

Max Plyhm

# **RPA IMPLEMENTATION IN INVOICE FACTORING**



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## ABSTRACT

Plyhm, Max

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Robotic Process Automation (RPA) is an automation technology, which allows organizations to automate their high volume, simple and repetitive tasks. By implementing RPA, the organizations can refocus human resources into other value creating tasks and increase efficiency while limiting human error. The aim of this master's thesis was to study the suitability of RPA in an invoice factoring process. The focus of this study was on the positive and negative aspects of a possible RPA implementation would bring to the organization, what a successful RPA project would look like and if RPA is the correct automation technology for the process. The case company in question is a medium sized financial services organization in Finland. In the literature review portion of this study the case for RPA implementation is built based on previous research on the subject. The literature review is divided into two parts. The first part looks at RPA in general and then expands to the strengths and weaknesses of RPA, the suitability of RPA and then finally what a possible implementation could look like. The second part focuses on how to conduct a successful RPA project. Based on the findings of this study, RPA is a suitable automation tool for part of the process. The part where simple data searches are being made to determine eligibility to finance are more than suited to be automated for RPA. The study also finds that RPA is best seen as a temporary solution to solve the simplest and most pressing automation issues organizations have, while developing more cognitive and capable technologies on the side. The organizational changes that a RPA implementation can be broad but were mainly seen as positive. This includes the change of job description, completely new positions and the change of organizational culture as a whole. The study revealed the success factors for a successful RPA project to being a robust communication, a well-developed plan, organizational preparedness and proper documentations. The findings of this study partially confirm the findings of previous studies but the lack of specific studies into invoice factoring leaves room for further studies. This study can be used as a guide in the planning phase of a RPA implementation project.

Keywords: Robotic Process Automation, RPA, automation, RPA suitability, implementation, RPA project

# TIIVISTELMÄ

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Ohjelmistorobotiikka on automaatioteknologia, jonka avulla yritykset voivat automatisoida nykyiset toistettavat manuaaliset prosessinsa. RPA:n avulla yritykset voivat tehostaa tekemistään, välttää inhimillisiä virheitä sekä ohjata säästettyä resursseja muualle yrityksen toimintaan. Tämän pro gradututkielman tavoitteena oli tutkia RPA:n sopivuutta laskusaatavaraohoitukseen. Tutkimuksessa keskityttiin RPA:n tuomiin positiivisiin sekä negatiivisiin vaikutuksiin ja miten menestynyt RPA projekti toteutettaisiin. Tapaustutkimuksen yritys on keskisuuri rahoitusalan toimija Suomessa. Kirjallisuuskatsauksessa tarkastellaan RPA:ta ja mitkä tämän vahvuuksia ja heikkouksia ovat, mihin prosesseihin RPA soveltuu, miten parhaiten implementoida RPA olemassa oleviin prosesseihin sekä menestyneen RPA projektin menestystekijöitä. Aiempiin tutkimustuloksiin nojaten, tämän tutkielman empiirisellä tutkimuksella haluttiin vastata tutkimuskysymykseen sekä ymmärtää mitä vaikutuksia mahdollisella RPA implementaatiolla olisi kyseiseen organisaatioon. Tutkimusten tulosten perusteella RPA on sopiva automaatiotyökalu osaan laskusaatavaprosessia. Koska prosessiin kuuluu yksinkertaisia datahakuja, joita tehdään lukuisia päivässä, niin täytyisi RPA:n automaation kriteerit. RPA teknologia on tutkimustulosten perusteella paras nähdä väliaikaisena ratkaisuna automaatioon, kunnes soveltuvammat kognitiiviset teknologiat korvaavat RPA:n. Organisaatioon koskevat muutokset automatisoinnin yhteydessä ovat laajat. Tämä tarkoittaa nykyisen työnkuvan muutosta, uusien työpaikkojen luomista sekä yleisen kulttuurin muutosta. Projektin menestystekijöiksi lukeutuvat suunnitelman tärkeys, organisaation valmius, dokumentaatio sekä vahva kommunikaatio. Tutkielman tulokset vahvistavat osittain aikaisempien tutkimusten tuloksia ja tuoden uusia näkökulmia RPA:han ja mihin kyseistä teknologiaa voidaan soveltaa. Tutkimuksen tuloksia voidaan käyttää hyväksi RPA-projektien alkuvaiheessa sekä suunnittelun tukena.

Asiasanat: RPA, ohjelmistorobotiikka, implementointi, soveltuvuus, automatisointi, RPA projekti

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# 1 INTRODUCTION

The factoring industry in Finland has in the past few years grown exponentially both from a supplier and clients' perspective. This has ultimately led to increased competition when the demand is not meeting the current level of supply. New solutions are being discussed to increase organizations competitiveness and Robotic Process Automation (RPA) has been suggested as a possible solution for automation. RPA is an automation tool that can replace human capital by automating simple repetitive tasks that have large volumes. Kroll et al. (2016) suggest that the benefits of RPA are two-fold. Not only does it make the process more efficient and less prone to error, but it allows the organization to pivot its resources to other value creating activities that require more cognitive skills. RPA is a highly flexible tool that can be implemented into any system and due to its low costs of development and speed it is seen as a very lucrative solution. Kroll et al. (2016) suggest that because of the low development costs and development speed the Return on Investment (ROI) is seen very quickly. Authors Willcocks, Lacity and Craig (2015) highlight increased efficiency, increased compliance, speed and error reduction as strengths of RPA. Due to the current hype surrounding RPA it will come with its pitfall. By not properly studying the capabilities of RPA and what processes the organization want to automate, there is a high chance of failure of the RPA tool according to Syed (2020). The organizational readiness is also questioned since not all processes or organizations are suited for RPA automation due to the lack of flexibility or knowledge. RPA has also been attributed to stopping development of back-end automation technologies because of the high ROI and the unwillingness of executives to further automate. (Asatiani & Penttinen, 2016). Because of the RPA tool being business owned, the readiness of IT-infrastructure is often neglected and can lead to a failure of the RPA tool (Hindle et al., 2018).

The study is based on the fact that is RPA a suitable automation tool for a process such as invoice factoring and discusses other automation solutions. The simpler the task and the more routine tasks the process contains the more suitable RPA is for the process. If the process in question contains a large number of exceptions, which in turn require cognitive decision making, then the RPA solution might not be the correct tool.

The implications of automation and RPA implementation in general was also discussed in this study. While the general view was found to be a positive there are some negative impacts that a RPA implementation can have on an organization.

The aim of this study was to determine the suitability of RPA to an invoice factoring process. The study focused on the strengths and weaknesses of a RPA tool in the process, the implementation implications and the project success factor of a RPA project. Because of the lack of previous studies on the matter the aim was to create a general picture of what the requirements are for invoice factoring automation and what it takes for a RPA project to be successfully implemented to process. The study aims at answering the following question:

- Is RPA a suitable tool for invoice factoring automation?

The study is divided into two parts. The first part consists of previous studies into the subject, which builds the theoretical framework of this study. It introduces what RPA is, what its strengths and weaknesses are, what the selection criteria for RPA are, what steps an implementation takes and finally what a RPA project looks like and what it takes to conduct a successful RPA project.

The second part of the study is the empirical part of the study. A qualitative approach was chosen as the research approach. A case company was selected, and interviews were conducted in a semi-structured interview. After the interviews had been conducted the collected data was collected and thematically analysed. The methodology is introduced in the third chapter, while the results of the empirical study are introduced in chapter four. The fifth chapter included the discussion portion of the study where findings are being analysed. The sixth and final chapter of this study contains the conclusions of the study.



## 2 LITERATURE REVIEW

The first part of this thesis forms the literature review section of the study. The first theme of discussion is Robotic Process Automation (RPA), which will explain the key concepts to what RPA is and what are its advantages and where the challenges lie for RPA. This first section is further expanded by the selection criteria for RPA and how RPA can be implemented. The first section is followed by exploring the theories on how to define project success. The second section is then further expanded by discussing how to define RPA project success.

This literature review is based on the following word searches: search terms include “Robotic Process Automation”, “RPA project success”, “RPA project”, “RPA Finance”, “RPA implementation”, “project success criteria” and other possible combinations of the terminology. Scientific papers were searched by using Google Scholar. Further references were discovered by reading scientific articles and searching their references. Literature was selected on the basis of their relevance to the subject at hand and counts of citations. RPA related papers ranged from 2011 to 2020, while literature discussing projects could be dated back to 1989.

### 2.1 Robotic Process Automation

As a concept Robotic Process Automation is a fairly new one and was first introduced in 2012 by the marketing director of Blue Prism (Hindle et al., 2018) in order to answer the perennial question “should something be automated” (Aalst et al., 2018; Aguirre & Rodriguez, 2017). The term of “Robotic Process Automation” provokes images of humanoid robots replacing humans at the workplace but this is not the case. According to Willcocks et al. (2015) one should consider RPA more as comparable to a software license. Boiled down to its basics, RPA is about replacing a human with a “robot” to do repetitive task. Aguirre and Rodriguez (2017) describe RPA as a high-tech reflection of a human worker that carries out structured task effectively and cost-efficiently. Battaller et al. (2017) offers an explanation of RPA of being a method, system and a

tool including computer programs coded into computer storage in order to automate manual processes.

The idea of RPA implementation is two pronged. Not only to limit human error and increase task efficiency but to re-allocate human resources into other activities that will help the organization create added value (Kroll et al., 2016). Tornholm and Dunie (2017) provide the following description of what RPA is “RPA tools perform [if, then, else] statements on structured data, typically using a combination of user interface interactions, or by connecting to APIs to drive client servers, mainframes or HTML code. An RPA tool operates by mapping a process in the RPA tool language for the software robot to follow, with runtime allocated to execute the script by a control dashboard.” RPA is then best suited for repetitive tasks and areas of application can be finance and accounting and other front and back-office processes. (Mendling et al., 2018). Barnett (2015) states that RPA has advanced from simple tasks such as screen scraping to a much more rounded solution, which is capable of automating more complex tasks and complementing existing technologies such as Business Process Management (BPM).

The aim of a RPA implementation is to free up human resources from burdensome and repetitive tasks (Aguirre & Rodriguez, 2017). Former Deutsche Bank CEO John Cryan has describes current banking tasks as follows “Right now, many finance jobs require people to act like robots, so they’ll easily be replaced by robots” (Alberth & Mattern 2017). Aalst et al. (2018) differentiate RPA from other existing automation solutions is its highly efficient development time. While other automation solutions require wholesale changes to various systems and some need to be redeveloped from the ground up, RPA is simply built on top of the existing systems and the only changing component is the human. As a solution for streamlining and increasing efficiency RPA has seen an increased demand in a time where businesses are constantly looking for ways to increase their bottom line. (Aalst et al. 2018). According to Aalst et al (2018) the increased demand for RPA tools has been seen in that increasingly many RPA vendors have entered the market offering solutions. Because RPA solutions do not need cumbersome solutions built in tandem with the solutions itself, but it can be developed “on top of” existing systems Aalst et al (2018) argue that RPA is a fast way of achieving a high Return on Investment (RoI) due to the low initial investments.

According to Bygstad (2015) RPA solutions fall under the description of “lightweight IT” because of its nature and how it is developed. In contrast to the IT-department owned “heavyweight IT” the lightweight IT is usually business driven and owned but requires a loose coupling with the heavyweight IT in order to support the RPA tools (Bygstad, 2015). Heavyweight IT include large organization spanning solutions while lightweight IT is a far more recent term to describe applications and Internet-of-Things (IoT) solutions. (Bygstad,2015).

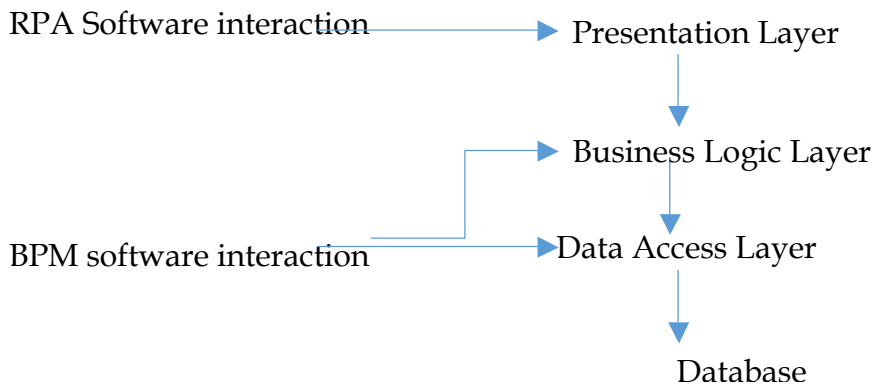


FIGURE 1 RPA as “Lightweight IT” (Willcocks and Lacity, 2015)

As Figure 1 shows from Willcocks and Lacity, that RPA software comes to contact with other systems only through the presentation layers. As shown the Business Process Management software (BPM) interacts with elements requiring expertise and are of high value to an organization such as Enterprise Resource Planning (ERP) and Customer Relationship Management systems (CRM).

Willcocks and Lacity (2015) want to underscore that the aim for RPA is not to offer an alternative to BPM, but form a sort of symbiosis where both systems can be utilized to their best abilities.

Hoffman et al. (2020) introduce the main characteristics of RPA in Figure 2 having followed the description of the IEEE Corporate Advisory Group (2017), which describes RPA as the use of a “*preconfigured software instance that uses business rules and predefined activity choreography to complete the autonomous execution of a combination of processes, activities, transactions and task in one or more unrelated software systems to deliver a result or service with human exception management*”. In the figure 2 below the characteristics and flow of the description will be displayed.

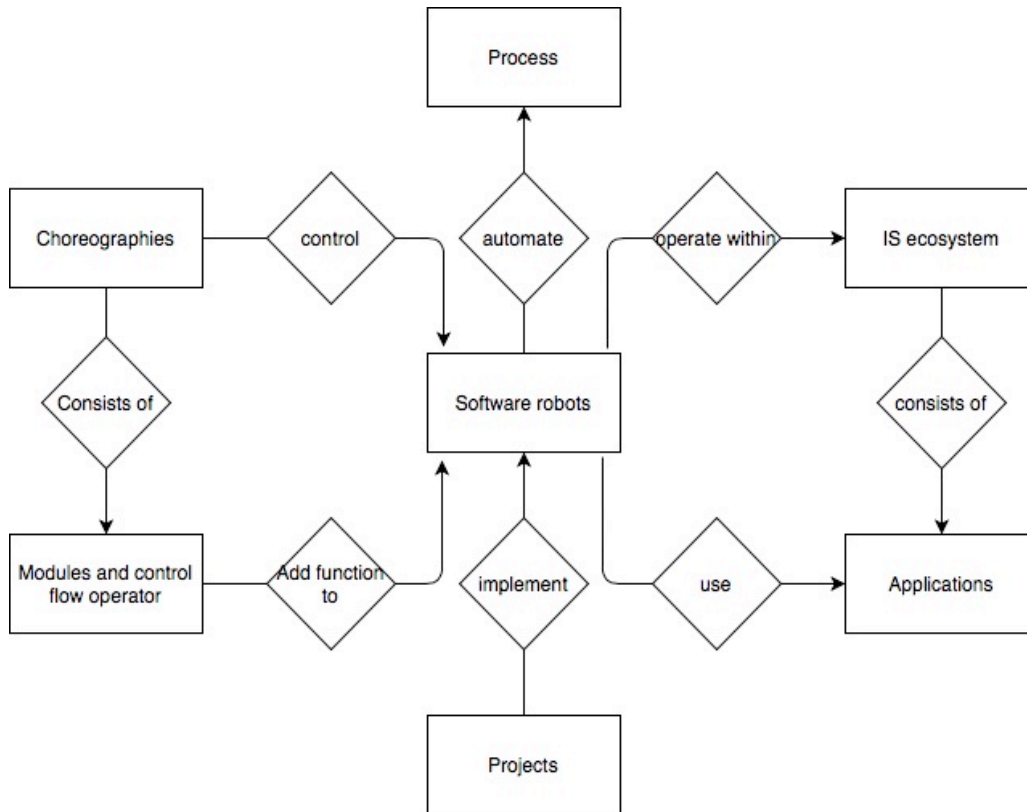


FIGURE 2 The nature of robotic process automation (adapted from Hoffman et al. 2020 and made with diagrams.net flowchart tool)

### 2.1.1 Advantages of RPA

There are many reasons for the surge in demand for RPA solutions. As mentioned before the speed of development and costs are two great drivers for demand in a organizations quest for efficiency (Aalst et al, 2018). As our technology in automation advances the possibilities of RPA implementation is growing as well (Kroll et al. 2016). Current RPA solutions replace repetitive tasks performed by humans but as technology advances RPA solutions can start taking on much more complex tasks and coupled with Artificial Intelligence (AI) and Machine Learning the RPA tasks can move on to highly complex tasks (Mindfields, 2017).

As organizations search for new ways of cutting costs and increasing profits, RPA stands out as a great solution for increasing efficiency. Since RPA is built on existing platforms the solutions do not require sizeable investments and the ROI becomes evident rather quickly (Kroll et al. 2016). The deployment of RPA solutions is quick in comparison to other “heavier” Enterprise Application Integrations (EAIs) (Aalst et al. 2018). Aalst et al. describe the process of building something on top of existing systems without having a major impact on existing processes a “outside-in approach”. RPA is a highly flexible and is easily integrated with almost any software used by a human. (Asatiani & Penttinen 2016). Asatiani and Penttinen (2016) suggest that organizations often

consider outsourcing as an alternative for RPA solutions. Outsourcing is an efficient method of cutting costs, but other issues may arise such as communication issues and increased management costs that will have an adverse effect on the bottom line. RPA does not bring about the issues that outsourcing might bring and therefore can be considered a more stable solution as a purely cost cutting measure.

Willcocks, Lacity and Craig (2015) raise other benefits of RPA such as, process efficiency, accuracy, compliance, speed, and error reduction, which often leads to increased customer satisfaction. It is often spoken that in any industry automation will lead to decreased employment due to robots taking over tasks. Asatiani and Penttinen (2016) argue however that as RPA is implemented in organizations it creates new positions where human workers are better positioned to add value to the organization.

After a company has successfully implemented an RPA to its business processes, the advantages can be seen immediately. In comparison to human labor the RPA bots work at a much faster pace than humans and bots do not need to pause for sleep, drink, food or holidays. They can work around the clock without errors. (Kaelble, 2018, 10). Both Kroll (2016) and Kaelble (2018) that since RPA takes care of the repetitive task and human capital can be re-allocated to value-adding, innovative and customer related task this increases worker satisfaction and boost the image of the organization. According to a study conducted by Wright, Witherick & Gordeeva (2018) that between the years 2001 and 2015 roughly 800,000 job losses could be accounted to automation in the United Kingdom and yet it had created in the same timespan about 3,5 million new jobs. As RPA advances it will replace human capital in some industries, but it will create new higher paid positions elsewhere where they can add further value to their organizations (Asiatiani & Penttinen 2016). Lacity and Willcocks (2017) raise the example of Telefonica O2, which is the second biggest telecommunications company in the United Kingdom. In 2010 management made the decision to start automating some structured tasks with the hope of reduce headcount, improve customer service like response times, which in itself would reduce inbound calls on the status of required service. The automation dealt with two distinct processes, the first one being updating old telephone numbers to new ones and the second process involved applying pre-calculated credit to a users account. Willcocks and Lacity (2017) claim that five years after Telefonica O2 had launched their automation project that 35% of their back-office services had been automated. Put in numbers this means that their robots were processing 400,000 to 500,000 transactions monthly. Not only had this cut wage costs but also turnaround times fro requests such as phone activation, which could have taken up to a few days was now a matter of minutes. This resulted in increased customer satisfaction and increased workforce flexibility. Authors Willcocks and Lacity (2017) raise the example of workforce flexibility in the case of new product launches. It is much easier to scale-up robots for increased demand and then scale them back down as the demand drops.

According to Syed et al. (2020) that those who have adopted RPA into their processes have seen risk reduction and increased compliance as great as-

sets of RPA. A common example that is raised is that each task the bot has performed has a corresponding log entry in order for there to be an ability to check if the tasks meet regulations. RPA can also be used to monitor human activity for any breaches against compliance rules (Syed et al. 2020).

### 2.1.2 Challenges of RPA

The advantages of RPA systems are plenty, but they do not come without their own challenges. Because of its current “hype” one can come to the conclusion that RPA implementation is a success no matter what. Syed et al. (2020) raise the concern that success is not guaranteed and depends on many factors. Organizational readiness and the adaptability of a RPA solution are raised as two key factors to any automation implementation success. As to existing guidelines or best practices Syed et al. (2020) suggests organizations looking into themselves and developing a systematic approach to finding the best solution if at all finding one.

Asatiani and Penttinen (2016) raise four critical obstacles for RPA to succeed within an organization. The first obstacle is the perceived “savior” status of RPA. It is a new and exciting solution, but one has to remember that it does not have all the answers and just because it is so new it has not that many successes singing its praises. Businesses often proceed with caution when there are new and unproved solutions, and this is a hurdle RPA has to overcome for it to be seen as a viable solution in the eyes of potential customers. Secondly despite its many advantages in cost, speed and flexibility it is still according to Asatiani and Penttinen (2016) “*inferior to back-end machine-to-machine communication.*” RPA is also seen as temporary solution from current legacy solutions where RPA bridges the gap between what is currently being used and the completely new fully automated systems (Asatiani & Penttinen,2016). The third critical obstacle Penttinen and Asatiani (2016) presents is an organizational one where RPA is still seen as a “job killer” and will just replace human capital. As mentioned in the previous chapter in a study conducted by Wright, Witherick & Gordeeva (2018) as automation had replaced roughly 800,000 jobs between the years 2001 and 2015, but during the same time it has also added 3,5 million new positions. Despite these figures there is still a skepticism among employees towards RPA, which can lead to RPA implementation having a negative impact on current employees. According to Lacity and Willcocks (2016) the RPA robots are perceived as direct competition for employees, and this can lead to tension between management and the staff but it was mentioned that employees appreciated the fact that RPA had released them of the more repetitive tasks. The lack of communication from management and assumptions that RPA will be greeted with open arms have according to Lacity and Willcocks lead to employees trying to sabotage any new endeavors into RPA implementation. As the last obstacle Asatiani and Penttinen raise for RPA implementation is the rather narrow scope of current RPA technology. RPA works only with clearly defined ruled based tasks that will not adapt if the parameters that it has been given are wrong.

Hindle et al. (2018) say that roughly 30-50% of RPA projects fail due to targeting wrong processes, not paying attention to optimization and existing IT-infrastructure. Although RPA has been mentioned as a business owned IT solution it is however incremental for the success of the project to involve the IT department early in the project (Lacity & Willcocks, 2017). In the case of Telefonica O2 RPA implementation they had to “learn it the hard way” to include the IT department into the project. According to Lacity and Willcocks (2016) there were two reasons for why they initially did not include the IT department into their implementation plans. First they had viewed RPA implementation as a solely business implementation, which did not require the specific skillsets that the IT-department possesses but rather process and subject-matter expertise. The second reason for leaving the IT-department on the outside was according to the authors that there was a worry that the IT department would bring with it an excessive amount of bureaucracy and this in turn would slow the development.

### 2.1.3 Selection of Technology

It is critical to distinguish the tasks that can be selected for RPA and for those which are not viable in order for the project to succeed. Asatiani and Penttinen (2016) has made up a matrix in order to help organizations separate those tasks which can and can not be automated by RPA. These four parts of the matrix are routine or non-routine tasks and if the task requires manual or cognitive skills. The non-routine task that requires cognitive skills seldom are suitable for RPA implementation because of the high variation of each tasks and rules are difficult to structure. Authors Asatiani and Penttinen (2016) mention a guiding rule for what tasks could be suitable for RPA as whether one can accurately write down each step, task and each possible outcome. Figure 3 below illustrates the matrix on how organizations can choose their potential RPA tasks.

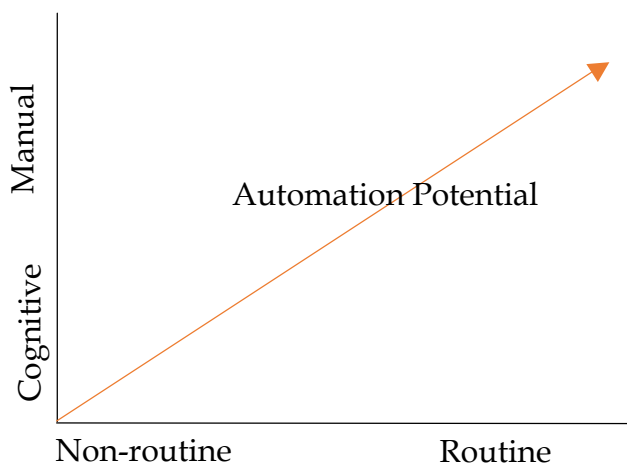


FIGURE 3 Automation potential of the task (Asatiani & Penttinen, 2016)

Asatiani and Penttinen (2016) do state that there are far more factors to be considered than the matrix illustrated in Figure 3. This figure is a crude assessment criterion for an organization to help the view weather said tasks can be implemented to RPA. Other factors that come in to play according to Asatiani and Penttinen (2016) are among others; is it viable to replace human labor and what are the implication of such decisions.

The identification of business goals is according to Waller (2018) a critical task because it creates a baseline for future decisions on what the organization seeks to achieve by implementing RPA. There are several factors to to be considered when determining business goals for automation. These include targets and objectives of RPA, stakeholder impact, process identification, governance framework, risk assessment, establishing risk assessment teams, schedule of implementation and assessing possible interdependencies between single processes (Mindfields, 2017).

In addition to Figure 2 Asatiani and Penttinen (2016) provide a deeper sort of checklist for potential RPA implementation that is provided below.

TABLE 1 Criteria for Robotic Process Automation (adapted from Asatiani & Penttinen, 2016)

<b>Criteria</b>	<b>Description</b>
High Volume of Transactions	Tasks considered for RPA is performed frequently or includes high volume sub-tasks.
Need to Access multiple systems	Task involves accessing multiple systems. Example: copying data from a spreadsheet to a customer registry.
Stable Environment	Task is executed within predefined set of IT systems that remain same every time a task is performed
Low cognitive requirements	Task does not require creativity, subjective judgement or complex interpretation skills.
Easy decomposition into unambiguous rules	Task is easy to break down into simple, straightforward, rule-based steps, with no space for ambiguity or misinterpretation. Example: Allocate all incoming invoices from Company X with value €3000 or more to category Y.
Proneness to human error	Task is prone to human specific error, not occurring to computers. Example: matching numbers across multiple columns.
Limited need for exception handling	Task is highly standardized. Little or



	no exceptions occur while completing a task.
Clear understanding of the current manual costs	Company understands current cost structure of a task and is able to estimate difference in cost and calculate return on investment (ROI) of RPA.

Syed et al. (2020) in their findings have arrived in a very similar conclusion that seems to support the findings displayed at Table 1. Syed et al. (2020) also describe matching the right task with RPA is key for its success. However, their findings expand on the criteria presented by Asatiani and Penttinen (2016).

TABLE 2 Expanded criteria for Robotic Process Automation (adapted from Syed et al. 2020)

Highly rule-based	High Volume	Mature	Easy to Achieve and show impact	Has digitised structure data input	Highly manual	Transactional
Standardised	Low-levels of exception handling	Highly repetitive	Less complex processes	Well-documented	Interacts with many systems	

Asatiani and Penttinen (2016) do stress that even if the process of RPA implementation does not require huge resources one should not approach automation without a well thought out plan. This requires analysis, evaluation and a detailed plan for how the RPA implementation will be rolled out.

Syed et al. (2020) states that in his findings these criteria or characteristics are often spoken of and usually agree but there are some contradictions. The authors give an example of the maturity and stability of processes are given as characteristics that are in favor of RPA implementation. Despite this Syed et al. (2020) note that authors often position RPA as a “lightweight” technology that is to be viewed as a temporary solution, which in their mind in direct opposition with stable processes. Contradictions arose in the volume section. While some authors argue that RPA is best suited for high-volume while others state that they do not need to handle an extreme amount in order to qualify as a viable candidate for RPA (Syed et al. 2020). Process standardization has in some papers been viewed as a pre-requisite for RPA implementation while others see it as an avenue for achieving standardization (Syed et al. 2020).

Lacity and Willcocks (2016) raise the question of the confusion between different software tools in the service automation arena. The authors divide the service automation landscape into two broad classes, the Realm of Robotic Pro-

cess Automation and the Realm of Cognitive Automation (CA). Lacity and Willcocks (2016) urges adopters of any automation software not to focus on the name of said tool but more in its capabilities for there is no real standar in naming automation tools and vendors use acronyms as they please, which can lead to confusion.

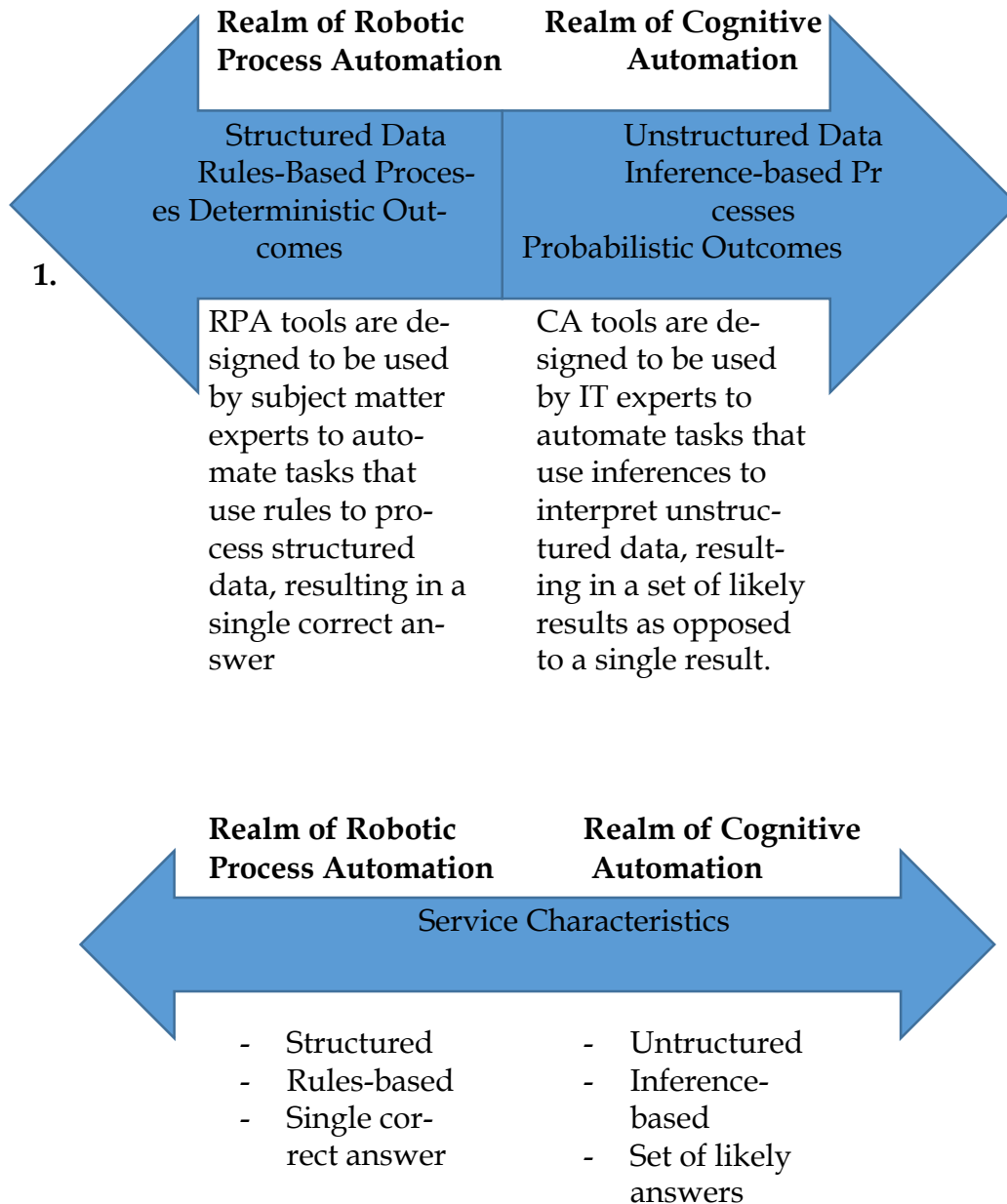


FIGURE 4 Service Automation landscape (Lacity & Willcocks, 2017)

Another form of automation has been raised by Penttinen et al (2018) as a contrast to RPA and that is back-end system automation. As mentioned earlier the

back-end system automation is what Bygstad (2016) describes as “heavyweight IT”. The definition for back-end system automation is invasive automation, which is implemented by system development and/or application layer system integration (Penttinen et al. 2018). As the RPA tools would only utilize the presentation layer in its integration, which gives it more agility than its back-end automation counterpart, which in turn needs to make changes to the system logic or interfaces in both the data layer and applications layer (Penttinen et al. 2018). Forrester (2018) argues that data and application layer integration offers a larger scalability it also requires much more specialized IT knowledge. Mohapatra (2009) add that there are four basic ways if back-end automation. First one can simply extend the current system, second purchasing a BPM-solution with business process automation (BPA) extension, third purchasing a middleware solution or fourth using special purpose built in tool.

TABLE 3 Comparison of lightweight and heavyweight IT (Penttinen et al. 2018)

<b>Feature</b>	<b>Lightweight IT</b>	<b>Heavyweight IT</b>
Type of systems	GUI automation	Back-end systems automation
Technology	Emergent, spontaneously adopted	Mature, proven
Culture	Business and process improvement	Software engineering
Focus	Agility, innovation, speed	Security, efficiency, reliability
Application area	Unknown, development of new services	Well-understood and known services
Invasiveness	Non-invasive, presentation layer	Invasive, data-access and business logic layer
Problems	Isolated systems, privacy and security issues	High complexity and costs of system

In their findings Fung (2014) acknowledges that despite us having research on the criteria of selecting RPA as a tool for automatization there is a lack in studies signaling the selection issues between RPA and alternative technologies that might be used for automation. The issue with the criteria is that they can argue the case for both RPA and back-end system automation simultaneously depending on the approach one should take (Penttinen et al. 2018).

#### **2.1.4 RPA implementation**

Once the decision has been made to select RPA as the tool for automation one needs to start the process of implementation. Asatiani and Penttinen (2016) offer a simple four step summarization on how RPA can be launched.



FIGURE 5 Stages of RPA introduction in the company (Asatiani & Penttinen, 2016)

The first stage in the whole implementation process is when one draws up the criteria for RPA implementation discussed in the previous chapter. This is where the feasibility of automation is considered. This time is used to conduct feasibility studies on can RPA be implemented by reviewing the current processes (Asatiani & Penttinen, 2016). Should the feasibility study be positive? Authors Asatiani and Penttinen (2016) write that the second stage is where one takes a closer look at the current processes being performed by human workers. This is to get a deeper understanding of how the automation could be designed. A road map is being drawn on how the processes could be broken down to simple rules-based steps in order for a robot to perform them successfully. The third stage is where the steps, which the robot will take are introduced and how the whole process is potentially automated. At this stage efficiency and the possibility of productivity enhancement are discussed. Total automation does not need to be achieved immediately but discussions on how current human capital and automation resources could best be combined (Asatiani & Penttinen, 2016). Should all indicators be positive and point toward RPA implementation the fourth stage is the RPA implementation itself. The robots have been given process libraries with step-by-step instructions for them to execute. Asatiani and Penttinen (2016) have provided simplified instruction on how these step-by-step instructions may look like in Table 4.

TABLE 4 A simplified example of instructions for a software robot operating across two systems (Asatiani & Penttinen, 2016).

<b>Steps for software robots to complete</b>
1. Pick first incomplete transaction from the work queue (the transactions in the queue could have been formulated e.g., by receiving triggers, by reading a specific report, by accessing a specific web portal etc.)
2. Launch application X.
3. Enter specific (fixed or variable) value into a specific field.
4. Click a specific button in an application.
5. Read value in a specific location in application X and store it in variable Z.
6. Launch application Z
7. (...)
8. Enter variable Z into a specific field in application Y.
9. If an error message is shown, store result about error in a report and

move to Step 12. Otherwise proceed to Step 10.

10. (...)

11. Store result of a transaction in a report.

12. Pick next transaction and return to Step 3.

Willcocks et al (2017) introduce an Enterprise Maturity Model for RPA derived from Blue Prism material on how a company can successfully implement and realize the full potential of RPA. Authors Willcocks et al. (2017) underscore the importance of building awareness and organizational adaptability as well as building specific RPA skills and capabilities. In this model the steps have been divided into three categories: organizational, educational and capability. The first phase is the initialization phase where the organization established capabilities on all three fronts. Organizationally one needs to focus on delivering a clear vision and targets. Organizational roles need to be clearly defined and establish clear communication throughout the organization (Willcocks et al., 2017). Awareness is key in educating the staff on what is about to happen so communication needs to be clear and efficient. By training a core RPA team, establishing environments, architecture and delivery methodology to support initial processes and delivering these initial processes to prove benefits all build improved capabilities. The second phase called the industrialization phase the “virtual workforce” is already up and running and providing an alternative service delivery mechanism. This is a stage where the organization tries to replicate processes and if needed ramp them up in all three categories. Education is provided by showcasing process capabilities to the whole organization, while incentivizing staff to suggest more automation opportunities. Capabilities will be increased by having the core RPA team train new members from different organizational units and establishing a RPA code of best practices guide. (Willcocks et al. 2017). The third phase in, which the organization will institutionalize the automation and deliver differentiated performance. The organization has fully adapted to a human and virtual workforce and will divide up the work between them according to their best capabilities. The virtual workforce and human capital work seamlessly to deliver increased efficiency. RPA benefits need to be established as a core performance measure in order to inform the organization of achieved success. As capabilities improve the skills and knowledge of each team deepens. Lean methodologies need to be embedded into the culture of each team to foster a culture of continuous improvement (Willcocks et al., 2017).

Kaelble (2018) underscores the importance of not only including business units in the implementation in order to enhance the chances of success. There is a need for both business and process knowledge and automation knowledge, which the IT department brings. In the early stages of implementation expectations are usually unclear so an all-inclusive discussion with various business and business support units could help clear up any confusions that might have arisen (Nelson, 2017).

Wright et al (2018) names inclusion and stakeholder buy-in as the most crucial factor in RPA automation success. The author mentions management, directly impacted human workers and the IT department as the most crucial

stakeholders to have bought in on automation. Not including these units and without open and constant communication the venture has very little to no chances of success. Both Kroll et al (2016) and Beers et al. (2018) highlight the importance of IT department involvement from the early stages. Without the IT departments knowledge on security, scalability, connectivity, server maintenance and hosting the RPA project has no chance of getting of the ground. The managerial support of RPA projects is needed in order for it to succeed (Wright et al. 2018) since managers are able to remove possible organizational barriers and hasten scaling if need be. Managerial role is to effectively communicate why and how something is happening in order to create awareness and settle any possible resistance to the project. The last group of stakeholders Wright et al (2018) mentions that are crucial to have bough in on the automation, are the employees themselves who perform the tasks that are to be automated. As Wright et al. (2018) have written that RPA will replace some tasks but consequently it will also create new positions where replaced employees can gravitate towards. Because of this shift it is critical for employees to back this implementation. This means that management need to have prepared the employees to the coming shift (Kroll et al, 2016). Change management will play a key role in the RPA implementation project (Kroll et al. 2016). In order for change management to have the desired impact management needs to have a clear understanding of what do the employees need in order to be successfully reskilled (Geyr, 2015). According to Geyr (2015) by involving the employees in the implementation of the bots, this accompanied by a proactive communication dispels any mistrust and fears employees might have had towards RPA and leads to quicker adaption. If purely seen as a technical solution to cut costs and increase efficiency without including the various stakeholders needed for a successful implementation the RPA will not reach its full potential (Wright et al. 2018).

In their paper Mendling et al. (2018) discuss further the broader impacts of automation beyond the processes and specific employees. In the paper the authors summarize their findings into seven points.

1. **Employment:** in their panel discussion conducted by Mendling et al (2018) the panelists see a future where a large share of todays jobs will either change or disappear all together in the coming decade. There are two forces at work here: the destructive effect that technology has had on labor and a capitalization effect of rising employment in sectors that achieve productivity gains (Frey & Osbourne, 2017).
2. **Technology acceptance:** According to Mendling et al (2018) technologies such as machine learning, RPA and blockchain are rather complex and difficult to comprehend, which leads to the initially these emerging technologies low acceptance
3. **Ethics:** From an ethical point of view automatization can bring about both good and bad changes. According to Spiekermann (2015) automated services may continue with the biases and prejudices they learned from the training data. Automation may also bring relief and help to processes we now perceive as tiresome and cumbersome due

to them being handled manually. The panelist in Mendling et al (2018) findings raise asylum-application processing as an example.

4. **Customer Experience:** Automation and emerging technologies are often adapted into improving customer experience. Chatbots and other scalable solutions have been replacing human interactions due to their high costs. Mendling et al (2018) raise the concern of balancing the automatization with real human interaction because of how a client will perceive the bot as a service although it may perform the same task as a human.
5. **Job Design:** Research has shown that effective job design has an positive impact on performance but also on wellbeing and creativity of the workforce (Oldham & Fried, 2016) and therefore using emerging technologies and automation can contribute to constructing an attractive workplace. Automating certain task because of danger or the repetitive nature of the job increases wellbeing.
6. **Social Integration:** New information technologies can improve peoples lives and make them happier. The negative side of this has been social manipulation according to Mendling et al (2018).
7. **Regulation:** the panelists state that regulation is often a means to handle the impact of emerging technologies. Blind (2016) states that regulations usually have an uncertain impact.

The field of technology is ever changing and as automation technologies such as RPA advance so will our understanding of its impact on the work environment and society (Mendling et al., 2018).

The impact of employment has been questioned in previous studies and that is what authors Kanellou and Spathis (2013) have found when studying automation technologies. Fernandez and Aman (2018) provide a theoretical framework based on the work of Kanellou and Spathis (2013) on what the impacts of automation should look like both from an individual point of view and organizational point of view.

TABLE 5 Theoretical framework (Kanellou & Spathis, 2013; Fernandez & Aman, 2018)

Professional logic	Impact on individual	<ul style="list-style-type: none"> <li>- Quality and work accuracy (Lacity &amp; Willcocks, 2015)</li> <li>- Save the accountant's time (Lacity &amp; Willcocks, 2015)</li> <li>- Change of tasks and roles (IRPA, 2014)</li> <li>- Technology creates fears for workers (Smith &amp; Anderson, 2014)</li> <li>- Lesser job opportunities (Dobson, 2017; de Castro &amp; de Olievera, 2015; Gorla et al. 2010)</li> </ul>
	Impact on organization	<ul style="list-style-type: none"> <li>- Requires proactive planning (Lacity &amp; Willcocks, 2015)</li> <li>- Support from management and</li> </ul>

		<p>support from information technology (Lacity &amp; Willcocks, 2015)</p> <ul style="list-style-type: none"> <li>- Requires appropriately skilled worker (Lacity &amp; Willcocks, 2015)</li> <li>- Work at any time (Kanellou &amp; Spathis, 2013)</li> <li>- Reduce the number of workers (Lacity &amp; Willcocks, 2015)</li> </ul>
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## 2.2 Factoring industry

In their book Salinger (2006) uses the Consise Oxford dictionary's definition on what a factoring company is, and it describes it as a company that buys a manufacturer's invoices and takes the responsibility for collecting the payments due on them. Soufani (2002) offers a little more specific explanation on what factoring is and it is described as a financial process where a firm purchases the accounts receivables from a client that has offered a service or sold goods to the debtor. According to Soufani (2002) the factoring company, which has taken on the debt from its client towards the debtor assumes the credit risk of the transaction, sales ledger administration and collection for the accepted accounts. By engaging in selling ones' accounts receivables the client company may improve the working capital positions and crucially alleviate cash-flow issues that organisations might have (Soufani, 2002). The 2005 study made by Klapper for the World Bank states that factoring is a growing source of external financing for all sizes of organizations but especially SMEs (Small and medium-size enterprises). Especially since most small businesses find it hard to access financing and taking into account the fact that the invoice might be due as high much as 90 days after the goods or services have been delivered (Klapper, 2005). This leads to a cash-flow crunch for many smaller suppliers, which both directly and indirectly impacts their overall creditworthiness for financing through the more traditional methods (Klapper, 2005). According to Klapper (2005) businesses can circumvent their low creditworthiness and get finance by selling their debts and account receivables directly to a factoring company and get their cash-flow problems fixed. The credit that is given by the lender is not linked to the creditworthiness of the supplier but the value of the accounts receivable. Factoring therefore allows high-risk suppliers to transfer their credit risk to a high-quality buyer (Klapper, 2005). Factoring has been a been a financial instrument for a long time, but it really started gathering pace in the late 1990's and the industry grew by 88% from 1998 to 2004 (Klapper, 2005).

A typical customer for a factoring company is relatively newly founded, has a revenue range between 250,000 dollars and 3 million dollars and is engaged in sectors that usually have terms of payments stretching several months into the future like manufacturing, distribution and transportation (2002, Soufani).



I will describe a typical factoring transaction between a client and a factoring company. The two parties will make a contract of the client agreeing either in an exclusive partnership where the client can only use one vendor for their factoring needs or then they can sign a contract for one particular invoice transaction or something in between depending on the terms the vendor prefers. There are instances where the provider asks the client to provide a guarantor for the contract, if the goods and services are not delivered as stated by the contract and the debtor refuses to pay. In these cases, the factoring company does not absorb the risk but transfers the accounts receivables back to their client. This contractual arrangement varies between vendors. After the contract has been signed the client may finance their first invoice through the vendor. In this hypothetical firm, Client A, is a small manufacturing company based in Southern Finland and is making plastic goods for construction industry. Client A has agreed on a 60-day term of payment with a large construction company, LCC Oy and because the Client A is not financially able to wait for 60 days to receive payment they decide to use, Vendor A as their factoring vendor. The invoice is 20,000€ over 60 days, so Client A sends the invoice to their vendor. The vendor will determine the credit worthiness of LCC Oy and subsequently they finance the invoice with the agreed upon price for 60 days that the contract between Client A and Vendor A had signed earlier. Below is an example of how Vendor A calculates their share from the invoice:

<b>Invoice sum:</b>	<b>20,000€</b>
<b>Processing fee:</b>	<b>5€</b>
<b>Commission:</b>	<b>600€</b>
<b>VAT:</b>	<b>145,2€</b>
<b>Payment:</b>	<b>19249,8€</b>

According to this example Client A, gets 19249,8€ immediately instead of waiting for 60 days in order to receive 20000€. The Vendor take a processing fee that is a flat 5€ for every invoice. The commission depends on the terms of payments and usually ranges from 7 days to 120 days and subsequently the longer the payment terms are the higher the commission, in this case 60 days has a commission on 3%. VAT (24%) needs to be paid on the processing fee as well as on the commission so that is subtracted from the sum being paid to Client A. Now Vendor A assumes the credit risk and wait for payment in 60 days.

### 2.3 The RPA project

This chapter will discuss the the nature of project in information technology and RPA and will draw from previous research on the subject matter. The definition of a project according to Schwalbe (2010) is a temporary setting of people and resources with the goal to achieve a particular objective within a defined schedule, budget and specifications. Projects withhold within them a level of uncertainty from start to finish, which is the product of project being unique and customized in order to achieve set goals (Schwalbe, 2010). Schwalbe (2010) also describes IT projects as widely diverse and can be disrupted by changes in technology, project requirements, personnel and the external environment, which differentiate them from projects in other industries. Rodriguez-Repiso et al (2007) also highlights that IT projects have varying features from other engineering projects that make them different. The high chance of failure according to Rodriguez-Repiso et al (2020) coupled with an ever-increasing complexity differentiate IT projects from other projects. As a consequence, IT projects have been given to label of “high risk” (Rodriguez-Repiso et al, 2020).

As mentioned, IT implementation is often pursued in a project and as in any endeavor, leadership and management are critical to its success (Liu & Horowitz, 1989). The definition that Munns and Bjeirimi (1996) offer on project management is that it is a process on controlling the objective to achieve set goals by application of skills, knowledge, tools and techniques. Schwalbe (2010) argues that the complexity of IT projects is added because it is not limited to a single industry or line of business. Because of this project management in a IT project does not only need to have a robust knowledge of information technology but also of the business area in question and being able not only to understand but to convert the needs of the customer to the software.

Rodriguez-Repiso et al. (2020) state that a widely accepted criteria for information technology project success are; project having been delivered on time, within the given budget and meeting the specifications given by the customer. Or as Westerveld (2003) refers to them as the “golden triangle”. In a study conducted by the Standish Group International in 1995, which had data on thousands of IT project and came to a conclusion that only 26% of projects met the criteria of finishing on time and within the given budget. While 28% of projects were cancelled before completion and 46% had costs go over the given estimation and being behind schedule (Saleh & Alshawi, 2005). In another study conducted by the Oxford University together with Computer Weekly in 2003 came to the conclusion that 16% of IT projects were considered successful (Sauer & Cuthbertson, 2003). Given these results one should perhaps reconsider the criteria given in order to guarantee the success of an IT project (Rodriguez-Repiso et al. 2020). A project can have been done on time, within budget and within the given specifications but it might not be used by the customer or simply does not provide the efficiency to the organization that is was looking for (Rodriguez-

Repiso et al. 2020). Savolainen et al. (2012) also highlight the limitations of the “golden triangle” by saying that projects might not have met the end-users needs, profitability or business success.

Of course, there are as many projects as there are people and they vary according to technology, size, complexity, risk and other variables (Shenhar et al. 2001). According to Shenhar et al. (2001) despite the large variety of projects much of the traditional project management literature seem to view all projects as one unified monolith. Authors Shenhar et al. (2001) have distinguished projects into four categories.

1. **Low-tech projects:** Rely on existing and well-established technologies, such as construction, road building and “build to print” projects, where a contractor rebuilds an existing product
2. **Medium-tech projects:** Rest mainly on existing, base technologies but incorporate some new technology or feature. Examples include industrial projects of incremental innovation, as well as improvements and modifications of existing products
3. **High-tech projects:** Are defined as projects in, which most of the technologies employed are new, but existent, having been developed prior to project initiation, such as developments of new computer families or many defense developments.
4. **Super high-tech projects:** Are based primarily on new, not yet existent technologies, which must be developed during project execution. This type of project is relatively rare and is usually carried out by only a few (probably large) organizations or government agencies.

Sudhakar (2012) in his research concluded that according to previous studies and the frequency of said criteria, there are seven Critical Success factors (CSF) to a project.

- Communication factors
- Team factors
- Organizational factors
- Technical factors
- Environmental factors
- Product factors
- Project management factors

Communication factors include internal and external communication. Leadership, stakeholder relationship management and cooperation (Sudhakar, 2012). Team factors include factors such as the capabilities and competences of the team, team composition and team empowerment (Sudhakar, 2012). Organizational factors include the realistic expectations from executives to management provided with support, change management and project planning. (Sudhakar, 2012). The technical factors are technical tasks, trouble shooting, technical uncertainty, technology support, system testing and specification changes (Sudhakar, 2012). Environmental factors include stakeholder involvement from

users to customers and vendors (Sudhakar, 2012). Product factors concern accuracy, reliability, timeliness, quality control, documentation and product management (Sudhakar, 2012). Project management factors include project planning, scheduling, control, the competence of the project manager, clear goals, risk management and review and feedback (Sudhakar, 2012).

The nature of RPA projects is much lighter and quicker than usual back-end implementation however this fact RPA projects have a tendency to fail despite the much more straightforward nature of RPA tools in comparison to back-end-implementations (Lamberton et al., 2017). Authors Lamberton compiled a list of the ten most common issues that RPA projects had in common, and they are listed below in Table 6.

TABLE 6 Top 10 common issues in failed RPA projects (Lamberton et al., 2017)

Issue	Description	Mitigation
1. Targeting RPA at the wrong processes	Targeting RPA at a highly complex process is a common mistake. This results in significant automation cost, when that effort could have been better spent automating multiple other processes. Often these processes are tackled only because they are painful for agents but may not offer huge savings.	Perform a proper opportunity assessment to find the optimum portfolio of processes. Low or medium complexity processes or subprocesses are the best initial target for RPA, with a minimum of 0,5 FTE (Full-time equivalent) saving, but preferably more. Only tackle complex processes once you are RPA-mature and then perhaps look to automate the highest value/easiest parts first and increase the percentage of automation over time.
2. Using the wrong delivery methodology	Quite often companies try to apply an over-engineered software delivery method to RPA, with no-value documentation and gates leading to extended delivery time - often months where weeks should be the norm.	While IT governance is essential, most software delivery methods are over-engineered for RPA - especially as RPA rarely changes existing systems and processes are documented in the tool. Look to challenge existing methods and use an agile delivery approach to deliver at pace. Good RPA center of excellence, with the right methods can deliver new processes into production every 2-4 weeks.
3. Thinking skills needed to create a PoC (Proof of Concept) are good enough for final production automations and one can	One of the common traps of RPA is that with just a day or two of training, most business users can automate simple processes. But	It is good to expect needing at least 2 weeks of classroom training, when 2-3 months of hands-on project delivery with supervision

<p>move immediately and trivially from prototypes to full production.</p>	<p>the skill needed to create scalable, resilient RPA processes are significantly greater leading to lengthy testing and re-work cycles.</p>	<p>and coaching, before and analyst can deliver production-quality automations well. Its essential not to skimp on teams training or skills transfer or support.</p>
<p>4. Automating too much of a process or not optimizing for RPA.</p>	<p>Often, we see that companies try to totally eliminate human input in a process, which ends up in a very significant automation effort meaning additional costs or a delay to benefits. But we equally often see no effort in changing existing processes to allow RPA to work across as much of a process as possible and hence reduced savings.</p>	<p>The best way way to view RPA initially is as the ultimate “helper”, carrying out the basic work in a process and enabling humans to do more. Automating 70% of a process that is the lowest value and leaving the high value 30% to humans is a good initial target. Its always possible to back and optimize the process later. And while fully “learning” ever process may take too long, look to see if simple tweaks mean that a robot can do more of a process.</p>
<p>5. Forgetting about IT infrastructure.</p>	<p>Most RPA tools work best on a virtualized desktop environment with appropriate scaling and business continuity setup. It can be so quick to deliver RPA processes (typically weeks not months) that IT has not had the time to create a production infrastructure and hence get on the critical path to delivering benefit</p>	<p>Take advice about exactly what IT infrastructure will be required from RPA vendor or RPA SI. Knowing your company’s lead times, ensure and appropriate “tactical/physical PC-based infrastructure” plan is in place, if a production environment is not feasible quickly.</p>
<p>6. Thinking RPA is all that’s needed to achieve a great ROI.</p>	<p>While current RPA tools can automate large parts of a process, they often can not do it all - frequently because the process starts with a call or on paper or requires a number of customer interactions. Hence companies often end up automating many sub-processes but miss the opportunities to augment RPA with digital or OCR (optical character recognition) and automate the whole process.</p>	<p>The cost arbitrage of RPA is significant. As an example, the the UK a robot can be 10-20% of the cost of an agent. But more often than not, a robot only works on sub-processes and hence leaves a lot of the process that a robot cannot handle and therefore limit savings. Having invested heavily in digital and OCR technology that works well with RPA (and most do not) we are seeing that benefits can be up to 2,5x that of RPA alone - can truly deliver near 100% straight-through processing even on old legacy systems and are just as easy and cheap to deliver as RPA</p>

		alone.
7. RPA being IT-owned, whereas its best being owned by the business.	As RPA is software, some companies assume that RPA should be IT controlled. However, this approach can significantly limit its take-up within a business and hence waste significant investment and potential.	Often companies think about the initial automation project but forget that ultimately RPA will deliver a virtual workforce that allows the business to task robots across the entire business. IT would not be in charge of managing the current agent workforce, nor should they manage the virtual one. And as back-office agents can be trained to teach robots having a business-owned RPA Center of Excellence (CoE) means having very little dependency on constantly stretched IT department. So business-led CoEs allow the business to prioritize, which processes to automate and what the virtual workforce does, requiring only oversight from IT.
8. Not thinking about scaling past PoCs or pilots, and not having an RPA business case.	A common route for most organization is to perform an initial proof of concept (PoC) or pilot, the see that RPA delivers on its promise. But often there is then an embarrassing gap between a successful PoC and large-scale production automation as RPA programs cannot answer simple questions from the board about "Where are we going to target RPA?". "How much will it cost?" and "What is the return?".	There is a significant body of evidence to show that RPA can deliver tangible business benefits across all types of company, even those with the archaic IT systems. We typically advice companies to carry out a rapid company-wide or unit-wide opportunity assessment alongside a PoC. Typical PoCs can automate sophisticated processes in weeks, which is all it takes to perform a solid opportunity assessment and create a detailed business case. This means quick stakeholder sign-off and enhances the momentum of the RPA program.
9. Not thinking about after processes have been automated	As described above there are a number of issues with just getting an RPA program mobilized, targeted and delivering at pace. But another common mistake is neglecting to consider how to get processes live and who runs the robot workforce - both issues that will delay a	As described above, we believe a business-led RPA CoE is the best way to manage and enhance a virtual workforce - but it does not just spring into existence. So the CoE processes need to be in place, IT governance agreed and staff trained to operate robots and continue

	go-live and timely delivery of benefits.	to enhance processes. While this seems daunting, a well-executed skills-building program can see a fully self-sufficient CoE established within 6-9 months- and usually quicker and less restrictive than negotiating an outsourced CoE arrangement.
10. Not treating RPA as a change program, with a focus on realizing benefits.	RPA often involves automating sub-processes and hence people are still involved in the remainder of a process. So unless a structured re-organization and FTE-release of capacity happens, then agents “drift off” and start to perform other work – which is often providing a better service as they now have more time.	While providing better service is laudable, ultimately an RPA program must deliver its planned benefits in order to continue to roll out. Focusing on measuring and realizing benefits therefore key. Note that in doing opportunity assessment, we usually recommend a portfolio of saving, service improvement and transformation processes is delivered – each of which needs to be measured and benefits delivered in order for ongoing investment to continue.

Taking into consideration the seven CSFs introduced by Sudhakar (2012) and using the top 10 common issues in RPA projects (Lamberton et al., 2017) one can get a clearer image in what it takes for a RPA implementation project to be successful. The criteria for project success as discussed previously needs to be adjusted according to the project at hand and the simple “golden triangle” introduced by Westerveld (2003) is not enough. So, in order for a RPA project to be successful it needs to follow the steps that traditional projects follow and determine its unique criteria for the process in order for it to be properly assessed (Kaushik, 2018). Kaushik (2018) also suggests the following three prerequisites for RPA projects in order for them to be successful. First, a project needs to be well planned, second, the project needs to be well executed and third, those stakeholders impacted should not be overburdened.

By adopting the critical success factors authors Sudhakar (2012) introduced we can in the following chapters discuss further what a successful RPA project might look like based on the seven CSFs; communication factors, team factors, organizational factors, technical factors, environmental factors, product factors and project management factors.

## 2.4 Critical Success Factors

In this chapter critical success factors introduced by Sudhakar (2012) will be discussed further. By critical success factors one refers to the key elements of a project that must work in order for a project to be successfully completed. According to Sudhakar (2012) there are seven critical success factors.

### **Communication factors:**

As the first critical success factor Sudhakar (2012) mentions communication, and this is largely supported by other studies on project management and successful RPA implementation. Wright et al. (2018) mentions that for the RPA project to be successful there needs to be a broad stakeholder buy-in on the project from top management to the human capital most effected by the introduction of the RPA tool. Without an effective communication through out the organization the project will have little to no chance of success due to the lack of buy-in (Wright et al. 2018) and the employees will perceive the new RPA tool as a threat and will view it as a negative change (Lacity & Willcocks, 2017) instead as the “ultimate helper” as Lamberton et al. (2017) suggest. The importance of positive image building is key and is done through communication and delivering successful implementation stories to the organization (Hallikainen et al., 2018).

### **Team factors:**

As Lamberton et al. (2017) states that that the necessary skills for implementation are key for success and therefore the team in question need to have ample skills in order for the project to be successful. This requires extensive training both in-class and further hands-on training to hone the skills of the team to such a level that they can work independently and efficiently. Willcocks et al. (2017) talk about establishing a core RPA team in order for communication and training to be more efficient.

### **Organizational factors:**

Top managerial support according to Wright et al. (2018) plays a key role in the organizational factors. It is the top executives that grow and cultivate the culture of change and smooth over any organizational barriers or deal with employee friction towards the project. Lacity et al. (2015) also bring forth the importance of managerial input in a successful RPA project implementation. Top management usually bridges the gap between each stakeholder teams and act as enablers to the implementation itself (Lacity et al., 2015). The burden of correctly assessing the criteria and long-term goals also falls on the executive team (Lamberton et al., 2017). Rutaganda et al. (2017) highlight that incorrect leadership will lead to failure and this includes the fact that the RPA project needs to be business owned instead of IT owned, with a strong support from the IT department. This statement is corroborated by Lamberton et al. (2017) by stating



that the RPA resource should be considered a virtual workforce and should be treated as any other workforce in order for it to be best utilized.

**Technical factors:**

As Lambertson et al. (2017) states in their list of the ten most common issues of a failed RPA project that forgetting about IT infrastructure plays an important role in whether a RPA project is successful or not. In order for the organization to have their technical factors in order there needs to be an understanding what IT infrastructure will be used by the RPA.

**Environmental factors:**

As important as the buy-in of internal stakeholders is (Wright et al., 2018) there needs to be a focus on the overall impact of the RPA project. The organizational factors play a decisive role in how successful the project itself is but with if customer impact is completely disregarded then the RPA project might be a technical success but will not be a business success (Boulton, 2018).

**Product factors:**

By trying to automate the wrong processes one runs the risk of incurring needlessly high automation costs, which could have been directed towards automating a number of less complex processes (Lambertson et al., 2017). By choosing the right delivery method for RPA can save both time and money for the organization. As is often the case according to Lambertson et al., (2017) organizations attempt to apply an over-engineered software delivery method to RPA, which will consequently lead to cost overruns. According to Lambertson et al. (2017) a good RPA center of excellence can, with the help of the correct delivery method, churn out new processes into production every 2-4 weeks. Rutaganda et al. (2017) suggest that a common problem with organizations that they want to impose a heavy IT project delivery methodology on a lightweight RPA project, which leads to RPA benefits being reduced.

**Project management factors:**

In order for a project to be successful project management needs to be on point and especially time management and delivery times (Rutaganda et al., 2017). As mentioned in the previous section the RPAs key benefits are fast and cost-efficient development and with poor project management these benefits are quickly diminished (Rutaganda et al., 2017). Having a clear pathway towards implementation starting the feasibility studies all the way to the product launch like the one Asatiani and Penttinen (2016) suggest as an example in Figure 5 is key to successful project management (Rutaganda et al., 2017).

## 2.5 Literature review summary

The literature review of this study was constructed in three parts. In the first part RPA was discussed from a multitude of angles to gain a wide understanding of the concept of RPA. By discussing RPA as a theme, the aim was to build a comprehensive understanding of RPA and how it is perceived in earlier studies. The definition of RPA was further expanded by discussing the advantages of RPA, challenges that RPA faces, the selection process of automation technology and RPA implementation. The second part of the literature review was the definition of project success and this was expanded further by the findings of RPA project success from a multitude of sources. Finally, the third part expanded on what the factoring industry is and how it operates.

In layman's terms RPA is a tool to automate simple tasks that are currently performed by human resources. The speed and low development costs are often cited as the greatest selling points for RPA. The other benefits of RPA include but are not limited to the high flexibility of the tool, easy integration, increased accuracy and process efficiency. Due to the flexible nature of RPA, it is often referred to as "lightweight IT" because it is simply built into or on top of already existing systems without having to devote resources into development.

Despite its many perceived advantages, the challenges of RPA were also highlighted in this study to give an accurate picture regarding the capabilities of RPA. Due to the "hype" surrounding RPA there is willingness for RPA implementation, but research points out that not all organizations are prepared for it nor is the organizational structure adaptable enough for it to bring out its full potential. RPA also faces challenges with having a "savior" syndrome surrounding it, when organizations overestimate its capabilities. The scope of RPA was also brought into question and will only work with very simple tasks and commands. Therefore, RPA is seen as an inferior technology to back-end automation. RPA and automation still face cultural and organizational pushback because of the perceptions of humans having in regard to automation. It is still seen as a tool that will put humans out of work, despite that research has pointed to the contrary.

In order for a process to be viable for RPA implementation it needs to fulfill certain categories in order for it to be effective. The less cognitive interaction and the more routine the process holds within itself, the more the potential of RPA grows. By determining where a process falls it helps the organization to choose the correct automation tool. If it's a simple, high volume and repetitive task then RPA is the right solution.

After the the selection process has been completed the organization moves to the implementation phase. This chapter discussed the steps of how organizations could introduce RPA and what the implications of this implementation would be. There were both positive and negative aspects raised in previous studies on the implications of an automation implementation on an organization. The effects were discussed on a broad organization wide scale and more specifically how it could affect an individual within the organization. A proper buy-in from both business units and support units are required to have a suc-

successful implementation. This will be achieved by having all parties concerned involved in the process and establishing proper lines of communications where ideas for development can flow both ways.

The second chapter of this study is about RPA projects and how one plans and executes a successful RPA project. Westerveld (2003) introduces the golden triangle of information technology project success. They need to be on time, within the budget and meet the given specifications. However, according to the findings of previous papers the story of a successful project does not end there. According to the studies these criteria should be changed since by going with the given criteria, most IT projects fail. This chapter introduces the Critical Success Factors that help organizations plan and execute a successful IT-project. Also discussed in this chapter are the 10 most common issues in failed RPA projects.

When researching the topic there was no prior research concerning RPA automation and factoring. However, studies had been conducted regarding RPA in the fields of finance in general and accounting. This study in combination with the findings of previous studies was aimed at finding out if RPA can be used in factoring and what are the steps an organization needs to take in order to achieve this. Because of the lack of previous studies into the matter, the material was used as a guiding assumption.

Based on the findings of the literature review the empirical part of this study aims to build an understanding of the suitability of RPA for factoring but also what the organizational impacts would be and what it would take for a project be successful. The following chapter is the empirical research of this study.

### **3 RESEARCH OBJECTIVES**

In this part of the study the aim is to describe the empirical research process. The first section consists of the description of the case company, the second part explores what methods were used in the study and how the data was collected. The fourth and final part discusses the methods of analysis of the gathered data.

#### **3.1 Case company description**

The case company that has been selected for this research is a Swedish financial service company founded in 1981. Currently the organization employs over 2000 employees in twelve European countries and the Finnish unit of the organization can trace its roots back to 2002 and has roughly 200 employees spread over five offices throughout the country (Helsinki HQ, Sastamala, Tampere, Kuopio and Oulu). Currently the company offer services to both businesses and private consumers. This study will particularly focus on RPA implementation for the factoring products, but other services provided to businesses include leasing, corporate credit finance, debt collection, invoicing and providing payment solutions for online stores.

As stated, this study will focus on the feasibility of implementing RPA tools to their factoring services. Currently factoring services constitute the biggest share of the case company revenue and profit and there is foreseeable growth and threats in the market. The factoring sector is a growing sector but as it grows the competition is increasing. With more competition the price of the services has seen a drastic dip and therefore has been eating the profit margins of the companies in the sector. Increased demand has also led to the growth of factoring teams, which in turn has led to increased recruitment. In order for the companies to have a competitive edge management needs to find cost efficient solutions without sacrificing customer satisfaction through the speed of service or the level of customer service.

The case company provide their service through a team of finance officer who receive the invoices from companies through a web-based portal that

handles XML e-invoices. As the invoice is being handled by the finance officer the officer makes a risk assessment based on pre-determined factors on both the supplier (the client of case company) and the debtor (recipient of the invoice). If the finance officer determines the eligibility of the invoice to be in accordance with the pre-determined factors, then he or she can finance the invoice.

Currently all checks are done manually, and several web-based service providers are used to determine whether an invoice can be financed or not. The aim of this study is to determine if RPA tools can be deployed in order to partially automate or fully automate the process, which finance officers are currently performing on the client and the debtor.

The interviewees were selected from all seniority levels from the country manager to finance officers handling day to day operations of the factoring product. This was done in order to get a broad view of the possible impact of RPA from the viewpoint of one that has a narrow view on the product and those who view it from a larger perspective. Also, the technology chief of the Finnish operations was chosen in order to provide a technological feasibility aspect to the case study. The interviews were conducted in English or Swedish.

## **3.2 Methods**

The selected methodology for this empirical section of the study is a qualitative case study since data is scarce and previous studies do not tackle the question at hand. When a topic is not deeply studied or well known, a qualitative approach is usually preferred since it gives a broader image and offers an opportunity to delve deeper into the subject matter and therefore get a better understanding of the subject. By making observations and through discussion one can form a broader understanding of the subject matter. In a qualitative study one does not pursue to test a theory or hypotheses, but rather to reveal unexpected findings through thorough interpretation of the collected data (Hirsjärvi et al., 2009). By conducting this study, the aim is to answer the research question and further increase our understanding on the subject.

### **3.2.1 Data collection**

Yin (2003) raises many data collection methods that can be used when conducting case studies, these include interviews, observations, focus groups and small-scale surveys. For this study it was deemed that a semi-structured interview was the best way for collecting data. While the questions are the same for each interviewee the way the questions are set up leaves more room for discussion.

As the research question is about implementation the interviewees were selected on the basis of seniority within the organization, how automation would impact their job and experience in automation. Top executives, IT manager, automation experts and factoring specialists were selected to be inter-

viewed to get a broad understanding on the benefits, risks and organizational impact of a possible RPA implementation. All interviewees are from the same organization. The interviews followed the same pattern of going through the current knowledge of RPA and automation in general, the opportunities a RPA implementation could bring while also discussing the risks, the business case for RPA and how to gain a competitive advantage, the technical side of a RPA implementation and the organizational impact RPA could have. These themes reflect the research question and the literature review part of this study. The goal for this interview was to find out the prior understanding of RPA, the feasibility of RPA implementation to a product such as factoring. The interviews were conducted face to face and by Skype lasting roughly 30 minutes to 45 minutes. Three of the four interviews were conducted individually while one had two participants. The interviews were recorded and transcribed into a text format for the analysis. The selected interviewees and their background are presented in Table 7.

TABLE 7 Interviewee backgrounds

<b>Interviewee</b>	<b>Role</b>	<b>Sector Experience</b>
Interviewee #1	Country Manager	35 years
Interviewee #2	Head of Corporate Finance	20 years
Interviewee #3	Head of IT department	15 years
Interviewee #4	Robotics Specialist	5 years
Interviewee #5	Finance Officer	5,5 years

### 3.2.2 Data analysis

Once the interviews were conducted and had been transcribed a data analysis of the data was performed. The selected method of analysis was a thematic approach, where one tries to find commonalities through-out the data. This was the best suited approach due to the fact that the study aimed at finding an answer to the suitability of RPA for factoring. In a thematic method one starts with familiarizing oneself with the material and then dividing the text up to different parts. After the division one starts to look for common patterns and themes. When this is done the definition of said themes need to be done and then a free-flowing text may be produced based on the analysis of themes so that the narrative fits the data. When conducting an analysis, one needs to bear in mind the multiple levels of analysis that may vary depending on the size of the group from an individual up to society as a whole and as such it is recommended to view the data from level in order not to have cross-level misattribution (Bryman & Bell, 2003)

After the interviews were transcribed into a text format, the text was analyzed and categorized based on the given themes. The result of the analysis will be discussed in the following chapter.

## 4 RESULTS

In this section the discussion is focused on the results of interviews. The results have been divided according to a theme and these are: strengths and weaknesses of RPA implementation in a factoring product, suitability of RPA in a factoring product, project success factors and the organizational impact of a RPA implementation.

### 4.1 Strengths of RPA implementation in a factoring product

Before making a decision on any sort of RPA implementation one needs to weigh the strengths and weaknesses of an RPA tool being used in a factoring process. While analyzing the findings a wide array of strengths and weaknesses were found from both a technical and a business point of view. The specifics of these strengths and weaknesses will be discussed later in the findings. Overall, the findings indicate a very positive mindset towards RPA implementation from a purely business standpoint but when discussing the technical issues, the possible hurdles and stumbling blocks start to appear. The weaknesses will be discussed in the following chapter.

The most common strength of RPA was by far the speed and relative low investment cost. This was mentioned by all but one interviewee. This was definitely seen as a positive by all but one who mentioned the relative speed of developing a RPA tool. Interviewees one and two both highlighted the costs involved and the fact that the ownership in Sweden is not keen on wide scale systems development so RPA could be used as a bridging technology between manual labor and a proper back-end automation.

The higher ups are not so keen on big system changes so RPA could be a good path towards that goal. I do not see RPA as a long-term solution, I see it more as a patch that can solve our most pressing issues right now but at the end of the line the automation has to be done "correctly" (Interviewee 2)

The second most pointed out strength was the suitability of RPA tools for the legacy systems currently in use by the organization. This combined with the ownerships unwillingness to currently invest resources into full scale back-end automation made RPA implementation a very appealing solution to them.

Also mentioned often was the fact that a robot would make the finance officers jobs more appealing. It would limit the mundane and repetitive tasks from their current processes so they could focus on matters that require more cognitive skills. This would not only make the job more appealing to the finance officer, but it would also save time both for the finance officer and the customer, so they could get their invoices financed quicker. The increased quality was also mentioned by the interviewees. Interviewee 1 highlighted the fact that a robot never tires, never asks for sick leave and does its job as its told without friction.

Adding to that on a general level, that the more monotone or mundane the task is, the less effort is being given to the task by the employee. So, if we have these mundane tasks that people do not simple care about, we run a great risk of human error because they are not paid attention to. The question I think, is not if human make mistakes but how much or many mistakes they make. So, with a relatively small investment we can increase quality by quite a lot (Interviewee 4)

Together with the heightened quality of an RPA tool, the possible increase in customer interaction by the finance officers was always mentioned. Because of the fact that a RPA tool could free up time for the finance officer, they could use their time to have a more proactive relationship with the organizations clients. This was seen as a benefit, especially given the current market where prices are at an all time low, which means margins are paper thin and competition for evert cent is tough.

Interviewee 1 raised the point of the adaptability of a robot in comparison against human capital. The robot does exactly what we have told it to do, while human capital need time to adapt to changes being made in a certain process, which takes time and there is the possibility of friction with the suggested changes.

In the next chapter will discuss the weaknesses of RPA that were found while analyzing the interviews.

## **4.2 Weaknesses of RPA implementation in a factoring product**

This chapter is devoted to highlighting the weaknesses and risks of a RPA implementation to a factoring product. After analyzing the data from the interviews, one could see that there were quite a few clear weaknesses and risks involved in RPA implementation. Both interviewees 1 and 2 gave us the examples of finance officers having the “touch” to the business and being able to spot the so-called grey areas in the business. This is something that the robot would completely lack. They both agree on the fact that they are “yes” or “no” tasks involved in the financing process but they argued that sometimes a “no” is not necessarily a “no” but one can find exceptions and a human can find solutions



and avenues a robot can not simply do. Interviewee 1 goes as far as saying that the binary way of thinking of a robot coupled with the finance officers not being able to react quickly enough to exceptions may lead to a loss of an account.

Interviewees 3 and 4 both mention the great risk that a proper lack of documentation bares with it when implementing RPA.

From my perspective as a developer, the biggest risk for automation is the lack of proper documentation. That a person develops something and informs others orally so that there is no paper trail of this development. This is from my standpoint the largest risk to automation in general (Interviewee 4)

When developing a RPA tool there needs to be very proper and precise documentation of what has been done and why. Because if this is all in the head of one person who leaves the organization one needs to start the whole developing process from scratch to be able to figure out what has been done.

Interviewee 5 raises the risks of the external service providers that the process relies on having down time or simply not delivering the data necessary to make correct decisions. The fact that we rely on these external service providers was also mentioned by interviewee 1 and 2. They took the view on the quality of the data.

If we then deploy RPA to some part of our process, we can make the RPA tool to make the right decisions based on the commands we have given it but the data it is based on is for a lack of a better term "crap". This can lead to huge issues and massive credit risk. We have a lot of small clients such as sole proprietors who have no legal obligation to release all the facts and figures we need (Interviewee 2)

Even if the RPA tool works as the organization built it up without suffering from bugs it can still make financially poor decisions because of the data it has been instructed to make its decisions on is poor. This can according to the interviewees end up costing the organization a lot because of credit losses and the perceived "increases in efficiency" of an RPA implementation will evaporate rather quickly.

Interviewee 3 saw a risk in the lack of supervision for the RPA tool itself. They saw that the organization in its current form does not have the proper means or resources to properly oversee the tool. In the theoretical part of this study, it was said that RPA tools should be business owned and interviewee 3 agreed on it but they held the belief that the businesspeople do not have the necessary resources of effectively supervising and overseeing the tool without substantial support from the IT department. This according to interviewee 3 would just shift the workload from one entity to the other.

RPA can have a negative effect on the development of proper back-end automation development according to both interviewee 2 and 3. In their view RPA is simply a means to an end technology, which would pave the way for

automation technologies containing machine learning and A.I. Their view however is that RPA has a great risk of reducing or halting investment in further automation development. According to interviewee 3 the board of directors usually do not have a broad understanding of automation and see RPA as an end solution, and it is very appealing because of its benefits of being quick and relatively cost efficient.

One final major point where three interviewees agreed on as being a big risk is the organizations IT-structure. Because of the fact that the organization in question is operational in many countries and IT-functions are spread out to Sweden, Finland and Norway and there is according to the interviewees no cohesive IT-strategy. Although all use the same system in their daily jobs, but all use different functions and development is largely confined to the country itself. This has led to functionalities being deleted, added or changed without informing other countries, which has led to some issues. Taking this view and adding a RPA tool, which independently works away in the system and not having been told by a system update, which might impact the data the RPA tool is tasked to collect could have a severe impact on our service. Interviewee 2 says that these can be very small changes that we won't notice after 6 months and then the benefits of the RPA evaporate because we probably need to allocate time and resources into fixing the problems caused.

### **4.3 Suitability of RPA in a factoring tool**

In this chapter the discussion turns to the suitability of RPA to a factoring product. The overwhelming majority of the interviewees saw RPA as a suitable solution for our factoring department. However, although there was a positive response by the interviewees to a possible RPA implementation there were some doubts on its suitability.

Interviewee 1 and 5 both took the view that our current financing process includes simple repeatable tasks that require checking a certain data from a certain place and documenting it. These include simple tasks such as going to an external service provider and checking if they have their legally required payments paid (i.e., taxes among others). Now the finance officer goes through this process for every single client we have to make their financing decision. This could easily be done by a robot according to the interviewees. Both interviewee 2 and 5 go as far as claiming that we are already behind and they see that we should have already deployed a tool such as RPA to this part of our process a while ago. Interviewee 1 also highlights the fact that another department in the organization already deploys a similar tool to pre-determine whether a client is eligible for financing. This however is a simpler process and requires much less data than the factoring process.

Despite the positive output from the interviewees towards a RPA implementation in a factoring product there were some doubts.

In my world, RPA is best suited for products, which contain multiple simple tasks but with a large number of processes to go through. This has been a little issue in our organization, since we do have a huge number of manual processes but not necessarily enough volume to justify automation. (Interviewee 3)

The primary doubt was raised by interviewee 3, 4 and 2 respectively and it was in regard to the volume or lack of necessary volume to justify a RPA tool. Although they saw that RPA could be deployed to the factoring department but raised concerns if they department has enough volume for a RPA tool to bring the added benefits. Another possible stumbling block for an RPA implementation was raised by interviewee 4.

*The less exceptions a process handles the better the design. If the process contains plenty of exceptions, then it kind of defeats its purpose since all the exceptions need to be manually handled. (Interviewee 4).*

Because of the nature of the job where everything is not black and white the RPA tool could become redundant due to the high number of exceptions. Exceptions would be deferred to a finance officer who would then go through the process manually. The concerns raised by the interviewees was that the high number of exceptions would defeat the purpose of a RPA deployment. The next chapter will discuss the organizational success factors of a possible RPA implementation project.

#### **4.4 RPA implementation success factors**

In this chapter the discussion moves to the analysis of the project success factors based on the conducted interviews. This was the theme that had the most varying views on project success and critical success factors. Despite the variation in the answers after analyzing the data one can find similarities on the organizational level, communicational level and project management level.

Most of the interviewees (1,2 and 5) had a traditional approach in defining a project successful and what its critical factors are. They concentrated on efficiency, cutting costs and bringing the project online within the allotted time for the project. Increased quality was the single most mentioned aspect of what the interviewees expected from a RPA implementation. Increased quality without sacrificing delivery times for clients is what most of the interviewees expected to see after a RPA implementation project. Interviewees 1,2 and 5 also saw it as critical that everyone involved had a buy-in on the project. That the development itself would not just be a handful of people working in secret but that the whole team from bottom up could come with meaningful input on how the RPA tool could be deployed in the most efficient way. This according to the interviewees is solely down to efficient communication. Two of the three manag-

ers involved saw it as their job to properly communicate what the organization wants to achieve and therefore alleviate any concerns or fears the employees might have concerning the project. The interviewees saw the success of the project hanging on the buy-in of the whole team. Through this team wide buy-in interviewees 1,2,4 and 5 saw that it would increase job satisfaction when finance officers would be freed from the monotone tasks they are performing today.

Its all about documentation for me. That's the beginning and the end for the success of a project. The manual process needs to be documented, the RPA process likewise and there has to be a proper hand over to the business entity that is responsible for monitoring the RPA tool. Organizationally there needs to be "RPA responsible" employees that need to act as point persons for the tool. So, this might lead to a new team of process specialists that then work on monitoring and developing their respective RPA tools with the support of the IT-department (Interviewee 3)

Interviewees 3 and 4 saw the whole success of the project being balanced on properly planning and documenting everything. They saw that if there is a proper plan without making the common mistakes of cutting corners and also knowing exactly what needs to be achieved, then the project can succeed. Another point was the proper allocation of resources. This includes proper training to the factoring department on how a RPA tool works so that the department can properly oversee the tool without massive help from the IT-department.

One final point brought by interviewee 2 was that it needs to do what it was developed to do and work. Rain or shine it needs to work and the organization needs to be able to trust the decisions it makes without having to second guess the RPA tool.

There was not a clear cohesion except for increased quality internally and externally for the service provided to the client in the interviewees answers for what success factors need to be achieved in order for the project to be deemed a success. In the next chapter organizational impacts of implementing a RPA tool in the factoring team are discussed.

## 4.5 Organizational impact of RPA implementation

This chapter discusses the potential organizational impact the interviewees expect an RPA implementation to have. One can clearly see patterns emerging and similar lines of thought from the interviewees. All but one interviewee mentioned the fact that the organization does not compete against its competition with the product itself, because the product is the same with every organization. However, the main competition is with delivery times and price. This is according to interviewee 1 what the clients care about. How fast they can get their money and how much do they have to pay for it. Interviewees 1,2,4 and 5 saw RPA as a means to increase the competitive advantage by increasing delivery speed without sacrificing service quality or quality of the work.

The current margins we have in this product are melting before our eyes every year, every month. The way you can combat this are: cutting your financial costs, cutting your staffing expenses or you cut your credit losses. These are the three ways to improve margins and RPA could definitely help in achieving one if not all of them. (Interviewee 4)

The four interviewees saw RPA as a way to gain a competitive advantage whole interviewee 2 saw it as a must. They claimed without deploying automation is some sort the organization will fall of the wagon and will not survive.

The changes to the jobs itself was raised by interviewees as well. Mostly it was seen as a welcome push towards an overall change in culture in the organization. Most saw the implementation of RPA of changing the nature of the job of a finance officer to a more “customer focused” role and then RPA could bring about new positions if and when the need for finance officers performing manual tasks is diminished. Interviewee 1 stated that this might not be welcomed by everyone since there might be people who enjoy the routines and have no interest in being more involved with the clients or development of processes. The question of culture was also raised by interviewees 1, 2 and 4.

It would be amazing if we could start a sort of loop where there would be a constant stream of ideas to make something better. Now I feel that we are a little slow on our feet when it comes to developing new processes (Interviewee 4)

Interviewees 1 and 2 expand on the change of culture they wish an RPA implementation would have on the organization

As I said our culture does not nurture change and therefore the input into making these changes is minimal and it comes from a very small group of people who do not have all the facts. Here could RPA have a great impact

on our organization. Because it would free up resources in our factoring team it could lead to people having more time to develop new ideas or even create new positions within the organization (Interviewee 2)

Usually, we have been quite slow in responding to new development until there is a client specifically requesting something. I believe that there are far more processes that we could automate, and we need to look into that. There needs to be an active search for ways to make our processes better not only for ourselves but for our clients as well and that is something, we have not been terribly good at. I do not know if it's a lack of knowledge or a lack of resources, but we need to pay attention to it in the future. (Interviewee 1)

Interviewees 1,2 and 4 believe that if RPA would free up resources for finance officers to perform more cognitive tasks rather than the repetitive, they are performing now that that would increase the critical thinking of the processes themselves a spurn a change in culture, which would bring about change and input from the finance officers themselves. By introducing RPA, the interviewees expected the organization to evolve from the current reactive state they are to a more proactive state where they can anticipate the clients needs by focusing more attention to them.

The impact on the finance officer themselves was discussed as well by the interviewees and interviewee questioned the fact that would all finance officers make better use of their time if RPA could save some time of their current processes. Would they simply make up more tasks or take longer to complete the manual tasks not perform by the robot? This point was supported by interviewee number 5 but countered by both interviewee 2 and 4. Interviewee 1 and 5 saw the implementation of RPA as a means to cut the staffing costs and do the same amount of work with less people. These two also expected friction within the factoring department to slow down the development.

Having been at our department for more than five years, I have to say I believe people will lose their minds. Always when something new is introduced there is a storm out of nothing. (Interviewee 5)

Interviewees 2 and 4 however, did not expect push back and saw that people would be upfront about the changes to their jobs. This was according to the interviewees all down to communication. They saw it as the defining factor in bringing about a successful implementation.

Interviewee 3 raised concerns about RPA implementation that while it eased of pressure else where, it would raise pressure in another department.

As mentioned before, the switching of burden effect would probably come with the implementation. When you release a pressure valve someplace the pressure ultimately ends up some place else. This has definitely led to an increased workload for our guys in order for them to get something done. So at the department in question, they might as I said, celebrate and be

praised but the IT-department has so far at least experienced an increased flurry activities and headaches. So purely from the point of view of the IT-department, those small RPA implementations we have done, have not been a catastrophe but not far off. (Interviewee 3)

According to the experience of interviewee 3, they expect an RPA implementation in the factoring department to decrease the workload in the department in question but to heavily increase the workload in the IT-department. According to interviewee 4 it could end up being a zero-sum gain for the organization as a whole. If the factoring department can say that they have increased efficiency and re-allocated human resources, the IT-department must employ new people in order to answer the increased workload in their department.

## 5 DISCUSSION

This chapter is devoted to discussing the study. It has been divided into three parts where different topics regarding the study are discussed. In the first part the discussion is about the implications of the research findings in regard to the research question. The second chapter discusses reliability, validity and the limitations of the conducted study. The third and final chapter will discuss further research topics.

### 5.1 Implications

When choosing the topic of this study the aim was to try and determine if RPA could be a suitable automation tool for a financial product such as factoring. Taking this point of view, the research aimed at answering the following research question:

- Is RPA a suitable automation tool for a factoring product?

The literature review explored what RPA is and where its strengths and weaknesses lie. The empirical part wanted to reflect the strengths and weaknesses of RPA in regard to the specific product in question and similarities were discovered in the collected data. The answers reflected the strengths of RPA mentioned in the literature review. These included the quick development time of RPA tools and low development costs in comparison to other automation technologies. The weaknesses mentioned in the theoretical part were also quite reflective what the collected data revealed. The technical concerns where there and the readiness of the organization was questioned. However, the largest concern concerned the organizational impact a RPA implementation would have. The risks of friction, lack of buy-in and sabotage were concerns raised by the interviewees.

When comparing the theoretical findings to what the research revealed there can be clear similarities in results drawn to findings of previous studies.



RPA was clearly seen as a suitable tool on how to automate part of the current factoring process. This was seen in the empirical findings, similar to the literature review that RPA technology is flexible, quick and requires very small investment. However, when looking at the criteria for RPA introduced by Asatiani & Penttinen (2016) for RPA implementation the factoring product in question does not necessarily fulfill the “requirements” as introduced by the authors. Out of the seven requirements introduced by Asatiani & Penttinen (2016) the factoring clearly fulfils five categories. The current process accesses multiple systems where the finance officer has to access each of the manually to retrieve the information essential to the factoring process. The environment is stable and has been working for years, at least part of the process requires very little or no cognitive thinking since they are simply yes or no questions. The process itself can be easily decomposed into simple task, which in fact it has already been done by giving the finance officer a “check list” of information they need to check in order to determine the eligibility to finance the invoice. There is a proneness to human error partially due to the relatively high volume of invoices each finance officer handles daily and due to the fact that the process of doing these checks does not hold that much merit for the finance officer, but they concentrate on other more pressing issues within the factoring process. Having gone through the requirements the factoring process fulfils, the two that fall short are volume and limited need for exception handling. In the empirical findings one of the doubts concerning the suitability of RPA in the factoring process was the volume. Is there enough volume to justify an investment in RPA or would it make any larger impact on the process itself, because the volume might not be large enough. Secondly, because of the process is divided into three parts, these three parts are very different in nature. So, the question arises, is the factoring process simple enough for RPA or would it require a lot of exception handling? In the empirical findings there was a mentioning, like in the literature review, of RPA being considered as a bridging technology for back-end automation. Based on these findings that does hold true for the factoring process in question. By introducing partial RPA to the simple part of the process, it would still free up a lot of time and act as a starting signal for more cognitive automation technology development in order to fully automate the factoring process from start to finish.

As in found in the previous studies, the empirical findings supported the implementation process suggested by previous studies such as Asatiani & Penttinen (2016). The empirical findings placed a very high importance on the planning phase of the implementation. This was lifted as the highest requirement by some of the interviewees since they saw the role of planning and documentation as key to being able to implement an RPA tool to the factoring process. The buy-in of the department and the supporting department was also discussed and while the previous studies said IT-department support was key to a successful RPA implementation, this was not viewed as a concern by most of the interviewees, all but one who subsequently worked in the IT-department. The organizational impact of RPA was seen mostly as a positive, as long as management takes initiative and establishes robust lines of communication. The positive implications were seen as a change in roles, new positions, increase in

efficiency, a possibility for a culture change and more meaningful work, which could lead to increased job satisfaction. Again, these were in line with the findings of the literature review. Concerns were also raised on the negative implications RPA implementation could bring about. The change in the role of a finance officer could be not a welcome change to all current employees due to the fact that they might not like the position that it will pivot to. A great concern raised in the empirical findings was the fact that an RPA implementation would simply move the workload from the factoring department to the IT-department. The organizational and departmental readiness to handle and monitor the RPA tool was questioned and this would lead to the IT-department having a greater role in both supporting and monitoring the tool. This goes against the finding in the theoretical part of the study where previous studies highlighted the role of IT-support but underscored the fact that the RPA tool would be business owned and operated.

The project success factors and most common reasons for project failures were introduced in the literature review of this study. When comparing the findings of previous studies to the empirical findings of this study some similarities could be found. The overall lack of proper knowledge and skill to handle a RPA tool was mentioned as a common mistake, which leads to a failure of a project. This was supported by the empirical findings where there were doubts expressed over the factoring departments readiness to own and monitor a RPA tool. Forgetting about or underestimating the role of IT-infrastructure was also mentioned in the findings as a subject, which the organization has a risk of falling into. The various Critical Success Factors (CSFs) introduced by Sudhakar (2012) were also somewhat mentioned in the empirical findings. The project management and success part were the portion of the empirical study that failed to reach any sort of clear cohesion or pattern with the interviewees. The role of communication was highlighted throughout the empirical findings but otherwise very scattered results in regard to project management, project success and the critical success factors.

In general terms this study has found where the strengths and weaknesses of RPA implementations lie in the factoring process and what steps to take in order to successfully implement the tool into the process. Due to the limitations of the study, which will be discussed further in the following section, one can not draw general conclusions for the whole industry on the suitability of RPA for factoring products. The empirical findings are largely supported by previous studies and the view of this study is that a partial RPA implementation would not only be possible but beneficial to the current factoring process. The reason for a partial suggestion is that there are still parts of the process that require cognitive skills that RPA is not capable of. In order to automate the whole process a more cognitive automation technology would be required, which contains machine learning and artificial intelligence.

## 5.2 Implications for practice

The implications of a RPA implementation in practice would be wide ranging and have a great impact on the current working models of the finance officer at the case company. If the basic job of the finance officer would be transferred to RPA the role of finance officer would have to pivot towards a much more customer relations role rather than simply financing invoices and only being in contact with the client when there is a problem. In fact, both interviewee 1 and 2 alluded to the fact that in the current market where one can not compete with price one needs to find other ways of competing with the market. A more client focused strategy for finance officers might be an answer to their calls. If an organisation would invest more time and effort into predicting the needs of their clients and therefore creating a much more of a client relationship, it could prove more difficult for other vendors to pry them away solely on price. If the clients know that a certain organisation provides great service at a reasonable price, they are much more unlikely to switch to an unknown vendor with moderately lower prices.

Not only would the impact be solely felt by the finance officers in their pivot towards a different role but the business would also feel the impacts of automation. No longer would the organizations need to employ people to solely check creditworthiness, but they could transfer the resources towards client retention and new client acquisition. The number of human errors would fall drastically, which in turn could have a positive impact on the credit losses a company faces. The time from the client sending the invoice to them receiving payment could be shortened, which is a value proposition for prospective clients.

The positives are plenty, however an automation could have less than desirable impacts as well. As much as automation reduces errors it still does not erase human error. It is still a human that needs to determine the parameters within which, the automation tool has to work. If these parameters are off, there can be dire consequences before the organization realizes the damage. Faulty credit risk evaluations can have happened, which in turn would greatly increase the risk for credit losses without the organization knowing it.

The implications if automation in practice is a double-edged sword, which companies are starting to take their first cautious steps towards. The upsides are great enough to warrant investment into the technology but as with any new technology it is not without its risks.

### 5.3 Limitations of research

There are limitations to the research in both the literature review and empirical part. This is due to the nature of the subject being quite narrow and not having much previous research done. The literature review relied on previous studies on RPA, RPA implementation and RPA projects, which provided a more general data without bringing specific information regarding RPA projects or RPA implementations within the financial industry.

The empirical part of this study was limited by the scope of the interviewees being all from the same organization and that the number of interviewees was relatively low. Due to the number of interviewees, there was not much of a variation in the answers but since the subject is one that has not been studied before and the aim of the study was to broaden the understanding of RPA in the financial sector as well as answering the research question, which it has done, so the number of interviewees therefore is not an issue. Because of the qualitative approach the aim was to get a detailed view of RPA implementation from all tiers of the organization and the number of interviewees would not have changed the results drastically. The fact that all the interviewees were from the same organization might limit their view and understating of the factoring process. This study reflects on one organizations process, which is a clear limitation to the study.

Finally, the interviewer works in the organization in which the empirical study was conducted. This has both a positive and negative impact on the results. Firstly, the interviewer is highly familiar with the process, which can lead to the interviewees explaining more specific data concerning the process, which could not have been done to a less experienced interviewer. Secondly, the interviews were conducted in a friendly and conversational nature, which can lead to misinterpretations and human error.

### 5.4 Further research

Further research topics into the subject matter and the research question should be considered. Based on the findings of this study, one could expand the study to other automation technologies and how they would suit the factoring processes of organizations. In general terms RPA implementations within the financial industry should be considered as well due to the lack of previous studies within the subject matter. This study focused on the selection of automation technology, implementation, project success and how it would impact the case organization from the organizational stand point to the individual. Further research would be required within the area of other organizations to fully determine the impact of RPA implementation in the factoring process. Further research in RPA projects is suggested due to the fact that the subject is still young,

and the understanding of what RPA can and can not do are limited. Research into how RPA project would be conducted would be of interest. Would it be beneficial for the organizations to produce the RPA tool in-house or to have a service provider develop the tool for them?

## 6 SUMMARY

Robotic process automation is an automation tool that can replace human capital performing simple and high-volume tasks. The benefits of RPA have been suggested being increased efficiency, increased quality, saved time, cost reduction and fast and cost-efficient development. The rise of RPA as an automation solution is attributed to its flexibility with any sort of legacy systems and therefore the development costs can be kept relatively low, and the tool is quickly online. The “hype” surrounding RPA technology has led to many misconceptions of the capabilities of RPA and sometimes suffer from a “hero complex” where the technology is believed to be able to solve all the ails of an organization. The objective of this study was to tackle these beliefs from the point of view of an invoice factoring process and if and how a RPA tool could be used in the process. The subject is a new one and prior studies and theories on the subject matter were thin and even non-existent when it comes to RPA and factoring products in general.

A literature review was conducted in order to broaden the understanding of what the capabilities and limitations of RPA truly are. This was further expanded by reviewing previous studies on the organization implications of an RPA implementation. Thirdly, the literature review studied the nature of RPA project and what it takes for a RPA project to be successful. A qualitative case study was selected as the empirical methods for this study, where a medium sized financial organization was selected as the case company. The interviews were conducted in a semi-structured manner in order to get a both broad and deep understanding of what a RPA implementation would mean from the interviewees point of view. The interviewees were selected based on their roles and seniority within the case company to get a clear view of the possibilities and implications of a possible RPA implementation to the factoring process. The findings from the empirical part of the study were compared to what was found in the literature review.

The literature concerning RPA is rather extensive but direct studies concerning of RPA in the financial industry or specifically factoring were non-existent. However, by generalizing the findings of previous implementations and RPA projects in other fields, one could draw up a consensus based on pre-

vious studies what the implications were and what a successful RPA project might look like. The empirical part of the research largely agreed to the concepts introduced in the literature review of the benefits and challenges of RPA. From the findings of the empirical study one can deduce that an RPA implementation to the invoice factoring process would be feasible if not to the complete process. The part which could easily be decomposed to simple tasks did show positive signs of being ready for a RPA implementation. For full automation the empirical findings pointed to a cognitive automation technology. The impact of an RPA study according to the empirical research was a positive one but with few doubts concerning where the workload would be redistributed. Also, concerns were raised concerning the organizational readiness for a large-scale RPA implementation. The concerns circled around the know how and lack of skills of the team from a technical standpoint in order to act as owners of an RPA tool.

In general, there was an agreement between previous studies of project success and the empirical findings but between the interviewees there were large differences in criteria and what kind of impact they wished RPA would have on the organization. The one criterion that was agreed upon was the need for robust communication in order to have organization wide buy-in and to alleviate any concerns and fears concerning automation. The need for planning and documentation was also raised as a critical factor for project success.

Overall, the empirical findings point towards a partial RPA implementation to the factoring process of this organization. Previous studies and theories support the empirical findings. However, the study was limited to one organization and further study on the matter is suggested to confirm the findings of this narrow study.

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## APPENDIX 1 INTERVIEW TEMPLATE

Name and role of the interviewee

- What do you see as the strengths and opportunities of automating all or a part of the factoring process?
- How about the risks and challenges?
- Do you think that RPA would be suitable product for factoring automation?
- What would be the CSF for a RPA project for your organization?
- How would you deem a project successful? (Short term success and long term success)
- Do you see RPA or other automation technologies as a way to gain a competitive advantage in the market?
- Do you foresee any technical issues to a possible RPA implementation?
- What kind of an impact would you foresee RPA having on the organization?

Research question:

Is RPA a suitable tool for invoice factoring automation?