the job description of accountants and other administrative tasks handled by financial departments. Aho (2019, p. 31) argues that accounting, as a career, is shifting from the

role of bookkeeper to a role of a consultant. Accountants of the future are expected to hold the intellectual expertise which is used to solve accounting related problems for the client itself. In the past, bookkeepers were strictly following rules and regulations set for the accounting industry but in an increased amount the software is handling these regulated tasks and the accountant is left with the expertise of the subject. Aho in his 2019 book (p. 56) argues that the accountants of the future can play a role in the financial success of the client or the company they work in by offering information to the client, rather just the regulatory reports after each accounting period.

## **2.2 Robotic Process Automation**

Robotic Process Automation, referred to as RPA, is an act of automating processes using software implementation. The automated software is performing processes, or parts of processes, without human interaction thus eliminating the need of an employee undertaking the task. According to Lamberton et al. (2017, p. 11) RPA is optimally used to deliver solutions in automating manual labor-intensive back-office tasks. The act of automating the tasks streamlines processes while making them more cost-efficient, consistent, and regulated. Kaya, Turkyilmaz & Birol (2019, p. 237) further explains RPA to be differentiated from physical robotics used in various industrial processes. Therefore, RPA in this context should rather be understood as configured software doing the work prior done by humans to achieve the benefits listed by Lamberton et al. in their 2017 article.

RPA can be considered to work as a tool to automate repetitive and laborious parts of processes which follow a predetermined pattern. The research done by Willcocks, Lacity (2015a; 2015c) & Craig, Lacity, Willcocks (2015b; 2016) & Craig and Willcocks, Hindle & Lacity (2019) can be viewed as significant for the academic discussion around the topic of RPA. Willcocks et al. & Lacity et al. have created multiple case studies measuring the performance as well as the overall process of an RPA study in case companies. The research further consists of detailed explanations of RPA related concepts which will be discussed in the 3<sup>rd</sup> chapter of this thesis. The significance of case study methodology within the area of research will also be discussed.

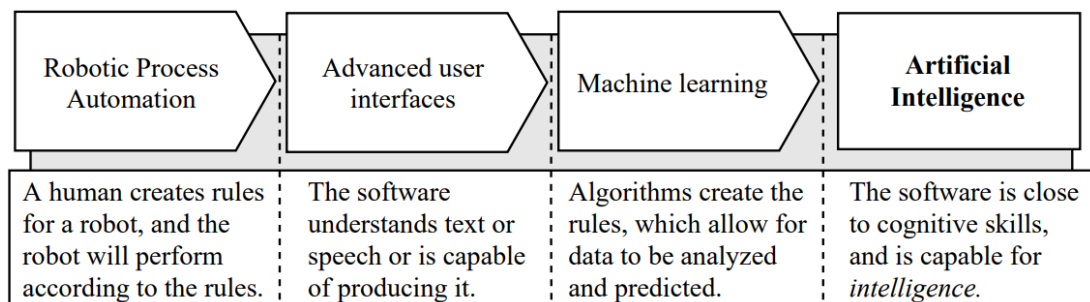
For the purpose of this research, it is important to view RPA from the perspective of financial administration. In their 2018 book, Kaarlejärvi & Salminen define how RPA can be used in the various processes which in their entirety compose financial administration. RPA can be implemented on all parts of financial administration as the processes are often very data intensive and consisting of repetitive steps. The significance of data will be explained later, as it is highly important to the topic of RPA. In financial administration, the data gathered from any process is often stored and manipulated using a so-called ERP-system, which stands for an Enterprise Resource Planning system. Especially in Finland, where financial administration and related processes are already running in highly digital format (see chapter 2.1) ERP-systems are a key factor in RPA implementation. RPA is often constructed as a part of an ERP-system which allows companies to improve their processes without having to change the whole platform the financial data is being processed on. When the automation can be constructed on top of existing software further cost reductions of the implementation can be achieved (Kaarlejärvi & Salminen, 2018, pp. 36-37). RPA is explained as a first step of a 4-step process towards ways of working where the machine is doing a major part of the work. The 4-step process evolves from RPA all the way to the so-called Artificial Intelligence state through advanced user interfaces and machine learning where the software is being able to evolve itself (Kaarlejärvi & Salminen, 2018, pp. 51-55). But for the purpose of RPA implementation in financial processes, it is important to understand RPA is a tool to use within an ERP-system and allowing the ERP-system to be used in a way where financial data is manipulated using predetermined parameters always set by humans. It is important to emphasize that this thesis focuses solely on RPA implementation.

### **2.3 Artificial Intelligence**

As mentioned, it is important to differentiate RPA from Artificial intelligence, or AI in short. AI is used to provide implications for automation which are out of reach of standard RPA. Therefore, the purpose of this subchapter is to differentiate AI from the context of this thesis, as the thesis focuses solely on RPA implications. As RPA can be simply look at a *set of rules* a software follows to complete a task, AI takes the matters further with adding *intelligence* to the software run operation (Poole, Mackworth & Goebel, 1998). Poole et al. (1998) argue AI can be taken as

computational intelligence simulated by a software. Thus, AI is intelligence a computer produces through simulation.

AI can be used in RPA in the form of machine learning in the simple end, and so-called cognitive AI in the most advanced end (Kaarlejärvi & Salminen, 2018, p. 61). Kaarlejärvi & Salminen (2018) argue future AI will eventually form a conscious and can interpret cognitive creativity in its operation. The current implications of AI in the context of financial administration can be found from machine learning, where the software is trained to predict the most likely outcome in any given situation. Kaarlejärvi & Salminen (2018, pp. 51-61) explain the development of AI, as seen in Figure 2 below, by dividing it to four different parts, being: RPA, Advanced user interfaces, Machine learning and finally, Artificial Intelligence.



**Figure 2.** Software robotics and other tools for smart automation, a dapted from Kaarlejärvi & Salminen (2018, p. 52)

Figure 2 divides the development of RPA all the way to AI using a linear progress. Kokina & Davenport (2017) explain the significance of AI in the context of auditing and assurance, and this article and its significance is being discussed later, in chapter 3.2. Although AI is significant from RPA point of view, this thesis is focusing only on the initial stages of automation using RPA. The differentiation is done due to the framework of the very thesis. The purpose of this chapter was to further explain what is meant by *Robotic Process Automation* in the context of this thesis.

## 2.4 Big data and cloud services

The term *big data* is often connected to RPA. According to Bhimani & Willcocks (2014 p. 470) big data can be viewed as a technology which is affecting how corporations conduct business and develop their overall strategy. The technology which is referred to as big data is simply the methods any given organization collects data in a structured and centralized manner. The 2014 article further emphasizes the importance of the so-called cloud storage, which has allowed for a more agile and cost-efficient way of storing and accessing company data. Storing data using a cloud service simply refers to a centralized service which is accessible over the local server or the public internet where the service user can collect the data it desires. A cloud service is often used as a separate service, working in parallel besides any ERP-systems a company might use. Therefore, companies acquiring any sort of data can build technology which can be referred to as big data if it is done in a centralized and structured manner.

The potential of big data in financial administration is clear. Financial processes generate vast amounts of data (Kaarlejärvi & Salminen, 2018) and therefore the various accounting processes can be implemented in structural data gathering, or big data implementation. Companies have used accounting information as a tool to track customer behavior to guide company strategy. Management accounting processes are often used to guide company strategy, but the data itself is gathered in the initial steps of financial accounting through invoices and other financial transactions. When data is structured and stored in a centralized database (such as cloud storage), companies can implement statistical analysis in order to find how the customers are behaving and ultimately find key focus points in their overall value creation process. (Bhimani & Willcocks, 2014, p. 475)



### **3 ACADEMIC BACKGROUND OF RPA**

In this chapter of the thesis RPA is looked from a literary perspective. The initial idea behind the literature review is to explain to the reader the significance of case study methodology behind RPA and provide context by explaining three known case studies from the area of research. The case purpose is also to provide justifications why case studies are significant for the purpose of this thesis. Later, in chapter 3.2, the reader is provided with additional research explaining the current state of academic research in the field of RPA and how it all relates to this thesis.

#### **3.1 Case studies**

The research design behind many RPA related studies is done following a case study methodology. Tellis (1997) gives a comprehensive overview of how a case studies can be applied in an academic context. According to the 1997 article case studies can be used ideally in research which is designed to look issues from a holistic point of view or are complex in nature. Case studies can be divided in to four main phases: designing the study, execution of the study, analysis of the evidence and drawing conclusions. Case studies around the topic of RPA are often conducted using qualitative methodology, such as in-depth interviews, but case studies can be conducted using quantitative methods as well. The reason behind RPA and the favoring of qualitative methodology can be related to the case-by-case nature of each project, where similarities between projects can be hard to find or determine and therefore the variables for quantitative research cannot be identified (Tellis 1997).

In this section of the thesis, various case studies are presented and the findings of which are discussed. The case studies presented are often cited in research regarding RPA, underlining the importance of secondary data in relation to RPA research. The case studies are presented in the subsequent chapters to establish an idea of how RPA projects are conducted and what kind of results have companies achieved with RPA implementation. The justifications behind presenting the case studies arise from the important secondary data the studies provide for future research. After presenting the case studies, a short overview of the results and significance of the studies to this thesis is presented in chapter 3.1.4.

### 3.1.1 Case Telefónica O2 (Lacity, Willcocks & Craig, 2015a)

Telefónica O2 is a British based telecommunications service provider serving over 30 million customers in the United Kingdom market. Due to the large customer base of the company they decided to take up on an RPA project leading up to promising results after its implementation. In their 2015 article, Lacity et al. explain the results of an implemented RPA project by the UK telecommunications provider.

The initial steps of automation at the case company begun in 2010. The automation was constructed to a core process where a customer exchanges an old SIM card with a new one, without changing the phone number. This task was considered as a high-volume, but a low-complexity core process which is often considered to be optimal for automation as described by Lamberton et al. (2017, p. 11). The project was undertaken and executed by an automation consultancy as a pilot program, and it was completed in just two weeks on top of existing software. According to the 2015 case study the results were highly positive, although they are not clearly presented. Ultimately, the initial implementation of RPA at the case company was used as a benchmark for subsequent projects.

By 2015, the year this case study was conducted, the case company had implemented over 160 software-based robots to process between 400 000 and 500 000 monthly transactions. The company had experienced significant returns on investment (ROI) over a three-year monitoring period. The ROI on the measuring period was over 650 per cent as described by the table below. These returns were achieved by training 4 employees which emphasizes the feasibility of a well-executed RPA project. The case company argues that the level of utility achieved by using RPA is remarkable, as the payback period is achieved in just 12 months of implementation.

**Table 1.** Telefónica O2's RPA capabilities, adapted from Lacity et al. (2015, p. 4)

Number of Processes automated	Monthly transactions handled by RPA	Number of individual 'Robots'	Number of FTEs saved	Payback Period	ROI over 3 years
15 core processes	400 000 to 500 000	Over 160	Hundreds	12 months	Between 650 and 800%

The table above also introduces a common measure of efficiency, an '*FTE*'. FTE stands for full-time equivalent and is used as a measurement of labor hours needed. According to Asatiani & Penttinen (2016), one FTE needed, is equal to one employee working any task, full-time. In RPA implementation, FTE is often used as a metric to express saved (or gained) labor hours after a task is automated.

### 3.1.2 Case Xchanging (Willcocks, Lacity & Craig, 2015c)

Xchanging operates as a technology provider for the global insurance industry. According to the (2015c) article by Willcocks et al. the case company had experienced positive results after the implementation of an RPA within its processes. The case began in 2013 after the company had realized vast amounts of repetitive back-office processes which required human input in the form of collection and the processing of data. The data was extracted from sources such as Microsoft Excel spreadsheets and individual PDF-documents. The starting point was ideal for an RPA project as the company had processes involving standardized digital data being processed using human input. (Willcocks et al., 2015c)

The project began in Q4 of 2013 and rapidly proceeded over the subsequent 5 quarters after ultimately being completed. On the early stages of the project the consultancy company implementing the RPA project at the case company evaluated the processes which were suitable for automation. Processes were evaluated in close contact with the experts within the case company who knew the end-to-end model of the tasks seen

suitable for RPA. After the evaluation phase the project design phase started. In the design phase the environments of the robotics were built to the existing systems used by the case company and staff were trained to work alongside the implemented robotics. Before a year had passed from the beginning of the project the first four processes had been automated. From this point on the project underwent a ramp up phase, where the next six processes were automated. After the ramp up phase, the goal of the project was to further refine the automated processes and continuously improve the outcome of the project. To further emphasize the matter, in just 6 quarters or 1 ½ years the company had implemented the project to a degree where outcome of it could be measured. (Willcocks et al., 2015c)

The results of the RPA project at Xchanging were positive. According to the 2015 article (Willcocks et al., 2015c p. 13), since the ramping up had happened the case company were working on 70 000 monthly cases using RPA. The project had set an initial target success rate of the implemented software robotics to be 80 per cent, but results found the actual success rate came higher in 93 per cent.

### 3.1.3 Case OpusCapita (Asatiani & Penttinen, 2016)

Asatiani & Penttinen (2016) introduces a case of an RPA solutions provider, OpusCapita Group Ltd. OpusCapita operates as a financial process and outsourcing service provider in Finland providing an important look at the issue from a Finnish point of view. The case company promotes the use of RPA for its customers for repetitive and highly routinized tasks. According to the study, financial departments host ideal functions for RPA implementation, most likely due to the high volume and repetitive nature of the core processes. The case company describes the benefits of RPA implementation similarly as Lamberton et al. (2017, p. 13) and Kaarlejärvi & Salminen (2017) and Aho (2019), where the labor is no longer required in repetitive tasks so it can be deployed in more advanced tasks. According to Aho (2019) the work of an accountant is shifting towards a more consultative role where financial data is interpreted more in detail and the value is created by understanding and presenting the reports software creates.

The 2016 case presents guidelines, under which RPA implementation to any task can be considered. The case study showcases criteria for the most common cases where RPA should be considered while simultaneously reminding not all processes are to be considered as a potential automation project as it may not be viable to exclude human interaction. Table 2, below, explains in depth the requirements the case company lists for any RPA project (Asatiani & Penttinen, 2016, p. 3). From the requirements it stands clear the case company is not pursuing to automate every function, but rather select the ones that fit the criteria and can be considered as optimal for RPA implementation. The criteria used at the case company in RPA project suitability can be tied to other literature of the subject, such as case Xchanging (Willcocks et al. 2015) and Lamberton et al. (2017). Each process needs to be understood by both the supplier and the user of RPA, which is often surveyed by the supplier from the user of RPA. Only once the process is understood and divided in to steps the automation can begin.

**Table 2.** Criteria for RPA, adapted from Asatiani & Penttinen (2016, p. 3)

Criteria	Description
High volume tasks	The task is performed in high frequency, or task contains many sub-tasks
Complexity in software	The task requires access to multiple software
Stability of environment	The task is performed in the same environment every time
Low cognitive requirements	The task requires no creativity, judgement, or complex skills to be performed
Simplicity of the process	The whole process can be divided into clear steps, without misinterpretation
Proneness to input error (by employee)	The task is prone to 'human error', such as matching numbers within a column
Linearity of task	The task is performed without exceptions
Understanding the current cost	The cost of the task is known, so ROI of automation can be calculated

Table 2 further underlines the criteria of understanding the cost behind the potential processes for an automation project. Asatiani & Penttinen (2016, p. 2) discuss about companies saving FTEs by outsourcing accounting sub-processes such as invoice circulation or simple data entry processes to countries of cheaper labor. When a company is comparing cost differences between in-house, outsourcing or automating,

the comparison can be problematic. On the first hand, when a labor-intensive process is performed in-house the company keeps control but might suffer from a large overhead, but on the other hand when a company outsources the same task it can lose control and be prone to issues such as communication problems, hidden service fees, etc. The case company argues RPA brings a third solution to the table, where the control is kept in-house, but the costs are kept at minimal. According to the 2016 case, RPA implementation can cost between 0.1 to 0.19 FTEs when done in-house, and between 0.33 to 0.5 when comparing to an outsourced solution. Thus, the 2016 case argues RPA can be looked at as a solution to many accounting related processes which companies are looking to outsource or already has them outsourced. Based on the secondary data provided by the 2016 case, RPA implementation is more cost-efficient than in-house operations or outsourcing of the process.

#### 3.1.4 Results of case studies

As mentioned, case study methodology has been significant in the research of RPA. The purpose of this chapter is to emphasize why the prior case studies are significant from the point of view of this research. This thesis has relied heavily on the secondary data achieved by prior case studies in order to explain, to the reader, how RPA can be implemented and how it has impacted on the companies where the automation technology has taken over manual processes. The objective of this thesis is to find out the effects RPA implementation has brought for financial administration in Finland and therefore the results of the case studies are summarized below and then compared with the results of this research later, in chapter 5.

According to Lacity et al. (2015a), the FTEs saved by the case company Telefónica O2 were in the hundreds and the reported returns of RPA implementation were upwards of 650%. The case study lacks to inform the reader how these metrics were achieved, and therefore must be taken in with some consideration. Although the metrics were not presented, the case study conveys how big of an effect RPA project can have for any processes within a company. In their 2015a article, Lacity et al. explains the high returns described above are not extraordinary and subjected to just one case study. According to the case study another UK based company had implemented even more software-based robotics in their monthly operations. The

example company added over 300 robots in their fleet resulting only two employees taking up to the tasks prior taking up to 600 employees. Mentioned also is the overall quality of the service provided has improved after the implication of the RPA project.

Case Xchanging by Willcocks et al. (2015c) emphasizes how fast-paced RPA projects can be, if done correctly. Only in 6 quarters, or 1 ½ years, the case company in collaboration with the RPA outsource company had planned, mapped and put in work automation, which allowed the case company to automate 70 000 monthly cases while achieving success rates of over 93 per cent. The case implemented RPA initially quite carefully but found emphasized that RPA is very scalable after initial pilot programs are seen to be on an adequate level. This case also provides secondary data for this thesis from large scale RPA implementation and success factors regarding a large RPA project.

Willcocks et al. (2015b, p. 18) has composited the results of their case studies, which are presented in table 3. The table takes note of case Telefónica O2 (Lacity et al., 2015a) and case Xchanging (Willcocks et al., 2015c) as well as another case done by the same authors not introduced by this thesis. The results achieved by RPA implementation can be viewed as significant in all the listed cases and provides important secondary data for this thesis. The economic benefits of RPA implementation seem clear, based on the returns achieved by the projects. Each case has explained implementation on optimal RPA usage points, as listed by Lamberton et al. (2017, p.11), being back-office tasks, which are repetitive in nature. Furthermore, RPA was implemented in substantial amount of 35 per cent of the back-office tasks. Value achieved by RPA can further be examined from increased service quality, compliance, strategy, and FTE savings perspectives.

**Table 3.** RPA value delivered in client case studies, adapted from Willcocks et al. (2015b, p. 18).

	No. processes automated	No. monthly RPA transactions	Return on Investment (ROI)	Value for business
Telefónica O2	35% of back-office (15 of core processes)	400 000 to 500 000	Between 650-800% (3 year-period)	<ul style="list-style-type: none"> <li>• Increased delivery speeds</li> <li>• Better service quality</li> <li>• Increased compliance</li> </ul>
Utility	35% of back-office (15 of core processes)	1 000 000	200% (1 year-period)	<ul style="list-style-type: none"> <li>• Increased scalability</li> <li>• Strategic benefits</li> </ul>
Xchanging	14 of core processes	120 000	30% per automated process	<ul style="list-style-type: none"> <li>• FTE redeployment</li> <li>• FTE savings</li> </ul>

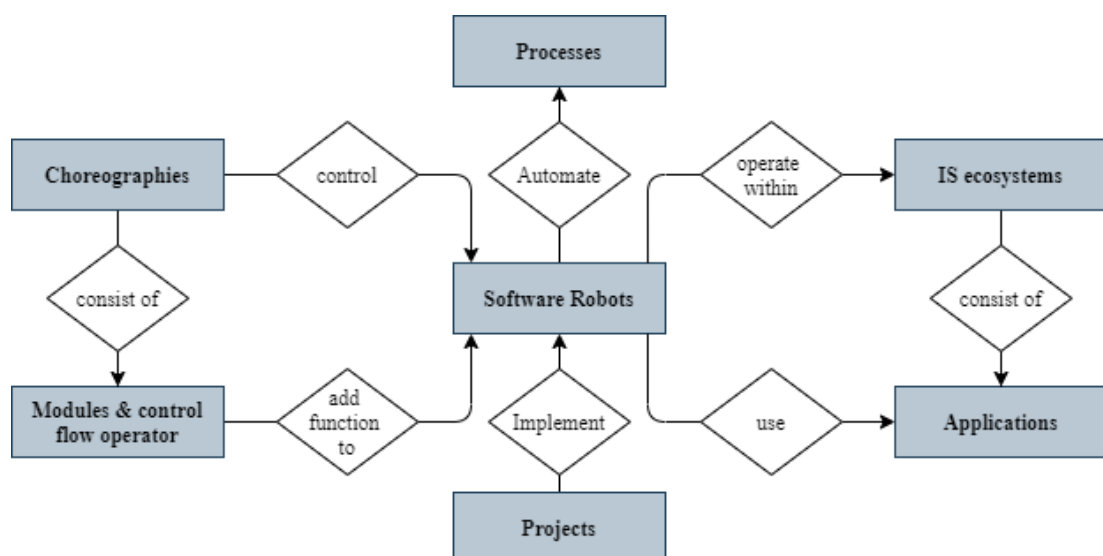
Lastly, Asatiani & Penttinen (2016) case looked at the issues from the perspective of an RPA solution provider. The most significant finding from this case study revolves around how companies should find out the costs behind the processes which are being outsourced or automated. Only by understanding the cost structure of each process the return on investment can be calculated after the process has been automated. The succeeding of this thesis, along with the accuracy of measurement highly depends on the methods companies have used when calculating how RPA has affected the cost-structure and error-rates of implemented RPA projects. Unless economic measurements have not been made in a proper manner, the results of this thesis can suffer from differences between the results of RPA projects themselves.

### 3.2 Academic research related to Robotic Process Automation

As mentioned in the beginning of chapter 3, the purpose of this part of the thesis is to provide the reader with information regarding the current state of academic research regarding RPA. The case studies discussed in the prior chapters provide the thesis with valuable secondary data, but they can too be seen to lack academic structure, especially from a theoretical standpoint. The purpose of this chapter is to go over current and related research, explain it to the reader and tie it together with the thesis. The subsequent chapter, 3.3 attempts to further deepens the theoretical standpoint of the research.



As mentioned, RPA lacks in academic research around the topic. Hoffman, Samp & Urbach (2020) take note of this shortage of academic research. The 2020 article argues that RPA can be viewed as a topic which is viewed as a popular phenomenon in the corporate setting, yet it lacks academic structure and background. The lack of academic research has been found to be correct in the initial stages of this thesis. The 2020 article further outlines that over 50% of companies operating within the borders of Europe are planning to automate at least 10 of their processes before the year 2020 (Hoffman et al. 2020, p. 99). Thus, RPA can be viewed as a very current issue and it could be argued academic research is needed to measure the impact it has on the functions within corporations creating a need for research such as this thesis. The incentives behind RPA seem to be clear in both academia and the corporate setting, supported by the prementioned fact companies seem to be implementing RPA on an increased level, but from the academic perspective research remains quiet. In their 2020 article, Hoffman et al. attempts to create a more academic and structural analysis of RPA, as it has been found lacking in the past. The presented structure consists of four main traits, or characteristics, of RPA as a concept showcased in Figure 3 below. The article provides a well needed background for future research of RPA.



**Figure 3.** Four traits of RPA, The nature of robotic process automation. Adapted from Hoffman et al. (2020, p. 100).

Figure 3, as explained by Hoffman et al. (2020), introduces a holistic and a structural way to look at any RPA implementation and tie the findings in an academic matter. The four main straits of the theory are showcased at each corner of the prementioned figure, where the relation of the traits is shown in relation to *software robots* located in the very center of the figure. The presented structure looks at automation from a process flow-chart perspective, which creates a logical body for the structure. The right side emphasizes the operational environment, i.e., *Software robots* operate within *IS ecosystems* which consist of different *Applications* used by the *robots*. The left side looks at of what the *robots* consist of. *Choreographies* control *Software robots* but also consists of *Modules and control flow operators* which add function to the *robots* themselves. By differentiating the four traits research can be done for each corner separately, while explaining the relation of the research to the software robots themselves. Hoffman et al. 2020 article gives structure to future research, but for the purpose of this thesis the theoretical framework lacks information how RPA performance should be measured. This thesis attempts to implement academic theory from the field of Information Systems, by DeLone & McLean (2003) which is gone over in more detail later in the thesis.

In their 2018 article, Cooper, Holderness & Sorensen provide information regarding how RPA is currently implemented in the context of public accounting. The 2018 article provides important background on how RPA is being implemented. The research has been conducted using qualitative methodology in the form of semi-structured in-depth interviews, where the interviewees consisted of 14 professionals of the accounting industry. The 2018 article provides insight on achieved benefits such as reductions of FTEs and improvements in process execution. The article (p. 18) has divided its research into the three main service lines of the so-called Big 4 accounting firms, being taxation, assurance, and advisory services.

Cooper et al. (2018, p. 18) outline conditions, similarly than Asiatiani & Penttinen (2016), which need to be fulfilled for RPA being considered a viable solution. The conditions consist of the complexity of the process itself and other similar conditions explained earlier, in Table 2 of this thesis. In tax service (2018, p. 21), RPA is said to be implemented in data modification for the purpose of tax reimbursement claims for in-house use. In advisory services (2018, p. 22) RPA is used as a product, to be offered

to the customers of the interviewees as an external service, where experts of RPA are identifying and executing RPA project for the clientele of the company. In assurance (Cooper et al. 2018, p. 24), RPA is explained to be in its early stages compared to tax and advisory services but seem to be benefitting from advantages made by the other functions. According to the respondents of the study, concerning assurance (and auditing) practices RPA can be considered to be the optimal place for implementation due to the auditing process being quite universal across countries. In tax practices there are always regional differences between rules and regulations. The significance of RPA for auditing services is further emphasized by Kokina & Davenport (2017) article. The main takeaway from the 2018 Cooper et al. article from the point of view of this thesis stems from the methodology used by the authors, as the research framework can be viewed to be similar as in this thesis. The article (2018, p. 8) claims to have achieved a foundation for future empirical research on the topic of RPA in the accounting industry, thus its significance for this thesis.

In their 2017 article, Kokina & Davenport further emphasize the significance of automation in the auditing industry. As discussed in chapter 2.3., AI provides implications for automation that are out of the reach of standard RPA implementation. In relation to Cooper et al. (2018), Kokina & Davenport present how AI is being invested on by the Big 4 accounting companies, where KPMG has partnered with IBM, PWC has developed a program called Halo, and Deloitte programs such as Argus and Optix. The common goal behind each Big 4 company is to answer to the growing demand of the use in the new technology, supported by the EY estimate (Kokina & Davenport, 2017, p. 116) new hires in the accounting industry might fall by half with the rise of AI. Therefore, the increased use of AI is seen to affect the auditing industry.

The 2017 article (Kokina & Davenport, pp. 117-120) provides comprehensive discussion, based on prior literature, on the implications AI could be though to have on the accounting industry. The main findings of the article argue accountants are most likely to work alongside the intelligent software by monitoring and correcting AI performance. Another, perhaps overlooked, aspect of the change within the accounting industry is related to the actual creation of accounting related AI programs, where accountants are needed as consultants in the creation of the program. The future of accountants as consultants is emphasized by Aho in his (2019) book, too. Some

accounting processes are also listed as “too narrow” to be automated, where cognitive adaptation of a human is required as building AI for the task would simply be uneconomical. The tasks too narrow for AI can consist of tasks such as holding meetings to report financial performance or contacting external suppliers for an issue in a purchase invoice. The purpose of this thesis is to look at the performance of already implemented RPA, but the issues which are outlined around AI by Kokina & Davenport (2017) can also be interpreted from an RPA point of view. For instance, it is important to find out what has led the companies to automate the tasks they have automated, and how important have the economics behind the projects been.

RPA can be seen to create academic discussion around itself, yet it lacks structure. The lack of academic structure as described by Hoffman et al. (2020) creates difficulties when framing studies, such as this thesis, from the topic of RPA. Similar research of the topic can be found with very thin theoretical framework, or no theoretical framework at all. Although qualitative methodology has been implemented successfully, as done in studies by Cooper et al. (2018) and Kokina & Davenport (2017), there seems to be a shortage of academic studies focusing on the direct impacts of already implemented RPA projects. The case studies introduced in chapter 3.1 of this study seem to be the most relevant literature concerning the topic of the thesis.

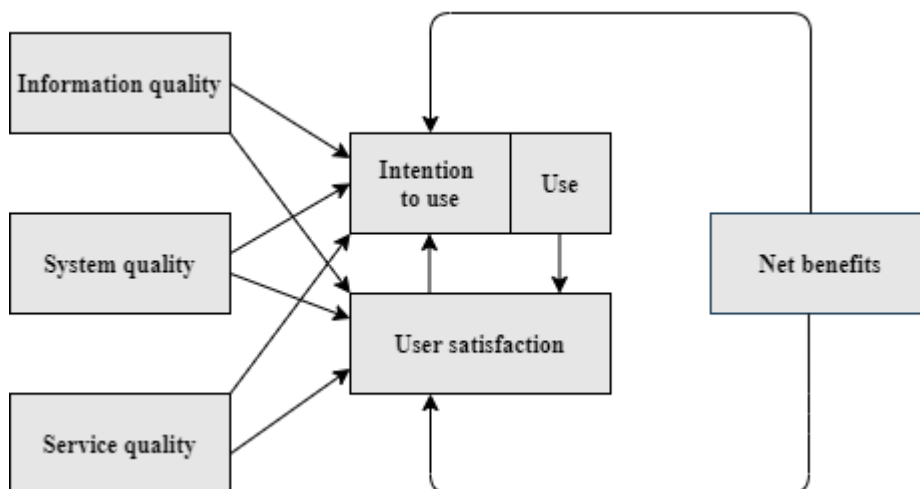
### **3.3 Theoretical framework**

As made clear by Hoffman et al. (2017) RPA research lack academic and theoretical structure. This thesis aims to seek out the effects and possible benefits achieved by RPA implementation in Finnish financial administration and therefore will follow the guidelines to measure information system success created by DeLone & McLean (1992). The DeLone & McLean IS success model can be divided in to two related theories, being the 1992 initial theory and the 2003 renewed theory. The 1992 theory will give the thesis important academic structure and aims to provide logicity to the reader when it comes to measurement of success in RPA implementation from an academic perspective. The 2003 renewed theory is used by the thesis to answer the research question. The initial DeLone & McLean (1992) IS success model provides a theoretical framework for measuring IS, or *information system*, success rate. DeLone & McLean (1992, p. 87) has divided the measurements of IS success in to six

individual categories. The individual categories are used to explain one another and ultimately used to find the *organizational impact* achieved by implementing the IS software.

According to the theory, *System Quality*, and *Information Quality*, are direct measurements of the system itself. The quality of the system directly affects the *User Satisfaction* and the *Use* of the software itself, both on independently and jointly. The two factors in the middle of the figure are dependent of each other, where increased *user satisfaction* will increase the level of *use*, and, decreased level of use can be often derived from decreased user satisfaction. Usability and the overall user satisfaction can therefore be seen to affect the individual itself through *Individual Impact*, again, both independently and jointly which directly influences *Organizational Impact*. DeLone & McLean (1992 p. 87) emphasize this presented model must take previous research into consideration, which is done in the field it is being implemented on. Simultaneously, the model is not intended to be used in too complex research, as it is intended to be used in research which is prone to be affected on the complexity of real-world situations, truly present in RPA research.

The 1992 theory has been since renewed by the same authors (DeLone & McLean 2003). creating a more holistic view at the IS success model, presented in Figure 4. The renewed model is highly relatable to the 1992 theory but is seen more relevant by this thesis and therefore uses the implications listed by the renewed theory. The implications of the theory will be further discussed in chapter 4 of the thesis, where the theory is tied to the methodological approach of the thesis. The 2003 theory is visualized in Figure 4, done in accordance with DeLone & McLean (2003, p. 24).



**Figure 4.** IS success model, in accordance with DeLone & McLean (2003, p. 24).

As mentioned, the updated 2003 theory by DeLone & McLean bases to the 1992 theory. The theory outlines quality in to three different dimensions, being the quality of information, the quality of system, and the quality of the service provided. Each of the qualities presented on the left side of Figure 4 have an effect, either individually or jointly, to the center of the figure, which holds dimensions related to the intention to use any given system and the overall user satisfaction provided by the system. The effect each dimension of quality has on the usability and satisfaction is presented by the direction of the arrows as seen in Figure 4. The purpose behind the arrows is similar as in the 1992 theory, but the 2003 model looks at the dimensions to be even more interrelated (DeLone & McLean, 1992 & 2003) therefore creating a more holistic view at the IS success model.

This thesis aims to explain RPA success using the renewed DeLone & Mclean IS success model (2003). The success of an RPA project is measured using the six characteristics of the IS success theory, being:

- Information quality,
- system quality,
- service quality,
- intention to use,
- user satisfaction,
- and net benefits

The six characteristics will be used in formulating the questions which are presented for interviewees participating in this research. The 2003 theory outlines that *information quality* refers to the accuracy, timeliness, and the overall completeness of the information itself. *System quality* refers to the functionality, reliability, ease of use, etc. of the software itself. The quality of system in the context of RPA can sometimes be irrelevant, as RPA is implemented in the so-called back office and a typical user might not even acquire the knowledge how the system itself works. *Service quality* was added to the theory as a metric which is meant to identify problems in similar areas as the previous characteristic *system quality*. It is mentioned by DeLone & McLean (2003, p. 18) the use of *service quality* as a metric can be viewed as a subcategory to the other two quality measures. *Intention to use* is a measurement of the usability of a system and the *use* refers to the actual type of use of a system and whether the system is used for purposes it was intended to be used for. In this research both the *intention to use* and the *use* metrics are implemented in parallel as presented by the 2003 theory. The *net benefits* are referring to all possible impacts the system might have on an organization, or a part of an organization. This research focuses on the benefits acquired by both the company and the employee. The net benefits are viewed as the most significant factor by both the theoretical model and this thesis. The methodology of the research will be further explained in the following chapter. Based on the performance of each characteristic listed above, in already implemented RPA projects, a consensus will be formed regarding the general level of success RPA has had for Finnish financial administration. The results of the study along with the analysis is presented in chapter 5.

#### 4 RESEARCH METHODOLOGY

The study aims to use qualitative research methods in the form of in-depth interviews in attempting to answer the research question. The interviews were held using semi-structural interview methodology, where structured questions are combined with unstructured questions to combine factual knowledge with the personal experiences of the interviewee (Halperin & Heath, 2012, p. 258). Semi-structured interviews often allow the researcher to ask questions which are directly related to the research question. On top of the questions allowed to be asked more freely, the interviewee is pursued to give a detailed answer of the topic from a personal point of view (Halperin & Heath, 2012, p. 253). Personal perception of a topic discussed can often vary between interviewees. The reason behind choosing semi-structured method of interviews is to not only gather primary data from the results of implemented RPA projects but further collect personal experiences of the interviewees and what kind of effects RPA implementation has brought in their daily work. The questions will be presented in appendix 1, and further the interview questions will be explained in relation to the theory in the empirical section of the thesis.

According to Tellis (1997, p. 10) interviews provide targeted information of any given topic, which is often used in case study methodology. The causal connections of topics are also often found using interview methodology, as it gives the researcher insight to how the topic at hand is being perceived by the interviewees. Some drawbacks of interviews are related to biases due to, for example, poor question design and possible biases in interviewee responses. Reflexibility can also be viewed as a possible weakness of the chosen interview methodology. The reliability and biases will be further discussed at the very end of the thesis, where internal and external validity of the research are discussed.

The interviews of the empirical phase of the research aims to interview managers and employees of the case companies who have taken part directly to the RPA projects or who are responsible for the tasks which have since been automated. The data gathered through the interviews is further processed, coded, and analyzed using qualitative methodology according to Halperin & Heath (2012, p. 278). The three-step analyzing process begins from reducing the data to a point, where only the most relevant data is



left concerning any given topic or theme chosen. When semi-structured interviews are used as a methodology, the reduction can be difficult as the questions are not always same for each interviewee. The method requires great care from the initial step, as it is used as a base for the subsequent steps. Therefore, each interview held will be transcribed carefully. Secondly, the transcribed data acquired will undergo the coding step, where the interview data is divided based on the category or topic. When coding, the data is therefore divided based on the six characteristics the DeLone & McLean 2003 theory presented earlier. The coding step requires constant comparison between the transcribed data to successfully point out the correct category for each line of data collected. The last step of the process is the analysis itself. During the analysis step the collected data is connected within each other in order to create meanings for the questions asked. The validity of the results depends on the final step, as the analysis determines whether the conclusions drawn can be viewed as credible or whether the conclusions drawn can have alternative explanations. (Halperin & Heath, 2012, pp. 278-283)

## 5 EMPIRICAL RESEARCH

This chapter begins the empirical section of the thesis. Firstly, there will be explanation of the chosen subject companies, how the companies were selected and contacted. Secondly, an explanation of the interview structure is given based on Halperin & Heath (2012) and DeLone & McLean (2003). Lastly, this chapter introduces the empirical data collected by the interviews by discussing the amount and significance of the collected data for this thesis.

### 5.1 Subject companies

The subject companies were approached via email. In total, 20 inquiries were sent out seeking out for interviewees from various organizations. The goal was to find key personnel within an organization considering RPA success from at least 3-5 organizations. The subject companies were chosen from either personal knowledge of an RPA implementation or to be known to use software allowing for RPA usage. From the 20 emails sent 5 responses were retrieved. From this point, time of an interview were scheduled with each respondent. After scheduling interviews, 3 respondents were found suitable for the purpose of this study. The remaining 2 respondents were excluded from the study due to the limitations set by the respondents' organization and the background of the RPA project in relation to this study. For clarity purposes, the chosen three subject companies are divided and referred to as Subject A, Subject B, and Subject C as shown in Table 4.

**Table 4.** Subject companies

Subject Company	Industry	Relation to RPA
Subject A	Accounting services	Software implementation
Subject B	Accounting services & consultancy	Scaling up existing RPA
Subject C	Manufacturer	In-house RPA implementation

The company representatives who have agreed to partake in this study are introduced in this paragraph. The first interview was held with Subject A, a Finnish entrepreneur

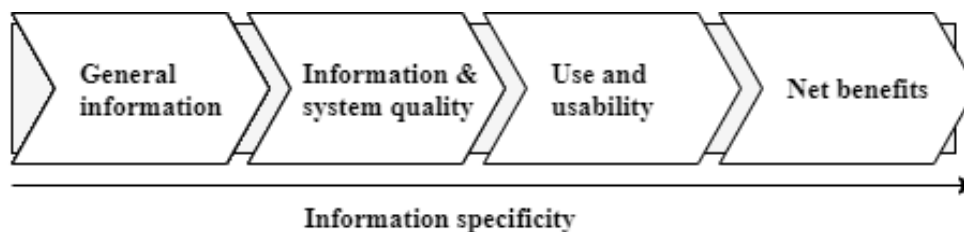
responsible for a company catering accounting services for its clientele. The business model of the accounting firm is to implement automation in every step of their service offering. The company had recently undertaken a software project, which has increased the potential of automation in the company. The second interview was held with Subject B, a leading specialist in a larger company offering accounting and financial consultancy services to its clients was interviewed. The interviewee had first-hand information what it is like to manage a team of accountants in a company implementing RPA in its processes, and how the level of automation is affecting the revenue acceleration using RPA. Thirdly, Subject C provided insight from a perspective of a key person developing and implementing RPA for financial services in a Finnish-based manufacturing organization. Subject C is the largest organization of the sample and operates its financial service center offshore, but as it caters to a Finnish based organization it was found suitable for this study. The subject companies provide the study a comprehensive look at how RPA is implemented in three different types of organizations and how RPA is used on various levels of an organization.

## **5.2 Interview structure**

The interviews are structured based on the DeLone & Mclean (2003, p.24) theory to measure IS success. As mentioned in the methodological section, the thesis will formulate the questions based on the six characteristics of the 2003 IS success model. The questions consisted of mostly open-ended questions as the aim of the interview methodology is to find the details in the researched topic (Halperin & Heath, 2012, p. 260). The choice of open-ended questions also leaves the interviewer room to expand chains of thought by asking the respondent to elaborate on relevant topics. The lists of questions are presented in the Appendices 1 & 2. Two of the interviews were held in Finnish, and one in English. The question list was used as a general way to guide the interview, but occasionally the interviewer asked the interviewees more specific questions which had arisen from the discussion itself. The interviews are held remotely, by using a standard conference call software.

The structure behind the interview structure is presented in Figure 5. The interviews will begin with broad information and constantly proceeds to narrow the information collected all the way to the measurement of the net benefits achieved by the RPA

implemented. Figure 5 illustrates, from left to right, how the information gathering process will begin, and how the information will be more and more specific from the point of view of the research questions.



**Figure 5.** Structure of the interviews

The interviews began with an introduction of the interviewer and a brief introduction to the topic of the research. It was important the interviewees understand what is meant by RPA and can differentiate RPA from concepts such as AI. The first part of the interview is to survey general background of the interviewee. More importantly the initial part of the interview is to acquire a brief background of the RPA project or projects the interviewee is reflecting on in his or her answers. The second part of the interview took the interview to look at the implemented RPA from the point of view of Information quality, as presented by DeLone & McLean (2003). The importance of this section of the interview is related to the completeness, timeliness, reliability, and quality the implemented RPA provides for the process. The third section looked at the system quality where the interviewees are asked to reflect on the quality of implementation and possible problems which have risen from the automation of the task at hand. Perhaps the implemented RPA has not performed in the desired way at the subject companies. The fourth part of the interview looks at the level of use and the overall usability of the robot. Basing on the 2003 theory (DeLone & McLean) it is significant to understand whether the implemented robot is being used as it is a metric which can be viewed as a fundamental part when determining if a project is successful or not. To put in simple terms, if an RPA implementation is not deemed usable by the

actual end-user, it is quite clear that the benefits of said implementation can stay at a moderate or an insufficient level. Lastly, the fifth section of the interview will look at the net benefits RPA implementation has brought up in the interviewed organization. The last part of the interview can be viewed as the most significant one when considering the research question and underline purpose of this study. In the fifth part discussion is brought up which allows the interviewee to reflect on the impacts to the organization, as well as the impacts to the work itself. If the company has measured the economic factors of RPA (as discussed by Asatiani & Penttinen 2016) the last section is where they will be brought up. On a general level, the last part of the interview allows significant benefits or drawbacks to be discussed by the interviewee as well.

### **5.3 Results of the interviews**

This section of the thesis is meant to showcase the results of the interviews from a broader perspective. The purpose of this chapter is to give the reader an idea about the RPA projects discussed in the interviews. The three interviews were all recorded and transcribed to acquire and store the empirical data in a clear and written format. From the transcribes each interview was condensed. The condensed interview data is presented in the following chapters, divided between the structure of the interviews themselves. This section holds the data gathered from each of the three interviews in such detail it can be used as secondary data in subsequent research on the topic. A more concise summary of the results can be found in chapter 5.4.1 where only the key findings in relation to the research question are brought forward. The main points of the interviews can be found in Appendix 3 alongside a table presenting the timing and length of each interview. Generally speaking, each of the three interviews lasted for approximately an hour.

The data is presented initially from the point of view of general information, where the interviewee of each subject company is introduced alongside with an explanation of the RPA implemented by the subject company. The interviews are then looked from the point of view of information and systems quality as suggested by the DeLone & McLean (2003) theory, followed by use and usability, and ultimately the net effects achieved by RPA implementation. The analysis of the data will be discussed in later

in this chapter, where the data is condensed even more, as suggested by the methodology of the research (Halperin & Heath, 2012).

### 5.3.1 General information

The three different interviews provided insight to this thesis from various perspectives. Subject A is an entrepreneur who has worked 12 years in the accounting industry. The subject company focuses on clientele who are solely interested in accounting services done in a digital form. The focus on customers keen on digital ways of working has allowed the implementation of RPA to be in the very core of their business model. The company offers services relating to monthly accounting, payroll, and other administrative services such as meeting minutes, declarations, etc. The company has two employees, servicing approximately 100 clients. The subject was chosen to partake in this study due to the eagerness of the employees of Subject A to discuss the topic of RPA.

Subject A has exchanged software they use in their daily work in the beginning of the year of this research, the year 2021. The company outsources the software service from an outside supplier, as is quite common in the industry according to the interview. Both the old, and new software the subject uses have RPA capabilities implemented within the software. The implemented software has an increased level of automation comparing to the old software, making the new software more sophisticated and better at understanding what the user requires. A practical example of how the new software uses RPA as a tool is presented from the point of view of a credit card invoice. The software understands the rows to be posted from the credit card invoice, and simultaneously can receive the credit card purchase receipt and direct the two separate documents to each other. This leaves the accountant to simply check if all the receipts have been received and if they have been linked to the correct credit card invoice. The old software was not capable of this, leaving the accountant with more manual work.

The new software is implemented by the Subject A at parallel with the old software. According to the interview, it is hard to determine which of the two software is going to be to main accounting program in the future. The old software was not sophisticated enough from automation point of view leaving the company to search for a parallel

program for three to four years. Ultimately Subject A landed on the new software, which they chose quite quickly as it was found suitable by initial conversations with the supplier. The change was due to pricing, user experiences such as software updates, and discovered software bugs in the old system. The company proceeded to investigate potential clientele to exchange software, which took roughly 2 months. The initial client who proceeded to work within the new software was a company which was also interested in robotics and automation. The subject company found out the change from old to new software was quite easy with the initial clients.

The interviewee from Subject company B began her career in financial administration in the beginning of the 2000's, for a different company. The company the interviewee worked for had some rudimentary digital ways of working, which were not apparent to the interviewee at the time. The interviewee understood the benefits of digital financial administration only after changing from the position to another one later in the career. The most significant digitalization had to do with electronic bank statements used by the company the interviewee worked for. Only once changing from the initial position to another company, the interviewee understood the importance of digital ways of working as the new company was "doing business like in the 70's" (Interviewee at Subject company B). According to the interview, going back in time in terms of processes felt unpleasant. The interviewee began at the subject company later, after 2010's where there would be presumably more automation in place, as the company was already a larger service provider of financial services at the time. In the beginning of the position at the subject company, there was still many processes which were handled by the accountants using only limited automation or even completely manually. The interviewee stated from the very early stages there was an incentive on a personal level to be eager to automate the most routine tasks. Ultimately, the interviewee began a position of managing a team of accountants in 2017. The team focused on the group clients of the subject company, where arguably automation was the most important.

The interview itself at the Subject B focused on the time the interviewee operated as a manager and how automation was used to benefit the team of accountants. According to the interviewee, the team was often apart of the automation projects held at the subject company from the initial stages on. The push of RPA from the company level

was also undisputed. The interviewee specifies the subject company begun developing RPA in-house during 2014. The implementation of RPA was done via a posting software used by the accountants across the company. In the initial stages of the RPA project the subject company piloted the software on smaller clients where control can be kept easier by the accountants. The subject company further expanded the software use by creating a dedicated team to expand the client base which used the software in the accounting processes. Simultaneously, the subject company launched another team, which had the responsibility of developing the RPA software.

Lastly, Subject C provided information how RPA is being created and implemented for the purpose of a financial service center the subject company is running offshore. The interviewee has worked with the subject company for 6 years beginning from the company's accounts payable team as a team leader. Now, for 3 years the respondent has worked as the development manager in the financial service center, focusing closely on RPA implementation in financial processes of the service center. The RPA implementation has since been expanded to take responsibility of processes happening outside of the service center, in other functions of the subject company. According to the interview, the financial service center serves the company's internal entities in some 30 countries around the globe. The function the interviewee runs as a development manager is a newly created position within the subject company initially harmonizing processes within the financial center. In 2019 the subject company begin to familiarize accountants alongside with the interviewee to the subject of coding. Currently, the team has a full-time RPA developer and has recently acquired another person to assist on the tasks the team is responsible for. According to the interview, the team benefitted from acquiring the accountants internally which were then familiarized to create the code in the various RPA projects. Since the beginning of the team, the subject company has offered its accountants and other employees apart the financial service center possibilities to learn about RPA through an online platform increasing the knowledge regarding the topic of RPA among the employees. From the employees partaking in the RPA course there are already two new part time projects undertaken to implement RPA.

The interviewee at Subject company C has been a part of over 20 RPA implementation projects during his time as a development manager. On top of this, the interviewee



specifies that in many cases, the team is building on top of existing automation enhancing the usability of the RPA. The RPA development team builds automation on for instance SAP software, standard Microsoft tools, and cloud services. The interview with the subject C provided key information for this study as the gathered information looked at RPA from a comprehensive standpoint.

### 5.3.2 Information & system quality

When looking at the qualities the information and the system where the actual automation happens, answers from the interviewees varied across subject companies. Beginning from subject A, automation is implemented in all parts of the processes at the subject company. As mentioned, digitalization is very close to the business model at the company. This does not mean that nothing is being left for the accountant. Some parts of the processes are better to be performed by a human. The company also is looking to further implement integration between software, to create a more holistic RPA structure. A more holistic structure would be seen to improve processes further and grant access to even more of the benefits of RPA. According to the interview, RPA is trusted to a high degree at the subject company and therefore the quality of the software is on a high level.

“... the robot is trusted, even on a level where the (RPA implementation) has affected on the way we check the outcome of the process. Our job will be affected in a way where it consists more and more of validating the automated actions, and less of the actual execution of accounting entries.” (Interviewee at Subject A)

Furthermore, the interviewee emphasized that the robots cannot be trusted blindly even with the level of quality being as high as it is, and therefore the accountant still needs to check that everything is done in the correct manner. The number of checks required is becoming less frequent at subject A. Contradictory to the decreased number of corrections, the interviewee specified that in the initial steps there are errors and fixes present when automating any part of a process.

The interviewee at Subject A sees the implementation of the software itself to be good. The interviewee pointed out, that there are probably plenty of features on the new

software regarding RPA which are yet to be discovered. As the software has only been implemented at the company for one quarter, there can still be more to discover. There are more bugs in the old software as found by the company. As the subject company has used the old software for longer, probably does reason why there are more bugs that have been found in automation. The interviewee mentions that the software probably works in the way it is designed to, but the software developer has not had the greatest idea of the accounting concept some software features are designed for. So, processes are being done which are not supposed to happen. For example, sales invoices in certain circumstances on the old software are being handled as zero tax rate revenue, which is more of an exception. The interviewee says these kinds of assumptions have been found by the company in the old software. The interviewee describes this as “the software probably works as it should, but the software developer has not understood what he or she is developing” (Interviewee at Subject A). With the old software, there is also problems relating to software updates. After an update, there has been a situation where something is missing. Another update related mistake with the old software had to do with old accounting periods opening after they have been closed by the accountant. This resulted with problems in VAT calculations from periods which had already been closed. This mistake was then resolved by the software supplier. Even with all the bugs, the old software allowed for a totally different possibilities comparing to when accounting was made by hand all those years ago. The error rates are constantly improving, as stated by the interviewee. Therefore, information and system quality are seen to improve as time proceeds.

The development of RPA at Subject B begun from automating different parts of the processes. In the initial stages, the RPA was used to automate the posting of sales invoices and bank statements. After this the RPA was developed to the posting of purchase invoices. The interviewee specified, as follows:

“in the early stages, the automation was constructed for different pieces of the process, ultimately allowing the creation of a holistic accounting system.” (Interviewee at Subject B).

The initial processes to be automated were looked from the point of view which specified the easiest to-be-automated parts of the process and more importantly the

parts of the process which include large number of manual steps to complete to save the most amount of time (or FTEs) as possible. The automated parts were also considered to be secure, where nothing cannot go wrong even if the automation fails. The subject company launched a mandatory checklist for the accountants to mitigate risks involved in automation. The checklist was created so the accountants could check on a routine manner, the steps done by the RPA software so possible errors could be addressed. The interviewee specified the report could be trusted in case of any anomalies, and the anomalies could then be addressed by the accountants themselves. The list increased the trust, according to the interviewee.

In the beginning of the automation at the subject company B, the interviewee specified there were errors occurred due to automation especially with larger clients with more accounting material. An example the interviewee gave had to do with an allocation of salary material, where the allocation was not done according to the rules given to the software. Moreover, in the initial stages there were errors in the work done by the RPA especially in the balance sheet entries, which required accountant interference to be fixed. The fixes were done manually. More significantly, there was an occurrence with the accounting of a client where the payroll processes were affected by a flaw in the RPA. As the client was larger, the amount of data affected by the flaw could be considered remarkable. The interviewee specified it took approximately 6 months of time to fix the errors in the RPA software to resume back to normal with the client's payroll accounting processes. With larger clients fixing the occurring errors can feel laborious and was left for the responsibility of the accountant. The software bugs found would be reported to the development team, but the accounting was left always for the responsibility of the accountant.

According to the interviewee at the Subject company B the development of automation has been beneficial for the various processes run by the accountants themselves. The amount of routinized labor eliminated by RPA is significant. Before the implemented RPA, all stages of the process from accounting to payroll and more required hands-on work from various employees. Before automation, the processes took approximately two thirds of the time by the accountant posting the accounting data by hand and the last third for the so-called reporting stages where the fiscal period is being closed after all entries are booked. The two thirds of the processes being manual, the RPA now has

taken over that amount from the accountants themselves, leaving them time for more desired work. According to the interviewee, when managing a team of accountants, the increase of automation in processes left the accountants with less amount of stress. When the manager was trying to delegate a task to an accountant who is not familiar with the task, automation made it easier as the accountants could rely more on the software itself. From the initial stages, the userbase of the RPA software increased on an ever-accelerating fashion. Due to the growing userbase, bugs were sometimes found from the software, especially in the beginning of the development. The software-level errors found were making the job of an accountant naturally more difficult, but the subject company took the errors found and fixed them swiftly. The user experience was seen improving, as the software development and the fixes for the errors were made quickly after they have occurred. According to the interviewee, the quality of the system itself was improving quickly after the bugs found were reported and addressed.

Lastly, the Subject company C provided insight on the qualities of the in-house RPA. According to the interview, the subject company mostly focuses on parts of processes being automated. The process is never an end-to-end process which is being automated using RPA. The interviewee further emphasizes the importance of continuing to build on top of prior projects, enhancing the processes even further. The interviewee also explains that sometimes it is better to leave parts of processes for a human, as the tasks might not be feasible to automate, or the RPA implementation becomes unnecessarily complex. The subject company chooses the processes to be automated through personal experiences of the team itself alongside with the team leaders of the financial service center. The RPA development team has actively informed the accountants and the team leaders how RPA works which has allowed the different functions to present RPA projects for the developing team. Over the time, the accountants at the subject company have understood what RPA is capable of. There have been times, where expectations of RPA quality have not been met at the subject company. On the occurrences when expectations were not met, it was often due to the RPA case having various exceptions to the process itself, which was not expected by the interviewee. The specific RPA project was discontinued as it was determined unfeasible by the personnel. Otherwise, the projects the interviewee has been a part of have been very successful. Moreover, the feedback from the users has been positive and the robots are

being used and trusted by the personnel at the subject company. When the subject company implements the RPA, the code is tested carefully with the relevant personnel. Before the robot can be put in production there is often a lot of fine tuning done to minimize errors or other problems after the RPA is implemented. That being expressed, according to the interview there has been an instance where a code has been set for a certain task, within SAP software, in a way which let the RPA select a box which should not have been selected. The RPA operated according to the flawed code, which led the software to perform actions it should not have been done. Although this had been not a major impact on the processes of the company, it is a flaw made by RPA which had to be fixed by an employee after the fact. The error was corrected by the software developer, as he or she also has accounting related skills. According to the interview, the emphasis is on the groundwork done when doing RPA related projects, especially when there are financial risks involved. The development team looks at the possibilities of what could go wrong and what are the impacts of the errors to the process itself. The software RPA is implemented on always has test environments, where RPA implementation can be thoroughly tested. The quality of the information has increased through RPA, overall. RPA leaves less room for error, especially with reports consisting of large amounts of data. According to the interview, RPA helps to improve with the process and the quality of information itself.

The interviewee at Subject C specifies, the RPA is implemented always in the back-office. This allows the RPA to run in the background of the software which the accountant is using, while simultaneously not allowing the accountant to see triggering or seeing the implemented automation in action. The RPA developers are often taking videos, or demos, of the complete RPA implementations and showing them to the accountants. By showing the accountants how the automation works the level of implementation will benefit. According to the interview, it is mentionable RPA is working well around clock and therefore the implementations are doing what they were designed to do. Sometimes there are minor problems when the accountants' specific co-operation is required for the automation to work. Furthermore, scheduling of the RPA processes is important in order to avoid problems for timelines of the processes themselves.

Overall, from a quality standpoint, implemented RPA is working well according to the interviewee. The accountants of the financial service center are not finding the RPA being disturbing to their work. The interviewee mentions that sometimes the RPA is being disturbed by the accountants:

“... for example, when a robot needs to access a specific Excel-file, and then the actual accountant is in it. So, this can be sometimes a challenge as documents like that, where accountants need to input data or change a recipient list, and the robot needs to access that on the same time, that can cause an error.” (Interviewee at Subject C)

This problem is being resolved by the team in the present by using cloud-based document sharing or changing the way the file is handled by the company. Furthermore, the subject company has guidelines in place for RPA implementation regarding possible system exceptions and by using the information the exceptions are being addressed in the code itself. The development team also runs software updates to the already in-place code, to mitigate problems made up by errors in the RPA. Bugs in RPA are quite common, but software updates take care of them. As the interviewee at subject company C is a part of developing the actual RPA, an additional question of the level of completeness on a system level is required by the company to implement the RPA in production. According to the answer, it depends highly on the type of the project itself. Some projects which are not so crucial, can be put live in production quite quickly. More critical projects are taken more carefully to production, for instance if it has a direct impact on the business. In the more crucial projects, there are always a lot more testing involved, and the code is more polished. For all projects, the subject company follows protocols, which involves exception handling and therefore the development team does not need to begin from scratch each time.

### 5.3.3 Use and usability

For the most parts, experiences with RPA at the Subject company A are positive. In most cases the user can have experiences where they find new features by the software. The interviewee states that sometimes, in the old software, there were some assumptions made by the software which was counterintuitive from the point of view of accounting principles. Sometimes, there are situations where the interviewee would

like to software to have more features from automation point of view. An example given has to do with posting rules on electronic bank statements, where the software does not allow the user to create a rule where certain expenses are posted to a specific account and a specific cost center at the same time. So, some general settings seem lacking but otherwise the software works better than the interviewee ever desired.

Initially, the interviewee at Subject A had contacted the software supplier to hand out suggestions. Later, the interviewee found that the supplier had grown so much that they necessarily did not listen to their users.

“... previously we have been (in contact with the old software supplier), but after the [software supplier] grew to the extent in which it currently is, it feels like they are not listening anymore. They have their own development strategy, which they are following, so we cannot influence the development anymore.” (Interviewee at Subject A)

The lack of listening was a reason behind changing software. The interviewee could not name any situations where it would have been better to do the job the robot was designed to do, and therefore the more optimal source of automation was implemented.

At the Subject company B, the use of the automation software was measured using automation percentages listed under each client of the company. The use of the automation at the team of accountants the interviewee managed the automation percentage was initially approximately 60-70 per cent. The subject company had given a target for teams to follow an automation level at least that of the team had. The teams used to keep the automation levels on the company target. The level of automation was achieved by having the right accountants who were eager to develop their own processes as accountants by the help of RPA. The accountants at the team of the interviewee used up time to figure out the ins and outs of the software and really try to create various rules for laborious parts of the processes in order to increase the automation percentage. The incentives of the automation to the accountants were mostly seen in the improvements of the service quality the accountant can deliver to the customer. As the service quality improves, the accountants were more likely to keep their clients. By an increasing use of automation, the accountants were left with

more time to serve the customer. As the customers were more satisfied, they remained with the company. According to the interview, by keeping the clients which were familiar it made the work more enjoyable over time for the accountants.

Sometimes there were situations where the team of accountants at subject B created rules for the RPA but did not allow it to post the entries without accountant acceptance. Usually, situations where the robot was not given the responsibility it was meant to have were exceptions and dependent of the client. The interviewee specifies that in the beginning, the resistance of not trusting the robot came from the accountants themselves. Prejudices of cases where RPA could not be implemented were heard, for example from the point of view of credit card invoice posting, similarly as in the subject company A. The subject company B took these prejudices from the accountants and develop the software based on them. Currently, the software can post the kinds of accounting material the accountants determined not to be automated. According to the interview, the feedback from the accountants was crucial for the success of the RPA and the increase of the automation percentage. The increase of automation required discussion between parties. The RPA rules were often done in cooperation with the clients and sometimes even the suppliers of the client. By having key words on the accounting material which the software was able to read and interpret, it allowed for some borderline cases to be automated. The suppliers could also add keywords or other identifiers on the invoices, making it easier for the software to interpret the correct account the invoice is supposed to be posted by. Often, the suppliers were eager to partake in the modification of the invoicing practices.

The interview at the Subject company B also specified that the user interface of the software also correlated with the usability of the RPA itself. As the subject company had involved the accountants themselves to the development process, it also allowed the user interface to be created based on the feedback from the end user, the accountant. From the team of the interviewee, there was also one accountant present in the development work of the software.

Lastly, at Subject C the interview looked at the implemented RPA and how always does less than desired due to the developer wanting the most out of the RPA as possible. When implementing RPA, there are always many ways to reach the same



goal, and streamlining the code is quite important. RPA design often requires a lot of time invested to the functions it is supposed to perform. Often, it requires a lot of trial and error to get to a point where the RPA is at a point, design wise, where it can be seen to do what it is supposed to do. Significantly, the development team has not found a time where an RPA proposal has been made after which the team was not able to find a way to implement RPA to the benefit of the process. It further requires a significant amount of experience to create RPA implementation which are user friendly for the accountants working in the finance service center.

According to the interview, employees of the Subject company C often find themselves doing the task which is supposed to be performed using automation. Change management is important in RPA implementation, as the employees of the company might fall for old ways of working in many cases. Some employees are more difficult to pursue with RPA implementation, than others. The interviewee further emphasizes RPA as a tool to harmonize functions within an organization, which is a mentionable target area for improvement. RPA allows the subject company to really go over various processes, to redesign and streamline them to be better in the future. In some cases, the accountants are left with no alternatives than to use the implemented RPA, for instance in cases which are strictly related to closing of a fiscal period. In some other cases, the accountants are left with a choice to use the RPA if they see fit. The development team enforces the use of the RPA they develop, and continuously surveys the end user whether the implemented RPA can be made better in any way. Overall, RPA can be seen as successful from the user perspective and there are some exceptions where employees stick to the old ways of working. All in all, the teams have incentives to do more, with less people and therefore a direct organizational incentive is put in place for the RPA to be used as widely as possible. The subject company monitors the use of the implemented RPA.

The initial RPA project the subject company C had, some years ago, was done with an external party. The subject company was not happy with the results of the project. The built RPA implementation suffered from the external partner not listening to the subject company's wishes and it required many software iterations to land on the finished project. Today, the company does not use this specific RPA implemented by an external partner. The interviewee mentions that it is a benefit RPA is being

developed in-house, as the development team is so close to the user and really understands the work they do.

#### 5.3.4 Net Benefits

The interviewee at Subject company A states there are key impacts RPA has on the work done by the company. Firstly, the accountant has freed up time and spiritual resources. Secondly, RPA increases the profitability of the company overall. The more manual tasks which are now automated after the software project, such as invoice posting, etc. the interviewee can now focus on more profitable tasks. The interviewee states that in certain situations, the robots can be trusted to do the daily accounting for longer periods of time, so it gives the accountant time to deliver some additional services to the clientele, which increases revenue. The interviewee states that the simplest manual labor is done with the lowest margins. So, the more the company can automate simple manual tasks, the more profitable they will become. The software used has always been determined by what the customer needs. So, the change from the old software to the new one did not matter too much. The general idea that there is automation in place is what creates the circumstances for accountants to create more value for the organization. The accounting service the company provides has always begun from the point of view of digitalization and therefore the change from the old software to the new one did not matter too much. The interviewee further states that due to the size of the accounting company being so small they have not found it to be reasonable to measure the cost structures of each project individually. The initial expenses from software projects are quite small, even for small businesses. The most significant cost of each project can be seen from the value of time invested by the accountants themselves.

The most significant benefit automation has brought for the Subject A are the resources which are freed up for each accountant from routine tasks. The freed up resources allow the accountant to focus on the more important aspects of the job.

“... the first, and the most important (benefit of automation), is that it has opened up time and resources towards more profitable work. As mentioned, the organizational work we do is clearly priced better than the actual accounting labor. So, now I can

perform it more, as in an emergency I can let the robot do everything, for a period of time, and myself focus on something totally different and more profitable.” (Interviewee at Subject A)

Contrary to the benefits, the drawbacks the interviewee sees arise from the user itself. Some new clients the company has gotten over the years, which uses the same accounting software, have come to the company in a state where RPA were trusted too much by the prior accountant. A case mentioned by the interviewee was about a new client which was found that almost all the expenses were posted under the account “administrative costs” as it is a default setting in automation in that software. The company plans on implementing additional, more tailored RPA solutions to take care of some specific laborious processes. Overall, Subject A looks at RPA to be beneficial for the company. The new software is smarter and has better integration for additional services such as electronic signatures and automatic document archiving. This has helped the company with documents requiring signatures, as everything is done digitally and is automatically archived, all within the same software. The increased digitalization has decreased the number of stamps and letters used by the company giving a concrete example of cost savings automation can bring to an accounting company. Furthermore, according to the interviewee the Covid-19 pandemic pursued even the last clients to pursue towards digital ways of working. The pursue of increased digitalization works for the advantage of the subject company. The interviewee further emphasizes the environmental benefits achieved by the decrease of physical paper copies used by accounting companies such as theirs.

At Subject B the RPA has impacted the work of the interviewee by assisting on the estimation of the workload of the team. The manager is more likely to approximate the capabilities of the team of accountants better when the variable of the manual work is done by RPA, not the accountant. When the automation percentage measured was lower on a client, the manager knew the client would take more time to complete and therefore possible sick leaves or other anomalies in the process would be harder to fix. From the point of view of the accountant, RPA is constantly performing the routine tasks, resulting in easier estimation of the workload. Prior of automation, when time was allocated to the various clients, if there was an anomaly in the routine processes the anomaly could impact on the reporting schedule for that client. Now, the

accountant can rely on the automation and therefore can take the process in a more relaxed manner. RPA further impacted the work from a quality standpoint. The quality of the product, accounting reports, increased after RPA implementation.

According to the interview at Subject company B, automation has affected the organization from two individual stand points. Firstly, the workload of an employee of the organization has been reduced by approximately two thirds. Secondly, the impact of the decreased workload has also decreased the amount of recruits the company has had to take in to perform accounting related tasks. These two factors combined, has also allowed the work of an accountant shift from booking entries to more consultative tasks, in accordance with Aho (2019). As consultancy has been a part of the business model of the subject company, the increase of automation percentage has freed up time for the accountants to deliver an increased amount of value to the customers. Notable is, that the interviewee did not see any cuts in personnel at the subject company due to an increase of RPA usage. The interviewee also mentions that the subject company acknowledges that the competition in the market is also moving towards and increased level of automation, it leaves the subject company no chance but to adapt. It is mentioned that it is important the development of RPA has been initiated at an early stage to remain competitive.

The interviewee at Subject B noticed the increased level of automation left the accountants of the team to ask for more work, which increased the total revenue generated by the team. ROI or FTEs were not used on a team level, but profitability was measured in other ways. The automation was not compared to the level of profitability, but the interviewee stated that it was noticed that the level of automation correlated with an increase in profitability. The interviewee stated to have used the overall automation percentage of the team itself as a measure of profitability. By increasing the automation, the interviewee could take the freed-up time to the upper level and request more work for the team. If the automation percentage was low in any team, they often required assistance from elsewhere in the organization and by that they often took a toll in the level of profitability. The profitability was measured using a standard gross profit margin. Due to the prementioned facts, the interviewee actively pushed automation to the accountants in the team. On an organizational level, the subject company is growing at approximately 15% increase in revenues year over year,

and as the subject company is a specialist organization, the fewer specialists needed the more profit the company can deliver.

The most important significant impact of RPA at the subject company B is the freed-up time for the accountants themselves. From the time freed-up the company has been able to deliver more consultancy-oriented products to its clientele and therefore create increased value. According to the interview, it should not be overlooked how much more enjoyable the work of an accountant can be, when the work is taken beyond recording accounting entries. The future of financial administration requires more employees with social and analytical skills to keep up with the value the client's demand. The drawbacks of automation cannot be identified at the subject company as the interviewee has only seen the benefits.

"... myself, whenever there has been automation in posting or robotics are used in the posting process overall, I have not seen any drawbacks there. Moreover, the quality improves." (Interviewee at Subject B)

The interviewee mentions that RPA development benefits mostly the larger organizations in the marketplace. Smaller accounting firms might suffer as they cannot compete with the large organizations implementing RPA. The smaller accounting firms also hold a lot of valuable expertise from the field of accounting, as everything is handled by hand. RPA might take away from the more experienced accountants, and it remains to be seen how it will affect the accounting industry.

Lastly, at Subject C RPA is too looked from the perspective of how RPA relieves the pressure on very busy periods from the company's accountants. The development team focuses on processes optimal for RPA implementation occurring on busy times. By focusing on specific processes, the team can decrease the overall level of stress within their accountants and ultimately reduce the amount of overtime worked by them. Due to the prementioned facts, on the financial timeline, RPAs are often implemented on the month-closing periods. Generally, the month closing processes are quite structured, and occur on top of existing responsibilities therefore making them optimal for RPA. Furthermore, the interviewee mentions that by eliminating the repetitive tasks, it leaves the accountants with tasks which are more financially feasible and value-adding. Based

on this, the end user shares the incentives to make the RPA as successful as possible. According to the interviewee, the accountants were quite hesitant when the subject company begun RPA implementation in 2017, quite similarly as at Subject B. In the early stages, there was more general discussion about the topic of RPA regarding it taking up the jobs of accountants, creating some discussion in the office. The discussion affected in the amount of cooperation the accountants had with the RPA development team. According to the interview, the capabilities of RPA are not there yet. Currently, the financial service center can take in more work from the entities of the subject company due to an increased level of automation. As the financial service center is growing and taking up more and more responsibility in the subject company there is concrete value created by RPA implementation. The development team also allows the accountants to become so-called upscaled accountants, ones with the knowledge about RPA development. The interviewee also mentions RPA has allowed them to create reports and projects which would not be feasible to do otherwise. Therefore, quality of service has improved. The gained reports allow to be used in the business development by the organization. With RPA, when you have invested the time for the development, the organization can use the gains for extended periods of time, without limit.

According to the interview at Subject company C, the accountants of the subject company are doing more now than they did three years ago.

“... so, they (accountants) are processing more invoices than they did three years ago. It is not only due to RPA, but also to harmonization with or without RPA so it (the time savings) consists of many factors. But to give an idea about it, we are tracking in a kind of FTE savings...” (Interviewee at Subject C)

The FTEs are used to track the benefits gained through RPA and other process improvements. The saved FTEs are monitored monthly, allowing the company to keep a close monitor on the actual improvements achieved through RPA implementation. The way the subject company acquires the information regarding the improvements in time used by the accountants is through discussions with the employees themselves. From the discussion with the accountant the work of the implemented RPA is then compared to the accountant and based on that a number can be derived of how much

time was saved. In the beginning of last year, the subject company had reported approximately 1 saved FTE, in March of the same year they hired a full-time RPA developer, and by the end of the year the saved FTEs were approximately four. At the time of the interview, four months later the saved FTEs are close to eight. The major reason behind the swiftness of FTE saves is due to the fact RPA runs day and night, and it does not require vacation. Furthermore, the interviewee emphasizes the 8 saved FTEs does not mean 8 people have lost their work, rather an equivalent amount of time has been shaved off the workload of the financial center. Based on the metrics used the subject company is past break-even point regarding RPA projects. FTE savings are used simply as an estimate at the company. The company uses reports to track the RPA projects individually, to keep track of the most beneficial projects. ROI, on the other hand is not used as a measure of profitability but might be in the future. The projects are looked at initially before coding starts from a business standpoint. So, the feasibility is being evaluated from the very beginning. FTE is a metric which is being used to measure the projects. ROI is being discussed and most likely implemented in the future and will consist of all the costs relevant to each project. The feasibility is being seen already by the managers at the subject company and the FTE is the official metric to report.

The most significant benefit of RPA implementation, at Subject C, is the shift from transactional work towards more value-adding work and harmonization of processes.

“... for me personally, harmonization. It has been one of my key focus areas and RPA is seen as a very good enabler of that (harmonization through RPA).” (Interviewee at Subject C)

The interviewee states RPA and process harmonization goes hand in hand which is often overlooked by the discussion around RPA. The interviewee can only name one drawback of RPA at the Subject C. As the development team only has one main developer working full-time on RPA. Automation can be created using only a limited number of employees, and therefore losing key personnel in an RPA team would be considered as a large setback and highly influential on the RPA development process itself.

## 5.4 Analysis

This section of the thesis is reserved for the analysis of the results found by the study. The analysis is summarized in the chapter 5.4.1 where key findings are presented. Based on the analysis, discussion of the findings is presented in chapter 5.4.2 where the results are compared to the theoretical knowledge presented. Analysis is done using the data reduction methods by Halperin & Heath (2012). This section of the thesis also will attempt to answer the research questions presented at the very beginning of the thesis.

### 5.4.1 Key findings

The key findings are derived from the interview data presented in chapter 5.3. The key findings are found using coding methodology, as presented by Halperin & Heath (2012, p. 280-283). Coding allows the research to take the interview data, and break it down in categories, which are relevant to the research question. As this study aims to present data from a limited number of subject companies, three to be precise, coding is done without the assist of software-based analytics tool. DeLone & McLean 2003 model for IS success attempt to look at the net benefits achieved through multiple qualities and usability traits software has. Therefore, the findings are presented from the point of view of the points of view presented by the 2003 model and further refined to look at the RPA success from three different perspectives: quality, usability, and the net benefits. The coded results can be found from appendix 3 but are summarized in the following chapters trying to find similarities amongst the subject companies. Moreover, the most significant results in relation to the research question are presented.

The *quality* point of is a significant part of RPA success, as found by the research. The quality of information, system and service-related data gathered were concurring across the subject companies. The subject companies all mentioned that RPA has seen to affect the general quality positively. The quality of information was perceived to have improved as especially argued by Subject C. The overall picture left from the data was that the whole purpose of RPA is to mitigate errors and therefore to increase the information quality. Errors were reported to have been occurring daily and across



the subject companies, but the benefits were seen to overcome the drawbacks. Errors were often found in the same parts of the processes, which allows the accountants to know where to look for them. Special checklists in order to mitigate any errors in the end-product were also introduced as mentioned by the Subject B. The system quality is achieved by constant monitoring and updating of the implemented RPA. Occasionally, new errors can arise from when old errors are fixed, as mentioned by the Subject A, but generally the arising errors are quickly patched by the software supplier. Subjects B and C both mentioned that quick software fixes are a stable at keeping the system quality on a required level. The quality-of-service point of view as introduced by DeLone & McLean (2003) was only visible in the Subject company A which outsourced its RPA, as Subject's B and C developed their RPA in-house. As a secondary finding this study shows that the quality of the service received by the subject A, ultimately resulted in the RPA project which led to the subject company outsource its software from a different supplier. At Subjects B and C, it was mentioned that the collaboration of the accountants in relation of the quality of the RPA system is crucial. This partly confirms that the DeLone & McLean model stands as the achieved quality has affected the overall usability of the RPA. Another important quality standpoint is that RPA has seen to benefit the process harmonization at Subject C, as the RPA implementation requires the company to go over the processes in such detail.

The *usability* and *use* point of view provided insight on how usability is measured and what benefits the general level of use in an organization. Subject A mentioned that from the point of view of a company who outsources its RPA, it is important that the supplier is listening to its customer. At its best, RPA can be implemented in only months of the initial purchase decision, which can shorten the timeline in which results of RPA investment is seen. Subject C had also limited experiences of outsourced RPA implementation projects, with insufficient results. Companies aiming to outsource their RPA projects should therefore carefully choose when to outsource an RPA implementation. The best way to as found by Subject companies B and C to increase the use of RPA is to include accountants in the process of software development. The collaboration with software developers and accountants is most likely easier when RPA is developed in-house, but if RPA is outsourced this is an important topic to keep in mind. The level of use is also an important factor when measuring the overall

usability of RPA. Subject B provided the study with data regarding the automation percentages found and used by the subject company. The interviewee at subject B saw a direct correlation between the automation percentage in relation to customer satisfaction and the automation percentage in relation to the gross margin achieved by the accountant team. Both Subject companies B and C found that the general level of use depends on the accountants themselves. The role of a manager is to push the automation to be used in the benefit of the overall processes. Moreover, incentivizing RPA from the organizational level, the overall usage further increases. Ultimately, RPA implementation will require change management of some kind to succeed.

The *net benefits* found and explained in this paragraph are most significant in relation to the research question of this study. The research question of this study revolves around the net effects found by companies implementing RPA technologies in their financial administration. Based on the interviews, the effects are seen highly positive. The limitations are related to errors in software, but which were in every case considered to be minor and not crucial in the big picture of RPA. The most significant finding of the study was mentioned by all three subject companies, which implied RPA helps to develop the work of an accountant to become more enjoyable, less stressful and more value-adding. Measuring RPA is done differently in the different Subject companies. In a smaller company such as Subject A, RPA benefits can be seen even without any reports measuring the impacts, larger organizations benefit from implementing metrics such as automation level of a client as done at Subject B, or monthly FTE savings as done at Subject C. From a manager perspective RPA implementation was found to assist on the estimation of periodical workloads within the team itself. Subject C also mentioned that RPA can be implemented on the busiest periods, such as month-end closing to relieve stress of the employees. The benefits to workload estimation and reliefs done to the busiest parts of the processes help with the predictability of the financial processes and improves timeliness and quality. Even when Subjects B and C are reporting significant FTE savings and reduction on recruitments, neither of the two subject companies saw any reduction on the level of staff. FTEs are often “shaven” from the workload of the whole department, rather than from the workload of individuals as RPA is implemented in the most laborious parts of the process. In a specialist organization employee costs are often the most significant cost, therefore keeping the costs at minimum results in value added. Subject

B also mentioned that the quality of the end-product, financial statements, has increased. The customer benefits from the increased quality, the organization benefits from the time gains left for accountants to handle more profitable consultative tasks. The economical benefits gained by RPA were also reported by Subject A. On a general level, RPA implementation is seen to keep larger financial service providers competitive across the market.

Contrary to the various benefits reported in the prior paragraph, some drawbacks were also found. The view of RPA from the negative perspective varied across the three Subject companies quite drastically. According to Subject B, smaller accounting companies can find RPA development negative, as it can provoke difficulties in the competitiveness of smaller firms amongst larger ones, such as Subject B. Subject A, being a smaller accounting firm has implemented digitalization and RPA in their business model ever since the beginning, not mentioning the problem Subject B stated. Subject B only found out that RPA can provoke drawbacks if the accountant running the automation is acting carelessly, for example not understanding what the automation does. From the point of view of a RPA developer, the drawbacks arise from the management side of things. RPA is developed using a small number of developers, and if resigns or similar occur, it can be quite crucial for companies and departments such as Subject C.

In summary, the conclusions drawn based on the interviews had in this study are highly positive. The benefits are seen in companies varied in size and type of RPA implementation. So, the net benefits as described in the research questions are found highly positive. The results are naturally affected by the sample size and the likeliness of how the sample can suffer from various biases. The limitations of the sample and the study in general are discussed in detail at the very last chapter of the study. In general, this study suggests RPA is a suitable solution for financial administrations. The findings presented here are further discussed in relation to the theory and prior literature in the subsequent chapter.

#### 5.4.2 Discussion

The findings of this study show similarities to the prior literature presented in chapter 3. The three case studies by Willcocks et al. (2015), Lacity et al. (2015) and Asatiani & Penttinen (2016) were looking at the RPA from the similar point of view as this study aimed to do. Together with the attempt of looking at the topic of RPA from the point of view of Finnish financial administration and the provided secondary data by the case studies of the benefits of RPA implementation gave this thesis important background to base the research on. This being mentioned, when researching a topic such as RPA in organizations it shows difficulties in the methodological approach. Case study methodology, as described by Tellis (1997), is a useful way of researching topics similar to this thesis. Ultimately, organizations do not have to report the results of their RPA projects and therefore qualitative methodologies benefit the area of research. In the initial stages of this research, some data was found reported by the suppliers of RPA software where mostly the benefits in efficiency of financial processes were brought forward, leaving out any limitations. Therefore, qualitative approach using willing Subject companies were found to be the right way to carry out this thesis. The results presented in the case studies were quite similar as found by this study. RPA is a highly effective tool in data heavy processes, which require routinized steps by employees. At their best, RPA projects can be done in a timely manner and the benefits can be found at the very moment the RPA goes to production. All three Subject companies participating in this study also seemed to implement RPA more after the initial pilot programs arguing that RPA is viewed as a positive in business development.

The contextual background of this thesis based strongly on the literature by Kaarlejärvi & Salminen (2018). The 2018 book outlined what is meant by financial administration, and how automation can benefit the processes related to the concept. RPA needs to be differentiated by concepts such as AI or machine learning, as it is important to understand companies can utilize RPA for only to a degree. RPA is always looked to benefit the most simple and routinized parts of the process, and the findings of this thesis support the theoretical concept. When moving onwards from RPA, as presented in figure 2 of this thesis, the research needs to consider more aspects of the matter. RPA as a tool is simple to understand, implement and even develop in-house if the

resources are not scarce and the organizational willingness towards development is present.

The DeLone & McLean (2003) theory for measuring IS success is found to be suitable for this study. The theory was selected due to the structure it provided for the empirical part of this thesis. The 2003 theory was used to provide multiple points of view for the semi-structured interview methodology to achieve a comprehensive view in relation to the research question. As the subject companies were quite different in nature, the interview needed a structure of some kind allowing for comparison between subject companies. When the interviews were held the interviewees also seemed to find it logical to use a structure the conversation basing on the theory, as it made a more sincere conversation possible.

## 6 CONCLUSION

Robotic Process Automation is changing the ways companies are handling their financial administration, both in Finland and elsewhere. This study finds that the benefits of RPA overcome the drawbacks found. RPA implementation is providing organizations with benefits on various levels for the companies by streamlining and changing the overall way processes are approached in companies, as argued similarly by Kaarlejärvi & Salminen (2018). The implemented RPA is seen to have affected on the cost-structure and overall profitability of financial administration at the subject companies. Willcocks et al. (2015) and Lacity et al. (2015) have reported significant organizational economic benefits achieved through RPA implementation, which are in line with this study, for the most part. The results of this study find significant benefits, both economical and organizational, but not in the level of what has been found by the case studies presented. Although not as significant, the empirical data acquired really shows how various type of organizations are investing resources into RPA development, all of which have found beneficial impacts on their processes. Whenever negative aspects of RPA are found, it seems they are easy to handle in nature.

On top of the organizational changes, the implemented RPA solutions will result in the change of the role an accountant or an administrative employee a company might have. Basing on the results of thesis, the change is similar as argued by Aho (2019), where the role of an accountant is transforming from doing manual labor towards a role consisting of more consultative responsibilities. Acquiring the knowledge of how RPA can be used as a tool can be seen to be beneficial to the employees in the field of financial administration. RPA implementation can be used to decrease the amount of stress created by busier times of the financial timeline which can result in more enjoyable working conditions.

All in all, RPA can be a very beneficial tool for the organizations and accountants of today. Financial administration is a potential part of organizational processes subjected to RPA utilization. It is important to acquire a solid base for RPA development as future technologies, such as AI, are becoming relevant.

## 6.1 Reliability & limitations of the research

### 6.1.1 Reliability of the research

The reliability of any qualitative research can be tied to the methodology chosen and the way the data used has been acquired and interpreted. According to Halperin & Heath (2012, p. 214) the issues behind qualitative methodology often arise from the small sample size used. As qualitative methods often look at just a few cases in detail, there are biases present. The most important reliability issue behind this research is selection bias. By selection bias, in the context of this study, is meant the biases arising from the selection process of interviewees. On one hand, when the subject companies were acquired for this study, it was clear that individuals who have witnessed a failed RPA project are not keen on talking about the project itself on behalf of the subject organization, or they are simply not being allowed to partake in a study where direct insufficiencies are found. On the other hand, individuals who have experience on RPA success were the ones who were the most interested of discussing the topic of this research.

To further emphasize the methodology related reliability, according to Tellis (1997, p. 10) interviews are a form of data gathering methodology with clear strengths and weaknesses. The topic of RPA is not new in the context of accounting (Keenoy, 1958) as made clear in the very beginning of this thesis, but from the academic point of view data is difficult to be gathered reliably using other than qualitative methodology. Interviews allowed this study for targeted discussions with professionals in the field of financial administration providing valuable insight to the mentioned benefits and difficulties found by this study. The weaknesses are presented by Tellis (1997, p. 10) due to biases in the questions formed. The 1997 article argues response bias can be something to keep in mind. By response bias is meant the tendencies interviewees can have when responding to the questions they are asked. The interviewee tendencies can hold characteristics such as false answering or purposefully inaccurately misleading the interviewer due to personal agendas. Furthermore, Tellis (1997, p. 10) lists reflexivity as a possible weakness. By reflexivity is meant when an interviewee might purposefully express his or her answers in a way what he or she thinks the interviewer wants to hear.

The prementioned factors affecting in this thesis were addressed before conducting the interviews. To minimize the biases, each interview was conducted quite close in time from one another, roughly over a week's span. The interviews were held in a similar setting, and each respondent was given similar information about the interview process itself. Most importantly, none of the interviewees saw the questions beforehand mitigating biases such as response bias. Once the interviews were held the data acquired was transcribed and handled individually, before combined as presented in the empirical section of the thesis. By looking at the data case by case, possible premature conclusions were not drawn, and each subject company were handled individually.

### 6.1.2 Limitations

This thesis can be seen to have limitations, as is present in any similar research. Firstly, to be mentioned is the time constraint limiting the scope of the thesis. This research was conducted over a given time span restricting the extent the research could deliver. Secondly, and possibly most significantly, this study suffers from constraints in available resources. This study has brought up a small, but relevant, sample size and analyzed the results using qualitative methodology. Therefore, the data gathered is limited to the three interviews held and presented in this study. Conclusions drawn based on a small sample size are often subject to biases, as discussed in the previous chapter. Larger sample sizes and other methodology, perhaps quantitative methodology could be used to answer the research questions more reliably. Lastly, this study based its theoretical framework for implications purposed for information systems, rather than specifically RPA. Although, one could argue IS and RPA are at least related to one another and therefore the use of IS success model is justified in the context of RPA.

## 6.2 Suggestion for future research

The research around financial administration and RPA is very relevant at the time of the publication of this study. Financial administration can be viewed as a highly potential field for RPA implementation due to the amount of data handled as discussed by Kaarlejärvi & Salminen (2018). When constructing a study similar as this one, it is



recommended to take in to account the limitations presented in the prior chapter 6.1.2. The time constraint has played a significant role in the scale of this research. The DeLone & McLean 2003 model for IS success worked quite well in the context of RPA, but it is recommended at using the most updated models as the theoretical background for similar studies. With more resources available, especially time, a qualitative study could find contradicting results to this study by acquiring subject companies with a different perspective to RPA implementation. Based on this study, finding suitable subject companies can be hard without relevant personal contacts or perhaps a channel through which respondents could announce their interest in partaking in a similar study.

Contrary to the limitations, this study suggests future research to look at the implementation of RPA projects from a similar point of view. On the first hand, if a similar study is constructed some years from now, the results can be more significant, or quite possibly some drawbacks have emerged which are unknown at this time. On the other hand, as RPA is provoking discussion both inside and outside of academia, a longitudinal study from the subject could present the effects of RPA implementation in a more accurate manner. As seen in this study, there are differences between how RPA success is measured between companies, and by standardizing the metrics used the reliability of the study could be seen to increase. By creating a larger scale study from the point of view of RPA could benefit the field in academia further by offering new models of how RPA success is being measured by companies across the market. On a general level, as discussed by Kaarlejärvi & Salminen (2018, p. 52) RPA is only the beginning of technological iterations in financial administration. Machine learning and AI are topics which are being used in the field already and could present interesting research topics for subsequent research.

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## APPENDICES

### Appendix 1 Interview questions

#### 1 Background

1.1 Career background

1.2 Brief overview of the RPA project interviewee was a part of

#### 2 Information quality

2.1 Is the automated task complete, or is the automation only done for a specific part of a process? (e.g., does an employee need to interact in a part of the process for the automation to work?)

2.2 Can you trust the robot does what it is meant to do in the time it is given?

2.3 Does the employees ever need to fix the work done by the robot?

#### 3 System quality

3.1 In your own words, how well implemented you see the RPA software in the task it was designed for?

3.2 Have you ever had any problems with the implemented RPA? If so, could you specify. (e.g., RPA not performing the task it was designed for)

**4 Use and usability of the software**

- 4.1 Is the RPA used for what it was designed for? Does it do more/less than desired?
- 4.2 Does the employees who use this robot find themselves doing the task themselves at all or is the robot given the responsibility it was meant for?

**5 Net benefits**

- 5.1 What kind of impacts the RPA has had on your work or the work of the team you supervise?
- 5.2 What kind of impacts the RPA has had in your organization, in your own opinion? (e.g., changes in cost structure, saved FTEs)
- 5.3 Have you calculated the return on investment (ROI) on the RPA project? If you have, could elaborate on it? If you have not, is it your estimation the RPA project was economically feasible?
- 5.3 What is the most significant benefit of RPA implementation?
- 5.4 What is the most significant drawback of RPA implementation?

## **Appendix 2 Interview questions in Finnish**

### **1 Tausta**

1.1 Uran tausta lyhyesti

1.2 Lyhyt kuvaus RPA projektista, jossa ollut mukana

### **2 Informaation laatu**

2.1 Liittyykö RPA:n implementointi tehtävään, jossa automaatiota on hyödynnetty tehtävän alusta loppuun saakka, vai onko automaatiota hyödynnetty johonkin tiettyyn osaan prosessia?

2.2 Voitko luottaa robottiin ja sen tekemään työtä sen jälkeen siinä ajassa, joka sille on mitoitettu?

2.3 Tarvitseeko sinun tai jonkun muun koskaan korjata robotin tekemää työtä?

### **3 Järjestelmän laatu**

3.1 Omin sanoin, kuinka hyvin implementoituna näet työkalun siinä työtehtävässä, joka sen on tarkoitus hoitaa?

3.2 Oletko koskaan kohdannut järjestelmätason ongelmia robotin kanssa? Jos olet, niin miten ongelmat ilmaantuivat?

### **4 Käyttö ja käytettävyys**

4.1 Käytetäänkö robottia tavalla, johon se oli suunniteltu? Tekeekö robotti enemmän tai vähemmän kuin on oletettu?

- 4.2 Onko tullut vastaan tilanteita, jossa olette (tai joku muu on) päättänyt tehdä työtehtävän itse, vaikka se olisi ollut tarkoitus suorittaa robotin avulla?

## 5 **Nettohyödyt**

- 5.1 Miten robotti on vaikuttanut työhönne? Entä tiiminne työhön?
- 5.2 Millaisia vaikutuksia robotin implementoinnilla on ollut yrityksenne toimintamalleihin? Kerro omin sanoin. (esim. säästetyt FTE, muutoksia prosessien kustannusrakenteisiin, ym.)
- 5.3 Oletteko mitanneet robottiin kohdistuneen sijoituksen tuottoastetta (ROI)? Jos olette, voitteko kertoa siitä? Jos ette ole, pystyittekö arvioimaan projektin taloudellista kannattavuutta?
- 5.4 Mikä on ollut mielestänne kaikista tärkein hyöty ohjelmistorobotiikka-projektissa?
- 5.5 Mikä on ollut mielestänne kaikista suurin heikkous ohjelmistorobotiikka-projektissa?



## Appendix 3 Interview details and coding of the data

### Interview details

**Table 5.** Timing and lengths of the interviews

Subject Company	Interview date	Interview length
Subject A	Apr 1st 2021	52 minutes
Subject B	Apr 12th 2021	56 minutes
Subject C	Apr 9th 2021	62 minutes

### Quality point of view

#### *Subject A*

- The quality of the information is trusted and perceived to be accurate.
- RPA is implemented on all parts of the process where the software is capable of automation.
- Quality checks are done less frequently by accountants.
- Errors occur daily, but in known parts of the process.
- Bugs in the old software pursued the subject company to seek out a new software supplier, which allowed for increased level of automation.
- Software updates are very important for companies which outsource RPA.

#### *Subject B*

- Initially, RPA was only used in certain parts of the process as RPA was developed in-house.
  - It helped to initially automate the easier processes, only after the more complex.
- The quality of RPA was monitored by accountants who used a special checklist develop to find any errors that the RPA might leave behind. The checklist increased the level of quality produced by the RPA as errors were caught and further refined into the RPA.
- Larger clients tend to provoke more errors in the beginning of the RPA project.

- The errors found were often left for the accountant's responsibility, and if errors were significant, it affected negatively on the job satisfaction of an accountant.
- System quality is increased by consulting the accountants of the RPA implementation.
- System related errors were found difficult to handle by the accountants but were often fixed quickly.
- System quality improved quickly as the company ran a team developing the RPA software.

### *Subject C*

- Some processes are better left to be handled by an accountant as the process requires complex skills.
- RPA quality improves when development is done on top of existing automation, further harmonizing processes.
- Knowledge of the processes in general is crucial on RPA quality.
- RPA implementation has been successful almost exclusively, but the subject company has discontinued an RPA project in the past.
- Generally, RPA is being trusted by the personnel at the subject company.
- Error mitigation increases information and system quality and is routinely done in RPA projects.
- Information quality is seen to increase after RPA implementation.
- Scheduling the RPA processes around the schedules of accountants is important. RPA works around the clock, and therefore scheduling is achievable.
- Constant software monitoring and updating takes care of any bugs and increases system quality. Occasionally, some RPA can be implemented quite quickly so the polishing of the code is done while RPA is already in production.

### **Usability point of view**

#### *Subject A*

- User experiences related to RPA are positive for the most parts.
- Outsourced RPA delivers more features as new software updates roll out.

- Supplier can be contacted if some new possibilities of RPA implementation is found.
- RPA is always the better solution to a process.

### *Subject B*

- Use of RPA was measured using automation percentages, giving the company an idea how automation is affecting the processes overall.
- Automation percentages begun from 60-70% level in the initial stages after RPA implementation, but have increased since.
- The level of use of RPA depends on the employees themselves.
- An increased level of use (of RPA) increases the quality of service the client gets, improving a client retention rate at the subject company.
- The accountants were able to impact the user interface of the software, further increasing the level of use.

### *Subject C*

- Trial and error are required when finding an optimal solution for RPA usability.
- The subject company has not found a time where RPA would not be considered as a solution in process harmonization.
- Users of RPA often tend to rely on old ways of working and perform the tasks themselves even when automation is offered as a solution.
  - The company needs to understand this and really require their employees to use RPA when offered.
- The teams have incentives to do more, with less people and therefore a direct organizational incentive is put in place for the RPA to be used as widely as possible, increasing the level of use of RPA.
- External parties have been used to create RPA solutions, with insufficient results.

## **Net benefits**

### *Subject A*

- Most significant impact of RPA is the time freed up for more feasible tasks.
- Profitability of the company has increased after RPA implementation through additional services provided to the customer.
- The job as an accountant more enjoyable.

- Time invested on learning new software is mentioned as the most significant cost in new RPA adoption.
- A mentionable drawback of RPA is that some accountants are using RPA wrongly.
- Additional RPA investments are seen at the subject company in the future.

### *Subject B*

- Workload has become easier to estimate after RPA implementation assisting managers on task delegation.
- Quality of the end-product, financial statements, has increased after RPA implementation.
- RPA frees up time of accountants to complete more feasible tasks.
- Workload of an accountant on routine tasks cut down by two thirds.
- Work conditions are more relaxed, and therefore the job more enjoyable.
- Recruitments have decreased, reducing the variable costs.
- In a specialist organization employee costs are often the most significant cost, therefore keeping the costs at minimum results in value added.
- No cuts of existing jobs have been seen.
- Measuring RPA implementation levels using automation percentages on a client-by-client basis helps to see the economic impact RPA has.
- RPA in the future will impact the job description of an accountant.
- RPA keeps large financial service providers competitive.

### *Subject C*

- RPA relieves pressure off accountants in the busiest periods.
- RPA benefits are seen especially in the month-closing periods.
- The work intake has increased at the subject company's financial service center due to RPA implementation.
- The department has been able to produce reports and other material which would have not been possible without RPA, which has benefited the business development.
- Accountants are being trained to increase the RPA knowledge in-house.
- FTE savings are increasing rapidly and are monitored by the subject company.
- Saved FTEs have not affected on existing number of jobs, rather they have helped in the big picture.
- Most significant benefit of RPA is related to the shift from transactional work towards more value-adding work and harmonization of processes.
- Drawbacks of RPA development can arise if the team dynamic of the employees developing the RPA changes, due to for example resignation.