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Potential automation of operative work in a case company

Helsinki Metropolia University of Applied Sciences

Master's Degree

Industrial Management / Logistics Management

Master's Thesis

22 April 2019

Metropolia

During the creation of this thesis, I received the help of many individuals and organisations, I hope to acknowledge in this preface. This journey has helped to develop my understanding of informatics and project management and enhance my professional skill.

I am also thankful to my colleagues at Valmet Oy who helped during this project: Senior Manager Henriikka Härkönen, Global Pricing Manager Esa Karjalainen, Procurement Manager Heikki Huida. Finally, I am incredibly thankful for all the Service team members who answered the interviews, and a special thank you to Elena Sorokovaia and Hanna Vertainen from the Delivery Control team, who used a significant amount of time helping me develop the programming solution.

I also want to thank the master's programme instructors, Dr Juha Haimala, Dr Thomas Rohweder and Dr James Collins, for providing exciting and motivating lectures and programmes.

This project has taken place during a challenging period worldwide, caused by the Covid pandemic of 2020 and, personally, by the birth of my first offspring, so I am grateful for the help and support of my partner during these exigent times and for the support of my extended family and friends.

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Vantaa
May 30, 2021

Author Title Number of Pages Date	Petri Roberto Eskelinen Potential automation of operative work in a case company 74 pages 12 August 2021
Degree	Master of Engineering
Degree Programme	Industrial Management / Logistics Management
Instructors	Dr Thomas Rohweder, Principal Lecturer Henriika Härkonen, Senior Manager

The text explores the practical aspects of implementing Automation of operative work in an order-fulfilment process and the challenges and practical considerations of such a venture,.

Considering the literature available on the concept and study of the organisation itself, it is possible to find insight into the practical concerns of Automation and its limitations. With the help of interviews and information that the case-company stakeholder provided, creating a framework to find the proposals was possible.

Despite the many areas where Automation is possible and makes business sense to pursue, it is not, for lack of structure and champions.

Especially in a country with high labour costs, an increase in productivity is possible by using relatively simple tools and a short time frame. The case company implemented the outcome automation, with which users found issues, but the user base found the solution satisfactory.

Keywords	Automation,RPA,Sales,ERP,Order fulfilment

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Acronyms

AI: Artificial Intelligence
BA: Business Analysis
BPM: Business process management
BPR: Business Process Reengineering
ERP: Enterprise resource planning
IT: Information Technology
KPIs: Key performance indicators
PDD: Process Design Document
PO: Purchase Order
PoC: Proof of Concept
RPA: Robotic Process Automation
SLD: Service Level Descriptions (Agreements)
SME: Subject Matter Expert
SO: Sales Order
VBA: Visual Basic for Applications
VBScript: Microsoft Visual Basic Scripting Edition

1 Introduction

This chapter introduces the case company's business context and shows the thesis's design and objective.

1.1 Business Context

This subsection describes the case company, followed by a brief explanation of robotic processes.

1.1.1 Case Company

The researcher conducted the study in a large company whose key component provides products and services for pulp, paper, fibre and energy machines; the case organisation of the study pertains to the business unit that accomplishes delivering spare parts for those machines or order fulfilment.

The company had an operating income of 281 million euros in 2019 and employed around 14 thousand people in 2019. Headquartered in Finland's capital region, its shares are listed on the Nasdaq Helsinki.

The thesis's scope consists of three business units in the same organisation and one unit outside of it. All are within the thesis's scope, which the text clarifies in later chapters.

The company recently changed its ERP system, implemented in its units worldwide. Units in Finland and Sweden have already implemented it. However, this has caused underperformance compared to previous years and created an urgent need for action.

Another resource limitation has made operational improvement in-house necessary, as a third party controls the new ERP system. The company wants to improve without transferring resources to the outside party, whose support is insufficient.

The company also wants to create a new framework that the organisation can implement in other units to transition to the new ERP system. For example, the company could efficiently distribute the guidelines in this paper to other unit's teams.

The business unit routinely undertakes many operative tasks with automation potential. Some explored later in the thesis are order confirmations, quotation requests and delivery-date follow-up.

The unit in question is interested in implementing a Robotic Process Automation (RPA) solution for some of its tasks. Another organisation in the case company successfully implemented their solutions and recommends them. However, the case organisation is willing to consider other proposals.

1.1.2 Robotic Process Automation

Understanding the rest of this thesis requires a short introduction to RPA and its origins.

RPA can be dated to early 2000, when developments in artificial intelligence, screen scraping and workflow automation made possible tools that facilitated creating programmable robots to accomplish routine tasks more simply, for a more marketable concept according to Laurent, et al., (2015). There is no strict definition of RPA; vendors and developers have proposed various forms. Marketing usually defines RPA as a software robot able to perform a well-defined task, interacting via the interface, like a human does, without its limiting the interaction. This definition differentiates it from other automation processes and lowers its entry barrier, by not requiring a deep understanding of the programs the software uses.

Contextually, the RPA can be an aspect of business process automation (BPA) evolution or an alternative to business outsourcing, solving the same problems that outsourcing resolves. However, RPA uses a robot instead of a human, and the process implementer can find similar answers in its implementation.

Rule-based and operationally driven, RPA cannot implement its solution to improve existing processes, and programmer foresight is the limitation on its abilities.

We will explore whether RPA can maintain its promise of quick implementation of its vendor-advertised operational processes. The developer cannot implement it without significant difficulties and time investment (Willcocks, et al., 2015).

1.2 Business Challenge, Objective and Outcome

Consideration in the context of business suggests using RPA software; limited previous internal experience has shown that its implementation is possible within a year.

The objective of this thesis is to identify the automation potential of work tasks in the case context and propose how to automate a select work task.

The outcome of this research is detailed instruction on how to automate a specific work task, an example of the automated task, guidelines for undertaking automation of other similar work tasks and conducting the selection process in a similar organisation.

1.3 Thesis Outline

The thesis begins with chapter 1, the description of the business context. Then, chapter 2 describes the methods used, including the research approach, design and data plan.

Conveying automation ideas requires exploring the current literature on automation generally and RPA, which chapter 3 reviews. Then, chapter 4 explores the contextual and practical aspects of the case organisation, with the help of interviews with the management and the workforce, presentation of internal documents and a description of the initial stage of the proposed automation.

Chapter 5 transforms the baseline information into a proposal for automating operative work and how the case organisation should approach future proposals for automating work. Chapter 6 presents the validation of this proposal and discusses the guidelines for arriving at the final automation proposal.

Finally, chapter 7 presents the implications of the research findings from this study, an executive summary and the thesis evaluation.

2 Method and Material

This chapter explores how the research was conducted and why this framework was chosen, explaining the research approach, its design, data plan and evaluation method.

The present researcher conducted interviews, explored existing literature and reviewed internal documents. Finally, the chapter describes the methodology for compiling the data and the recommended course of action, along with the author's methodology.

2.1 Research Approach

Design Science was the methodology the author chose for this thesis, explored below; The research also has qualitative and quantitative approaches to data, the implications of which this section also explores.

The framework used in this thesis is Design Science, as Purao (2002) describes it. Usually used in IT research, this approach provides a framework with the following elements:

- Contextual Environment refers to the people, organisation and technical system that constitute the problem and the opportunities that the research raises. The researcher explores these in the starting analysis to understand the specific problems the environment poses for the case organisation; indeed, the environment could constitute the problem.

- Knowledge Base refers to the current best practices that the literature reports, outside of the contextual environment. Though it is primarily found in the literature review, that is not the limit of the knowledge base. The researcher defines an Artefact as something that appears and may requires more necessary information and exploration. Knowledge could be thought of as a set of possible solutions. The researcher should use information from the above items to create a tool (the Artefact) to solve the issue at hand—the process that becomes an application, RPA or otherwise, that the researcher builds or commissions and evaluates. But the Artefact is not a necessity according to Baskerville, (2008).

This project—qualitative research using the Design Science approach (Purao 2002)—enables more naturally combining information on the environment—in this instance, the case company and current best practices. We had already established an artefact RPA robot and a practical process that the researcher had to evaluate concurrently. Because the business problem with which this document deals includes an artefact as a requested feature to solve the company's issue, and a large part of the investigative work is conducted in its environment, the researcher made a natural choice of this design method.

Another consideration is that the nature of the problem resides in IT, so a research approach used extensively to solve IT problems is a natural choice for this study. The researcher broached the problem with a critical review of its business aspect, for which evaluating both technical feasibility and business relevance is essential.

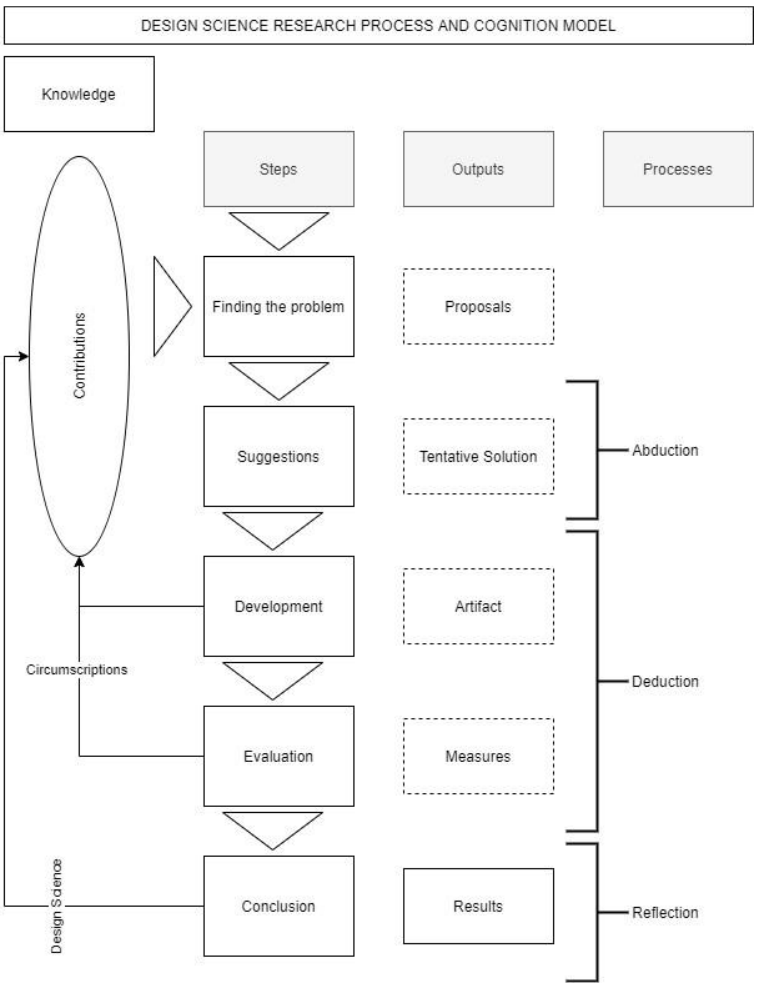

Figure 1. Design science research process and cognition model, an adaptation of figures in Järvinen (2007)

Our information is more suitable for a qualitative approach as our data collection will primarily provide qualitative information, and the few quantitative units that are received are not necessary to analyse (Järvinen 2007).

This thesis is further divided into two parts: the selection section, exploring the case organisation and its processes, and the implementation section that reviews the object's development and implementation. The two phases demand different design approaches.

2.2 Research Design

This section explores the research design of this thesis, illustrated below.

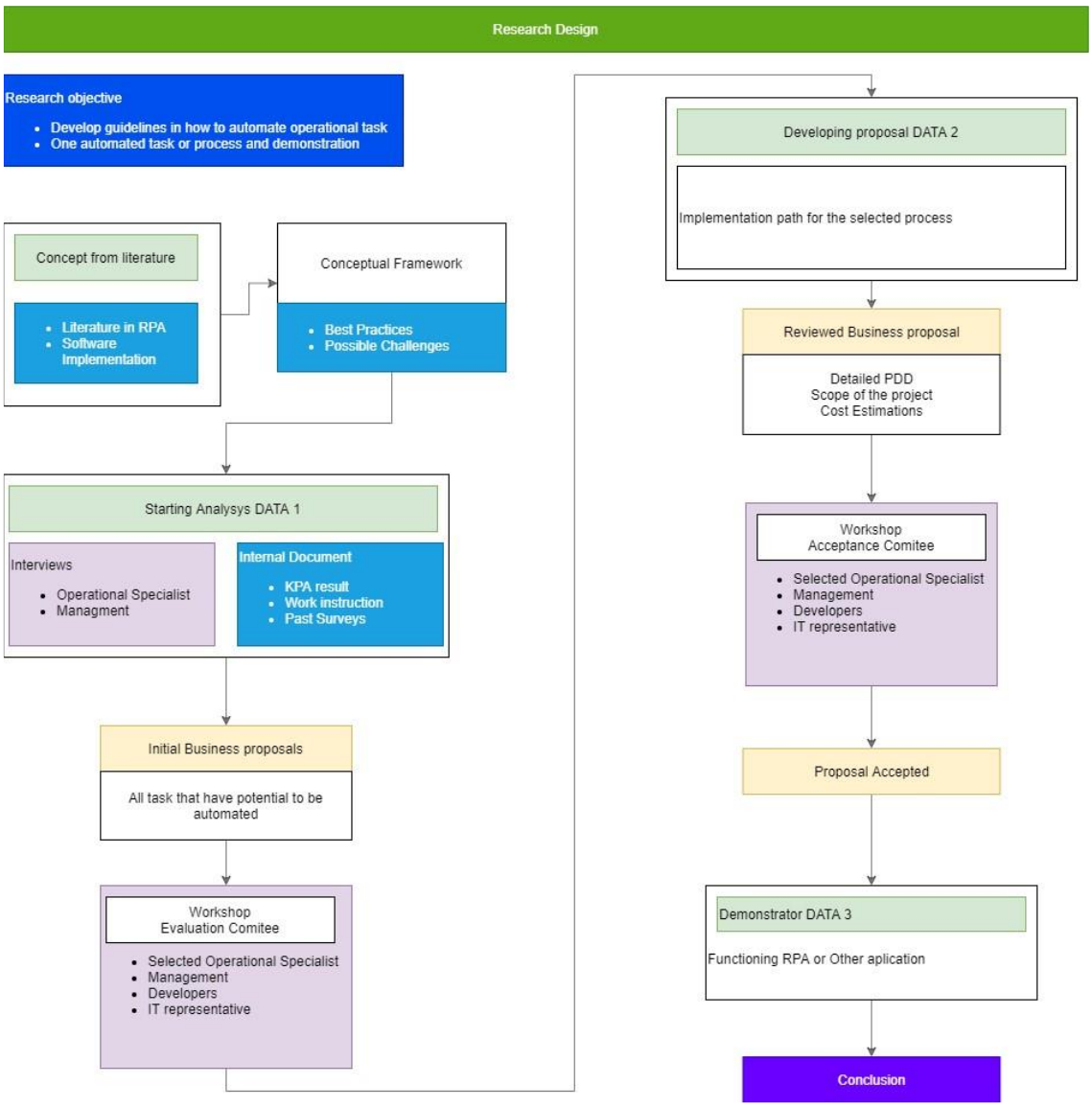

Figure 2. The schematic overview of the study design

This study first found similar examples from the literature, to inform the object of this research by seeing the commercial opportunity for this task and becoming familiar with the problems and limitations of applying RPA and other equivalent solutions that appear in the literature.

Second, an interview or questioner, working with the manager, finds the item they deem to be causing a bottleneck and identifies whether the current key performance indicators (KPI) applies to the newly implemented system (i.e. finding problems).

Third, questioners interview the operational specialist to gain his insight into the problem and provide the reference for doing operational tasks, then compare this information to the existing documentation concerning the operational task, using both sets of information when creating the automation process.

Following the compilation of this information, and based on the previously analysed literature, we selected the most suitable task to automate, other suitable tasks for future automation or guideline creation, providing arguments for prioritising that choice rather than others.

A chosen task is automated, and detailed documentation on how this is accomplished appears at the end of the study. Finally, the case company validates the case.

2.3 Data Plan

Data collection for Data 1 below shows how the researcher compiled a mix of face-to-face, phone and email discussions, depending on the respondents' availability.

Table 1. Detail of interviews, workshops and discussions in Data 1–3

	Participants / role	**Data type**	**Topic, description**	**Date, length**	**Documented as**
	Data 1, for the starting analysis				
1	Respondent 1: Senior Manager	Teams Interview Questionnaire	Current bottleneck and issues caused by new ERP	15.04.2020 1h	Fieldnotes and recording
2	Respondent 2: Procurement Manager	Teams Interview	Current bottleneck and issues caused by new ERP	16.04.2020 1h	Fieldnotes and recording
3	Respondent 3: Pricing Manager	Questionnaire	Current development proposals	06.05.2020	Fieldnotes
4	Respondent 4: Delivery Control specialist	Teams Interview	A routine task that can be automated and task time consumption	23.04.2020 30min	Fieldnotes and recording
5	Respondent 5: Procurement personal 1	Teams Interview	A routine task that can be automated and task time consumption	16.04.2020 30min	Fieldnotes and recording
6	Respondent 6: Procurement personal 2	Teams Interview	A routine task that can be automated and task time consumption	29.04.2020 30min	Fieldnotes and recording
7	Respondent 7: Internal Sales Specialist 1	Teams Interview	A routine task that can be automated and task time consumption	24.04.2020	Fieldnotes and recording
8	Respondent 8: Data Management Specialist	Teams Interview	A routine task that can be automated and task time consumption	23.04.2020 30min	Fieldnotes and recording

9	Respondent 9: External Sales Specialist	Teams Interview	A routine task that can be automated and task time consumption	28.04.2020 30min	Fieldnotes and recording
10	Respondent 10: Internal Sales Specialist 2	Teams Interview	A routine task that can be automated and task time consumption	29.04.2020 30min	Fieldnotes and recording
11	Respondent 11: Logistic Manager	Teams seminar	Presentation of another RPA project	09.05.2020	Fieldnotes
	Data 2, for Proposal building (Section 5)				
12	Participants : Selected specialist External RPA Consultant 1 and 2 Internal IT Consultant 1 and 2	Workshop/ discussion	Cutting non-workable tasks,	12.05.2020 1h	Fieldnotes Task Recording
13	Delivery Control Specialist 1 and 2	Team Interview	PDD creation, process description and exceptions	16.05.2020 1h	Fieldnotes and recording
14	Delivery Control Specialist 1 and 2	Team Interview	PDD creation, process description and exceptions	17.05.2020 1h	Fieldnotes and recording
15	Delivery Control Specialist 1 and 2	Team Interview	PDD creation, process description and exceptions	18.05.2020 1h	Fieldnotes and recording
16	Delivery Control Specialist 1 and 2	Questions	PDD creation, process description and exceptions	July to August	Copy of conversations
	Data 3, from Validation (Section 6)				
17	Respondent 1: Senior Manager Participants 9-12:	Group interview/ Final presentation	Validation, evaluation of the proposal and process financing approval	August 2020	Fieldnotes

As Table 2 shows, this case used internal documents to help indicate where the problems and bottleneck lay in the current ERP system and how each unit interacts with the others. However, the responsible manager first analysed the document limitation.

Table 2. Internal documents for starting analysis, Data 1

	Name of the document	Number of pages/other content	Description
A	KPIs result 2018, 2019 and 2020	3	Process result
B	Salesforce instruction	1	Process description
C	Valmet way to operate GSC	1	Process diagram
D	LN Purchase order instruction	1	Process description
E	LN Buyer instruction	1	Process description
F	LN Item Specialist instructions (several documents)	5	Process description
G	LN manufacturing order instruction	1	Process description
H	PDM Instructions	1	Instructions
I	Salesforce instruction	1	Instructions
J	Delivery Control Instructions (Several documents)	5	Instructions
K	UiPath Business Analysis training	10	Instructions
L	Business Case Calculator	2	Script

Table 2 also shows the instruction each task specialist received and represents how the creator of the new ERP and the owner of this software wished the workforce to perform the task. This information was compared to how the operative performed the task.

3 Concepts from Literature

Automation is the removal of human interaction from a task. The organisation had accomplished it by various means. Since the context of this paper is the service sector, it explores software automation and, more specifically, service automation, of which RPA is a significant part.

As a topic of academic study, RPA is new and limited. Therefore, this section discusses what information academics have explored regarding RPA, general software automation and alternatives. Because of its limitations, we considered similar processes to fill gaps.

The IEEE Standards Association currently defines robotic process automation as:

‘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 tasks in one or more unrelated software systems to deliver a result or service with human exception management’ (IEEE Std 2755-2017, 2017).

Identifying the potential service automation is explored in the first section of this chapter, followed by introducing possible limitations in this method and presenting a conceptual framework in the last section.

3.1 How to Identify Automation Potential

Initial exploration begins by understanding what RPA can do better than other solutions, then moving to the software and environmental concerns.

When identifying the RPA program's challenges, two specific contexts in one confront software and hardware. One limitation is the technical challenges in constructing and implementing the RPA. The other is the organisational/environmental problems. This section explores both, starting with the technical issues.

3.1.1 Software Context

According to a Deloitte survey (Laurent et al., 2015), elements in the process that RPA automates have the following factors that RPA implementation might improve:

Decreased cycle times and improved throughput.

Improved accuracy—by its very nature, the robot does not commit the same type of error that a human user would save and does not suffer from fatigue or morale problems; the robot error has a systematic nature, and the developer should permanently correct it.

Detailed data—the robot’s decision-making can consider various inputs that would be too time-consuming for the human user to consider or involve exact calculations.

According to Deloitte's practices, the implementer's flexibility and scalability can be easily replicated and repeated as necessary. However, this has not been the practice of the companies surveyed.

The elements that facilitate implementation are:

- Rule-based: Does not need any decision-making.
- Lack of exceptions: Each exception requires creating a new node in the program.
- Repetitive.
- Standard Input: Process input is always the same.

Hard to implement:

- Use of multiple programs to accomplish its task.
- Non-standard format.
- Non-standard input, needs different interpretations for the same task.
- Needs many decisions and exceptions for a successful operation.
- Free text.

Program-specific problems:

- Non-compatibility with the operational software.

Based on information similar to that above, many sellers of RPA tools have created a similar framework for analysing the difficulty of each task and judging which should have priority in its implementation

According to Laurent et al. (2015), elements in the RPA tool-set that the developer should consider and how they operate when deciding what to automate are:

- Autonomics
- Machine Vision
- Natural Language Processing
- Machine Learning

An element that RPA should not handle is unstructured data. At the moment, it cannot; most software is incapable of handling it.

3.1.2 Organisational and Environmental Context

Advocates of RPA process implementation should handle the challenges involved as a business problem. For example, creating a robot requires evaluating if it makes sense. The factors to examine in this context appear below (Chui et al., 2015).

- High transaction volumes: The user must implement a large number of tasks.
- High-value transactions: One transaction costs many resources to finalize.
- Stable environment: The process and software rules have few changes during implementation, also referred to as process maturity.
- Explicit business rules: An example often used is that the user would be able to write instructions for the substitute, and it would perform the task.

An element not explored by Chui is moral hazard. The current workforce may see the software as replacing their position and be hostile to its implementation. Currently, management does not consider this, despite being the ones who can prepare the workforce to participate in the value-adding task that will eliminate it. The realisation of such plans is rarely implemented or prepared beforehand as noted by Hjorth & Sturesson, (2019).

Moral improvement implies that the implementer should not neglect to notice that the implementation of a robot would free the human to focus on a more exciting task (Lacity & Willcocks, 2016). Though tedious tasks are necessary, their removal means that the workforce can concentrate on more stimulating and challenging tasks.

Another aspect that the implementer can consider is who takes legal responsibility for the robot's work. By its nature, the robot cannot be considered a person, so the consequences of its decisions should have an appointed individual who takes responsibility.

Negligence in the demands of software development by the organisation trying to solve all IT and software problems through RPA is an inelegant solution that will result in more work than developing other software solutions to solve such issues.

The automation proposal goals should align with the organisation or company's general strategy.

3.1.3 Common RPA Application in a Customer Service Environment

The right way to understand the RPA application is to review an existing implementation, to get a more grounded understanding of the technology's possibilities. Case studies and vendors' advertisements and presentations make this information available; examples below are from Chui et al., (2015). report findings:

- Automating order processing and payments.
- Monitoring inventory levels.
- Extracting data from PDFs, scanned documents and other formats.
- Software installations.
- Issuing refunds.
- Updating vendor records.
- Clean work task.

Dilmegani (2017) notes that except for the last implementation, all these unassisted robots will perform in the background with little or no input from the user; though possible, implementing RPA for active user assistance is not done.

3.2 The Concept for a Successful RPA Project

Lacity and Willcocks (2016) argue that early involvement of the whole IT department is necessary; its lack will slow down the processor, and cybersecurity is an element that needs everyone's involvement. Still, this implementer occasionally ignores it because its necessity is not immediately apparent.

Consulting with all employees about the application of the RPA raises the worry that automation might replace them, and such concerns left unaddressed will cause a problem with the implementation as well as other negative externalities for the implementer organisation. Willcocks recommends transparency to deal with this issue.

Proof of Concept (PoC), a proper assessment of workload that the robot will save upon implementation, can be a matrix showing the main element for comparison by the researcher and management (Taulli, 2020).

Solution redundancy or bleeding occurs when RPA development retards the source software development. Even though RPA is usually easy to implement, its nature is fragile, and neglecting the source software will soon create problems. However, the organisation could use RPA as a stop-gap solution, but not a permanent state (Davenport, 2019).

The subject-matter expert (SME) should review the reasons for implementing RPA, to guarantee that it speeds the process and improves quality (Lacity & Willcocks, 2015).

3.2.1 Common Problems with RPA Projects

Having reviewed RPA elements, we can explore problems that could arise in implementations, with a section on successful implementation and how to follow up on this type of tool. Dedicating a section of this paper to the subject shows its importance.

Edlich and Sohoni (2017) cite many RPA project shortfalls; typical examples are:

Lack of ownership—As many companies lack a straightforward implementation process, the various requisites for this process do not have a final implementer, resulting in a lack of continuity in the process itself or developing new-tools expertise.

Lack of infrastructure—RPA maintenance must figure in the implementation. An RPA is currently very fragile and needs an organisation to troubleshoot and edit the robot when the process changes slightly. Under most real-world circumstances, this will happen sooner rather than later. As this is not limited to RPA maintenance, all the robot software should have a clear path for complaints. The RPA developer cannot typically fix the software, beyond running the RPA itself.

3.2.2 Continual Development

After its creation, an RPA implementation should be continually monitored and improved. A change in the existing software or operational method will break the current RPA, and this will need resolution; personnel should have as an assignment carrying out this task. In addition, the developer should create preventive steps to ensure before it happens that a change in the software environment can be addressed.

IT personnel must continuously test safety updates, and check possible issues, so the RPA robot does not present a security risk. This means that the person who updates the software with which the robot interacts must know of its existence and qualities.

Another common issue is that bugs will appear during use that were not apparent during the implementation phase. Therefore, users should have a clear path available to address this issue. Preferably, management would integrate this path with the organisation's existing IT infrastructure.

Continual development also addresses one of the weaknesses of RPA. Its fragility before minor changes will make the robot unable to perform its task, usually resulting in complete failure. These problems are easily corrected; reprogramming the robot is not as challenging a task as creating a new one (Srivastava, 2017).

3.2.3 Implementation Concepts

The last element for a successful project is implementation, necessary for creating a framework or mindset towards the 'how' and 'why' of creating automation. According to Taulli (2020), simplifying the process of implementing RPA, compared to other software solutions, is necessary to not prolong the process. An overview of simplification of the various process discussions appears below.

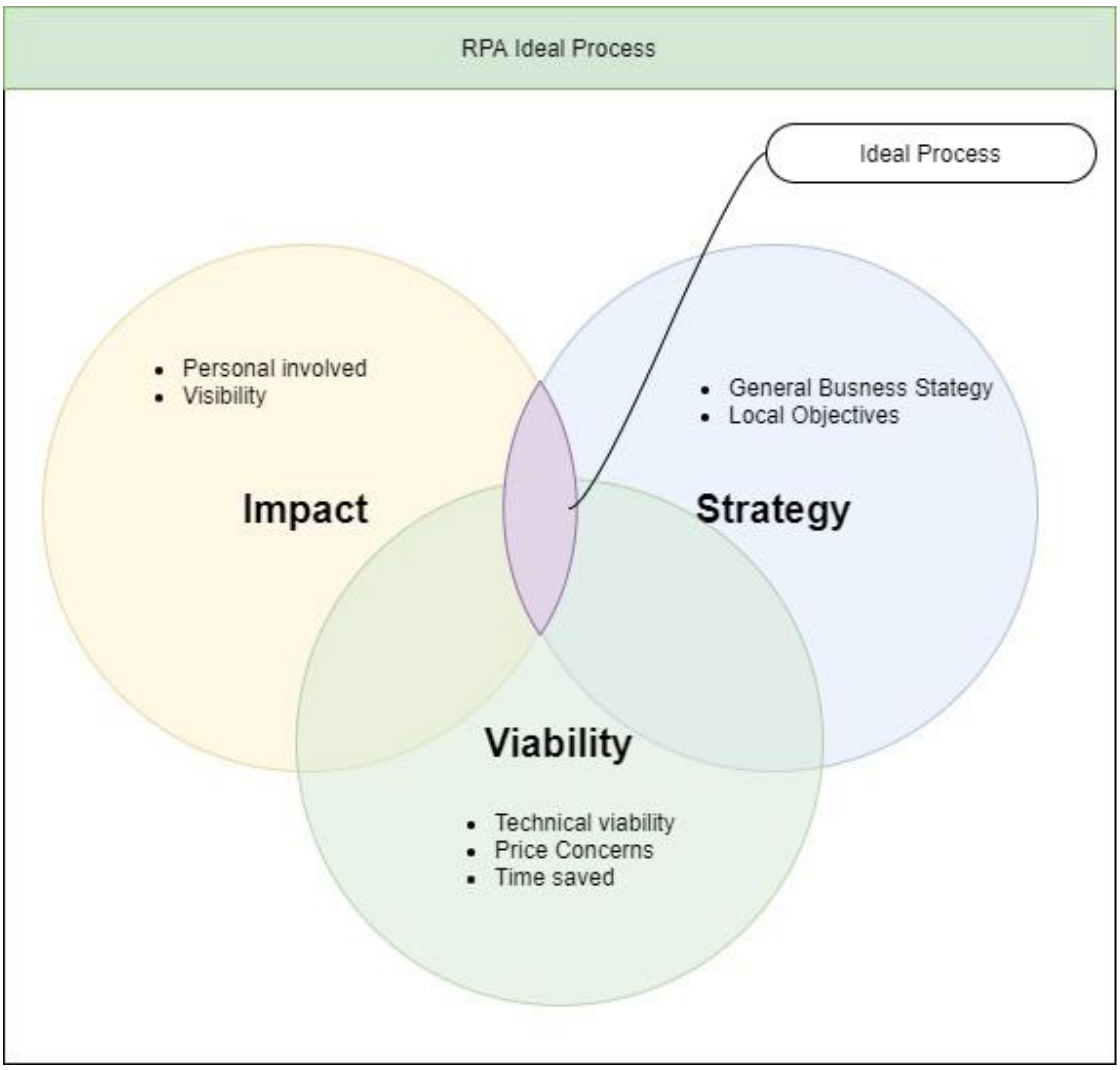

Figure 2. RPA ideal process

The objective of each step is to select the closest process that would arrive at all three main characteristics.

Impact—The internal documentation can also provide access. Confirming the information by interview as to what process affects each operational specialist visibly, it can be assumed they are aware of the impact of process success.

Viability—This is the easiest to quantify, as a process can easily be classified as viable or non-viable, and its price can be estimated with some precision. The only part suffering from lack of rigour is estimating time saved unless the whole process is automated. A person becomes obsolete; this is educated guesswork (Wellmann, et al., 2020).

Strategy—This is the most difficult to quantify as it is an interpretative concept, but it can be found in senior management's strategic end-of-year statement. Its implications for the local organisation likely reside in discussion with the administration, such as local managers. However, this deals with an element that is continuously changing, such as which software will have a new version, and the secrecy involved with significant updates. Therefore, this section should be investigated last; access will require more than desk research. According to Meinel and Leifer (2019), in a hierarchical organisation, the personal decision-making objective must be understood so that a proposal is implemented.

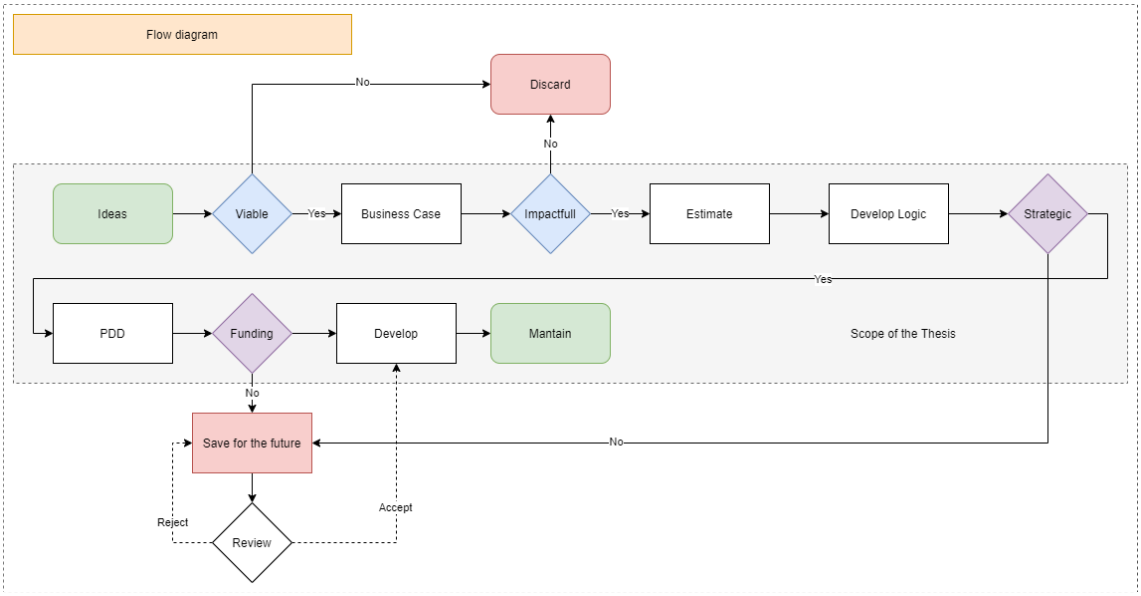

Figure 3. Flow diagram of the idea-handling process, interpretation and adaptation of Tauli text "Finding the Right Balance"

Ideas—These are found among the management, especially the workforce, who understand how operational work is performed. They can be divided into three main groups:

New Process Idea—Creating new processes to perform functions not already completed will help define the organisation's role. Alternatively, *Current Process Ideas* improve the existing process by streamlining existing tasks or identifying the most time-consuming task for automation. The latter should be divided into two groups, *complete* or *partial process automation*, as they have different business consequences—e.g. partial automation would involve user training.

Their viability for automation, as explored before, can be reliably accessed. However, just because the developer should not automate some of them does not mean that they can be adapted or used for some other development.

Process design document (PDD) is created with the SME's help and serves mainly to guide the developer in how the task works. This also serves to better explain the supposed user and the level of detail of this document requires to explain the users and their needs (Taulli, 2020).

3.3 Conceptual Framework

Based on the literature, we can create a framework for proceeding in the next chapter. The useful element for our environment will be explored in this chapter. A framework was created to showcase ideas in decision-making in the text and present a path to a solution, as shown below.

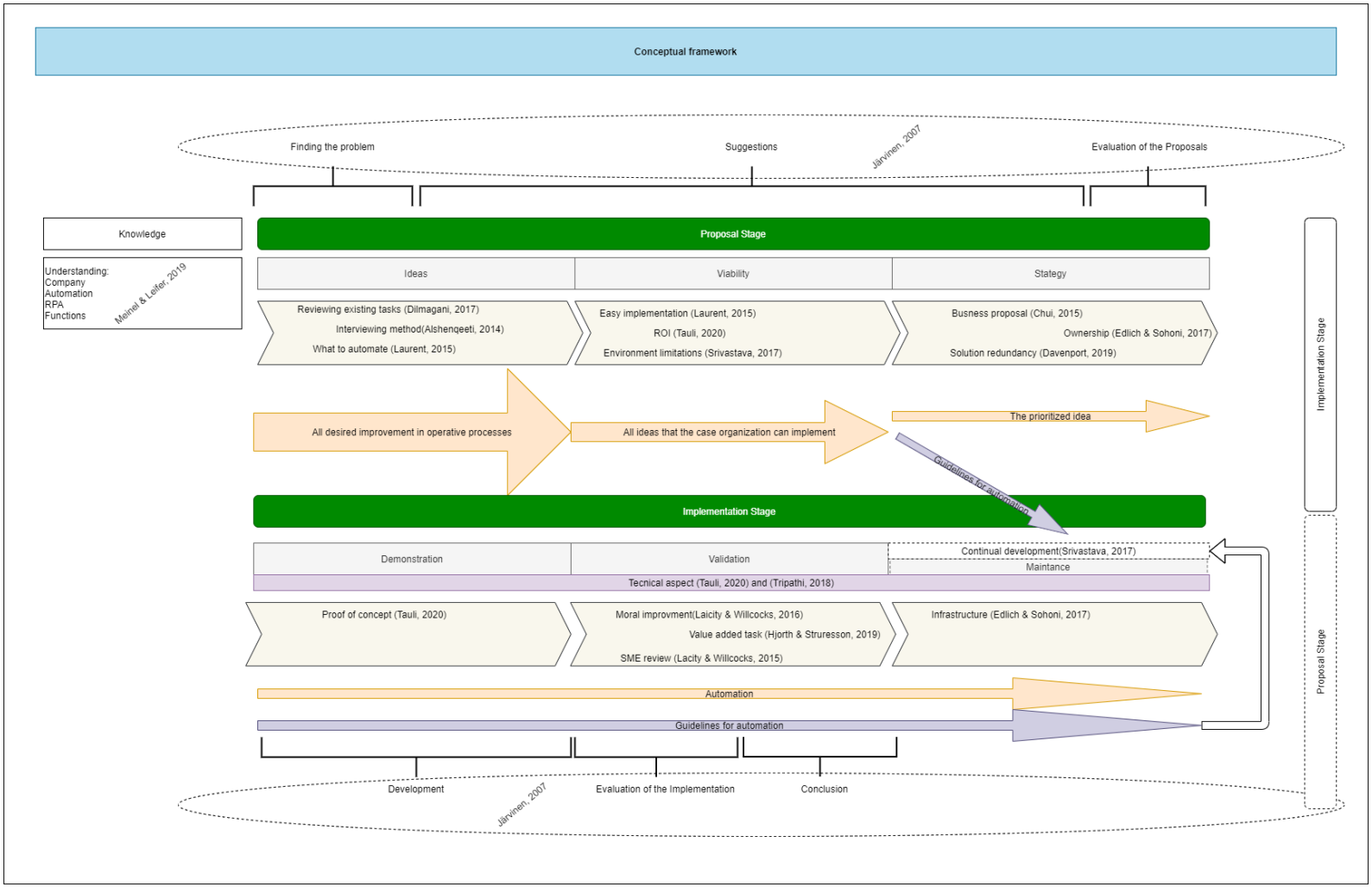

Figure 4. Conceptual Framework

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The conceptual framework of this research formalised the diagram above. The multiple objectives are necessary to divide the task into two main parts, the proposal stage and the implementation stage. In the first step, the overview of the organisation and the possible automation proposal are explored. Once found, starting the implementation stage, in which this specific automation is examined in more detail, is possible.

The initial phase is to understand the context for the solution implementation. This phase occurs according to an adapted framework, using the element of Järvinen (2007), further advanced by Meinel and Leifer (2019), who provide a more detailed process for finding the knowledge within the company context as they describe solution decision-making.

The need to find ideas for proposal-building should begin by reviewing processes in use elsewhere Dilmegani, (2017). We can apply techniques from Alshenqeeti (2014) for interviews, an effective way to start automating and discussing with the workforce what to automate, as Laurent et al. (2015) recommend. Besides draft proposals, this process will produce a better understanding of the organisation's needs and considering the environmental limits of the case organisation—following ideas that Srivastava (2017) explores—so the process does not fail. Finally, the strategic aspect is a business proposal, as Chui et al. (2015) explain. Edlich and Sohoni (2017) consider ownership to avoid pointless automation. Davenport (2019) recommends exploring options other than RPA.

After a suitable candidate proposal is found, Taulli (2020) recommends the creation of a Proof of Concept (PoC) to start the automation journey. To validate the automation, the recommendation of Lacity and Wilcocks regarding moral improvement and SME review is used, as is Hjorth and Struresson's proposal that real validation occurs if the previous user can create more value elsewhere. Lastly, this stage addresses the maintenance infrastructure concern, according to Edlich and Sohoni, as well as some application of continual development, according to Srivastava. All organisations working with RPA or automation should consider addressing this issue. The software also has technical aspects. Taulli (2020) and Tripathi (2018) guide for UiPath during the implementation stage this are aspect related to programming and scripting.

A valid automation proposal not selected for the initial automation became the guidelines for it, along with findings during the implementation of the demonstrator and stakeholders' comments in the validation and other phases of the project.

4 Identifying the automation potential of work tasks in the case context

This chapter reports desk research conducted to understand the state of the company process and development. As mentioned above, they function as limitation on what to investigate further; the development is very dependent on the stability of the process. The review of the previous attempt to apply RPA inside the company produces an overview of the software and work roles.

Following Meinel and Leifer's (2019) recommendation is necessary to find the motivation, morale and practical ramifications of the solution, and an understanding of the current tools used, the personnel involved and the leadership in question. A series of interviews produced the data to evaluate the leadership and personnel.

The other element is semistructured interviews with the specialists, to find the strengths and weaknesses of the current process—more specifically, finding out what consumes the most time and what would affect the morale of the stakeholder involved.

Methodologically, this adds strengths and weaknesses of the current process and development ideas. Finally, the chapter begins the proposal stage of the framework, with a review of the existing task, then an initial probe of what to automate.

4.1 Overview of this Data Stage

The starting analysis takes place in two parts. The first part comprises several steps. The first step reviews internal documents regarding software limitation, deployment and future development plans. Interviews with its users identify further limitations. The second step explores the roles that the users perform in the company. This step is also a result of the interview and other internal documents that describe the organisation, creating an overview of the tools that each user group used in the operational task and providing data for estimating the impact of automation in a future stage. Finally, a summary of interview results, used in the future stage, estimates the impact of an automation proposal and adds ideas for this proposal.

The second part is the result of this finding, transformed into possible proposals for automation. It also has three steps, the first of which produces an overview of all the viable proposals under consideration. The second step evaluates the result of the first workshop, aiming to compromise with the strategic consideration and its impact. The third

step explores the cost considerations that combine strategic aims and viability. This chapter ends with a summary of the results and key findings.

4.2 Identifying the Work Tasks with Most Automation Potential

The work task decision requires an overview of the software that the case organisation uses and its status in the development cycle, to select the element to automate.

4.2.1 Organisation objectives

As Meinel and Leifer (2019) explain, understanding the leadership of a hierarchical organisation, such as the case company, includes exploring items that affect them besides their own moral and motivational framework (difficult to explore), and the method of measuring their performance to create some understanding of the leadership's strategy, which constructing a successful proposal requires as explained by Chui et al., (2015).

The internal document and consultation with the management reflect an interest in providing faster response time and more exact information regarding order fulfilment. Another desired element would be a reduction in time used for any process related to procurement. KPI data shows that this is where improvement is most needed.

The management also wants a return to positive performance indicators, as was the case before implementing the new ERP. Now, performance is stagnant or declining.

The way the organisation measures performance is two-fold, both incomplete though helpful—namely, with the response time in its internal customer software (CRM Internal) and Salesforce. 'Performance Measurement' is visualised in Figure 5 below.

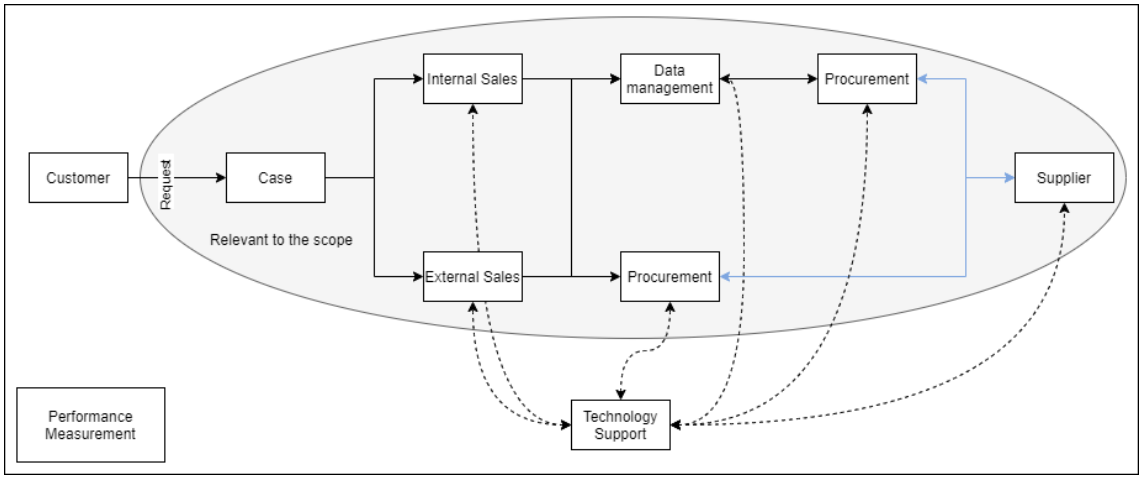


Figure 5. Performance measurement diagram

As Figure 5 shows:

a) Customer internally or externally creates a ‘case’ (a request of any kind);

b) The case is automatically transferred to the correct salesperson;

c) The salesperson decides if he or she can resolve the matter alone or requires help from Data Management, Procurement or Technology Support;

d) The process repeats until case resolution.

The organisation uses three elements to measure performance. Each step has a counter built into the software to measure the time to solve one case and how time is used at each stage, then compares those to previous years to see the bottleneck in the process.

The second element to measure performance is a questionnaire sent to each client yearly. The results validate the finding in the first report or find problems that the report did not identify internally.

The third element for measuring organisation success is completing the order in the promised time and identifying customer complaints. Later parts concerning strategy are also considered, to meet the desire to improve these numbers.

4.2.2 Software Limitations

Evaluating software limitations (Srivastava, 2017) is vital for the project's success. For example, a limiting factor for the RPA or any automation is how often the software would be updated. This significant limitation establishes the proposal's viability. Other reasons to explore the software are to find points of redundancy (Davenport, 2019), understand what this software does and offer alternative automation paths.

Several different software applications that the organisation uses can be further developed. Others are under the control of other organisations inside the company or have finished their development cycle, and the company will not update them.

The described results enable creating a table of values for each software's stability, based on information from internal documents and management interviews. This step is necessary for later stages and will affect the selection of the process to automate.

Similarly, internal documents, testing and interviews make possible finding the limitation of each software application and how the user transfers information from one system to another, to discover how they affect workload and morale. The used software's are described in the Table 3 below.

Table 3. Programs used in the organisation

Software	**Description**	**Development cycle**	**Notes**
A: PDM	Product Data Management	Safe to develop	Major update in 2 years
B: Salesforce (CRM)	Used for communication with the client and internally and where purchase orders are sent; software	Major update next year	Adding internal tools can be considered for processes that use Salesforce, no significant developments shortly

	under external management but a possibility to implement modification		
C: CRM Internal	For internal communication and communication with the supplier, its software is under case company internal control, allowing for more straightforward modification that should be considered when deciding if an RPA is the best idea	The Stream will be replaced by Stream 2	To be substituted shortly (less than two years)
D: Email	In practice, pure email communication is reserved for communication with the suppliers by the buyer's, other personal use and Salesforce	Safe to develop	All major RPA or other software have ways to integrate most email applications easily. Limits are on the legality of collecting info in the work email
E: New ERP	For creating a sales order, quotations and maintaining pricing software under external management and during an early stage of application; future changes are probable	Constantly update	

***F: Legacy ERP**:*	Used for a few tasks the new ERP is currently unable to handle	Safe to develop	An obsolete system with no future development
G: SCM	Vendor communication system	Safe to develop	No major updates
H: Compass:	Customer relationship management platform	N/A	N/A
J: VST	Order handling visualisation tool	Safe to develop	Visualisation tool for data in the server can be bypassed if necessary, by directly accessing data in the server
T: IBM notes	Collaborative software	No development	Obsolete but still in use for lack of alternatives, or inertia

The limit in the software for RPA development is development cycles. For example, if the user interface (UI) is changed, a developer must update the robot to understand the changes, depending on the application. The developer should avoid this when possible, by considering a native software solution to update in tandem. At present, software used instead of an RPA will be discussed. The organisation's limitations affecting the software updating is known; the information is in internal documents.

Another detail that the table implies is that all-important and most used software is frequently updated and developed, making it hard to find an operative task where an RPA would make sense, as the greatest impact would occur there.

4.2.3 Work Roles

Another critical element is reviewing existing tasks. As Meinel and Leifer (2019) explain, the current hierarchy affects decision-making, and understanding each stakeholder function helps with the proposal-building, especially concerning morale and interactions that the automation could cause (Lacity & Willcocks, 2016). Table 4 provides an overview of work-role responsibilities, what software they use, and their interactions in the company.

Figure 6 below illustrates the organisation in the scope of this study. Notes regarding external sales show that the role uses the same tools as internal sales. Still, they are part of another organisation within the company, raising considerations regarding logistics, and they are not part of the interview process.

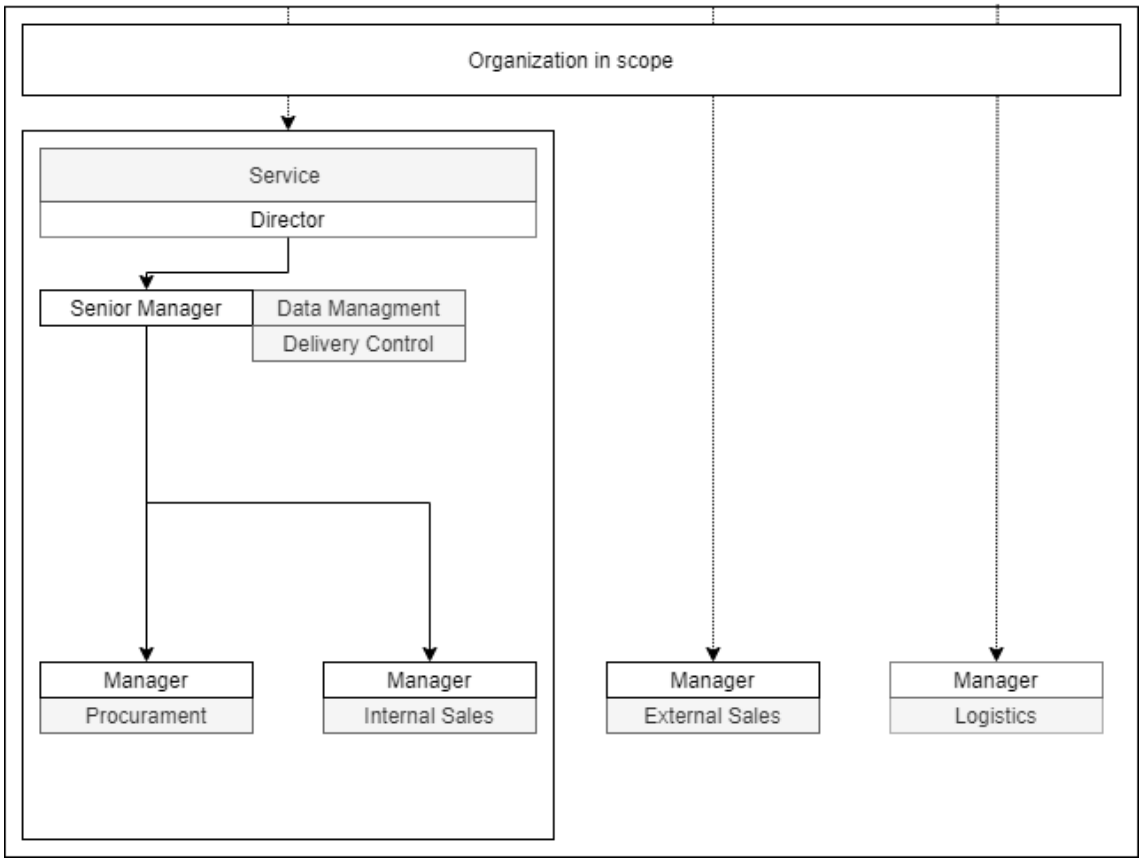


Figure 6. Organisation table

Figure 6 above presents the primary organisation as a service-performance organisation. The Director leading the organisation is ultimately responsible for the budget allocated for this project. A Senior Manager is responsible for Data Management and Delivery Control and supervises the managers for Procurement and Internal Sales.

Outside of this organisation is external sales under the Europe, Middle East and Asia (EMEA) organisation, which shares processes and responsibilities with service, so they were included in the scope. Last is Logistics; they do not participate in this research but should be considered when finding improvements.

Table 4 shows each work role and its representative tools:

Table 4. Work role table, the signs of the letters in Tools are in harmonized with the previous table

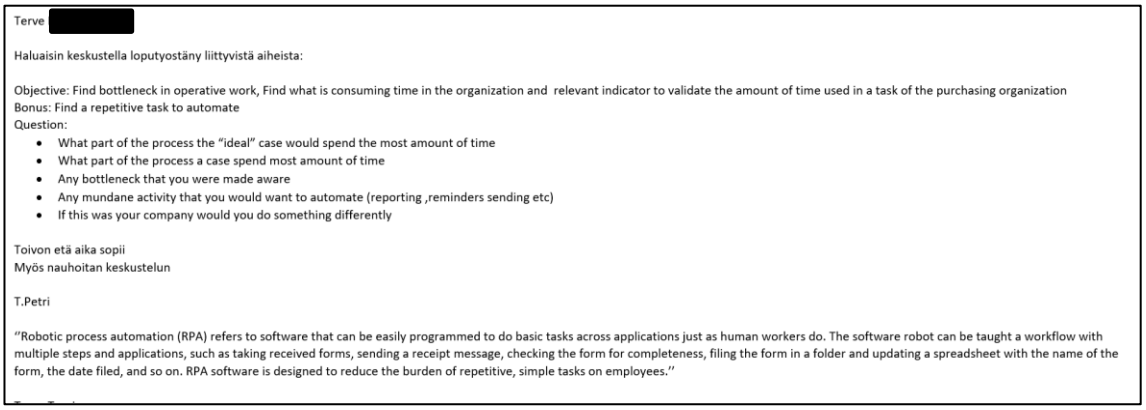
WORK ROLES	AMOUNT OF PERSONNEL	TOOLS
PROCUREMENT	Large	A,C,G,E,D
SALES EXTERNAL	Large	A,B,C,E
SALES INTERNAL	Medium	A,B,C,E
ITEM	Low	A,C,E
DELIVERY CONTROL	Low	G,E,D

SUMMARY: A = PDM,B = SALESFORCE (CRM),C = CRM INTERNAL,D = EMAIL,E = NEW ERP,F = LEGACY ERP,G = SCM,H = COMPASS,J = VST AND T = IBM NOTES

Table 4 shows the software that each specialist uses in daily work. Its purpose is to help measure impact of automating one task in the software that creates building blocks for further automation.

4.2.4 Interview Results

The semistructured interview questions appear in Figures 7 and 8, with examples of the questions sent to the management. The researcher recorded the interview for ease of access later. Using MicrosoftTeams software, interviews averaged 30 minutes.



Terve [redacted]

Haluaisin keskustella loputyostäny liittyvistä aiheista:

Objective: Find bottleneck in operative work, Find what is consuming time in the organization and relevant indicator to validate the amount of time used in a task of the purchasing organization
Bonus: Find a repetitive task to automate
Question:

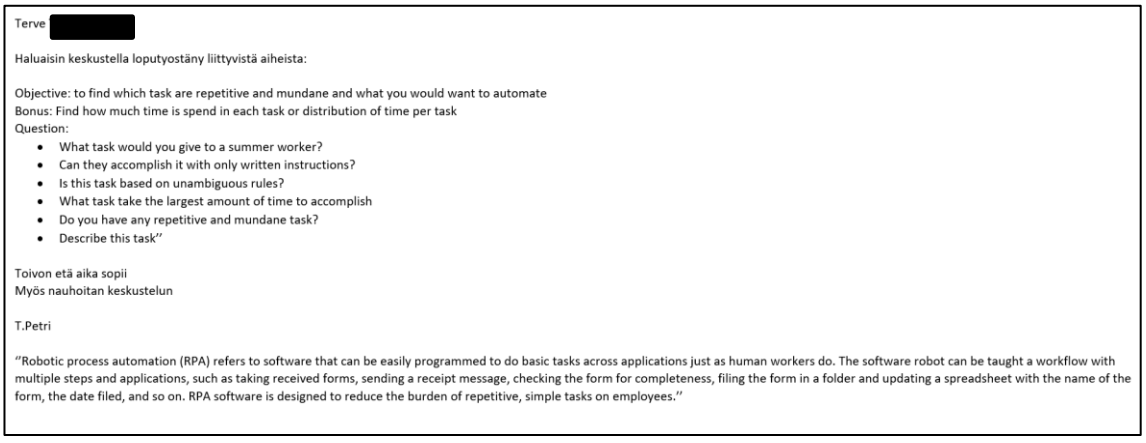
- What part of the process the "ideal" case would spend the most amount of time
- What part of the process a case spend most amount of time
- Any bottleneck that you were made aware
- Any mundane activity that you would want to automate (reporting ,reminders sending etc)
- If this was your company would you do something differently

Toivon että aika sopii
Myös nauhoitan keskustelun

T.Petri

"Robotic process automation (RPA) refers to software that can be easily programmed to do basic tasks across applications just as human workers do. The software robot can be taught a workflow with multiple steps and applications, such as taking received forms, sending a receipt message, checking the form for completeness, filing the form in a folder and updating a spreadsheet with the name of the form, the date filed, and so on. RPA software is designed to reduce the burden of repetitive, simple tasks on employees."

Figure 7. An example of a manager questionnaire email



Terve [redacted]

Haluaisin keskustella loputyostäny liittyvistä aiheista:

Objective: to find which task are repetitive and mundane and what you would want to automate
Bonus: Find how much time is spend in each task or distribution of time per task
Question:

- What task would you give to a summer worker?
- Can they accomplish it with only written instructions?
- Is this task based on unambiguous rules?
- What task take the largest amount of time to accomplish
- Do you have any repetitive and mundane task?
- Describe this task"

Toivon että aika sopii
Myös nauhoitan keskustelun

T.Petri

"Robotic process automation (RPA) refers to software that can be easily programmed to do basic tasks across applications just as human workers do. The software robot can be taught a workflow with multiple steps and applications, such as taking received forms, sending a receipt message, checking the form for completeness, filing the form in a folder and updating a spreadsheet with the name of the form, the date filed, and so on. RPA software is designed to reduce the burden of repetitive, simple tasks on employees."

Figure 8. An example of an operational specialist questionnaire email

The interviewee had some time to prepare for the questionnaire, receiving the email shortly beforehand. The 'operational specialist' was selected based on the manager's recommendation during or after the interview.

A summary of the interview findings appears in Table 5 below. It was an open discussion prepared according to the method described by Alshenqeeti (2014), namely, a one-on-one interview with time to prepare and flexibility (considering the limits of the study's small scale and bias such as optimism and previous relations). The interview is an adaptation of the questions on function and content by Dilmegani, (2017) based on the everyday use of RPA to facilitate SMEs and Management idea-building. It starts with a question regarding a summer worker, to generate discussion and informality in introducing the topic. Though the question was covered in some form, the subject had significant freedom in answering, as the objective was to generate a discussion about daily work difficulties and what is dull or could use improvement, to relieve any need to impress the interviewer.

Table 5. Summary of the interview results

Work roles	Improvement Ideas	Problems	Workload
Procurement	Automatic reminders that existed in the previous ERP should be created	Too much time used in computing info to new ERP	Higher than usual since the adoption of the new ERP
Sales External	Not to create extra reminders for this role	ERP is too slow	Higher than usual since the adoption of the new ERP and hard to trust the info provided by the ERP
Sales Internal	No reminders are necessary	ERP is too slow	Same as before
Item	Automate task, such as computing info into new ERP	ERP is too slow	High
Delivery control	Automated existing processes	New role hard to compare	Much manual work that should be easily automated
Manager	Better monitoring tools	Unreliable data	N/A

Table 5 shows an opportunity to develop new tools to help improve operative worker morale and performance and enhance the new ERP system and related processes.

This interview also created an opening for a task that they thought possible (Laurent et al., 2015). The case organisation is in the initial stage of its journey, there is no need to look further than the initial suggestion of the SME. The interview also provided further understanding of stakeholders' morale and practical concerns (Meinel & Leifer, 2019).

4.3 Selecting one sample task for further development

As explained above, besides the demand for the service, it is also necessary to find the technical viability and impact of the automation proposal.

Besides the best practice the seller provided, this sorting considers criticism from the literature that the seller does not explore, such as negatively influencing the improvement of the existing IT tool, by considering the difficulty/time of implementing changes in this software and assigning points at which to compare the difficulty in implementing changes.

Table 6 shows ranked difficulties of implementing modifications, based on the interviews, from the easiest to the five most difficult. The table provides a guideline for deciding whether to use an external programme or implement the change natively (Davenport, 2019):

Table 6. Software implementation difficulty ranked.

Software	Implementation Difficulty ranking	Note
PDM	3	Restricted implementation possible if a good enough business case is provided
LN	4	New programme large backlog of implementation
STREAM	1	Easiest to implement changes as they are developed internally
SALESFORCE	2	Easy to implement, changes are implemented externally (though a vendor)
BAAN*	5	Obsolete, further development not possible

The rest of the decision-making process follows the literature's best practices by assigning values to each element, explained in Table 7 below:

Table 7. Element validation table

Element	Validation method	Accuracy
Rule-based	User Instruction and Interview	High
Programme used	User Instruction	High
User hour saved	Can be found from the result of the interview or by simulating the task	Low
System Complexity	Quantities of software the system has	High
Stable	How often the system changes in a period	Medium
Volume	Interview	Medium
Human error	Interview	Medium

Using this element makes it possible to check the degree of complexity of the task and evaluate what should be implemented. The objective is to select a process within the

organisation; all items have their accuracy estimated, as Laurent et al. (2015) explains, driven by the need to understand the viability from a technical perspective. In this case, we use parameters recommended by Taulli (2020). However, both agree that very complex ideas do not appear at this stage as this is typically a joining of existing automation projects for synergy.

However, as Table 7 shows, some elements are close to guesswork—when used to decide, the result resembles low accuracy, and the product is not as meaningful as desired. The number of interviews did not provide enough data points to give accurate answers. Still, product viability can be accurately predicted with the available information.

This task researcher defined new work roles to aid the development, the text of which appears below. These reflect best practices the vendor suggested but are common in the RPA industry. Similar roles appear in Taulli's (2020) and Tripathi's (2018) recommendations.

Table 8. Implementation roles table

Roles in the Implementation	Role	Current Position
RPA Developer	Develop the RPA process	External Consultant
IT Specialist	Responsible for providing IT-related technical request	Internal Consultant
Operational Specialist	Provide operational information	Selected operational specialist
Manager	Decision-making	Existing Managers
Implementation Owner	Responsible for the implementation	Researcher
Developer	Responsible for the development of other programming solutions for the process	Researcher

The RPA developer is the selected individual from the RPA vendor, though the contract could suggest that the entire vendor company was to perform this role.

The IT specialist was the IT department's representative, to supervise all the RPA development in the company. IT is a part of another organisation and has taken on the role of champion for RPA development. It has implemented many such processes successfully, though primarily for the finance part of the company.

In this case, the operational specialist will be one of the people handling Delivery Control (shown later), the process selected to be partly automated, with responsibility for confirming the process final work product as intended and providing information about the process if needed.

The implementation owner is responsible for the process implementation and handling process modifications.

The developer in the implementation stage becomes apparent when a solution other than RPA is more cost-efficient. The necessity of this role becomes evident as the exploration of other solutions becomes necessary.

The manager is responsible for the approval of the funding of the project and its supervision. These roles are only relevant after the management accepts the decision to start developing an RPA process, thus, irrelevant here until chapter 6.

4.3.1 Process Proposals

As the interview indicated, there are three types of proposals: automating an existing task, partially automating an existing task and facilitating existing functions with a new process. The last option is the least feasible, as facilitating processes do not exist and must be invented second-hand. A complete automation process becomes too complicated for automating an easy task. However, these can be divided into smaller projects for future improvement, and possibilities parallel development for faster deployment, to estimate the person-hours used in each process. Questions arose during the interview about the time consumed in each task, so speculations were necessary; regarding their validity, the answer is difficult to prove with such a sample size (Alshenqeeti, 2014).

Assuming that each task's time in each lesson can be difficult to determine, the researcher estimated by performing a small simulation of each task. The impact would be

related to the number of users directly affected by this process, the improvements in the process's quality and the saving in personal hours.

As a task performed by all would be felt in the organisation and more visible, the time consumed is another aspect of value; this should be a visible time saver for the user in question.

Solutions that the researcher found in the initial stage of the investigation before applying pre-selections, in which a task did not meet Laurent et al., (2015) 'easy implementation' standards, were excluded; other processes were further analysed (see Table 9 below). This table adapts the information provided in the document 'Overall Summary Quick Scan Tool' from DigitalWorkforce, (n.d.). The document bases its report on experiments with the software, interviews and instructions.

Table 9. Possible automation projects with a summary of properties

Process	Process Description	Impact	Viability	Direct Beneficiaries	Software used
Process 1	Item Price Update from quote to LN	15	13	Procurement, Sales All and Item	4
Process 2	LN Master Data Standard correction	10	14	All	2
Process 3	LN Sales Order completion check (Subcontract/Manufacturer)	14	13	Sales All and Delivery control	3
Process 4	Sales Order Creation from PDFs	13	14	Sales Internal	2
Process 5	VAL Item and ODI item with history automatic quotation request from stream	11	8	Procurement	3
Process 6	SalesForce Thank you note remover	3	3	Sales all	1
Process 7	Delivery Follow Up Process Automation - Internal Elements	12	9	Sales, Procurement and Delivery	5
Process 8	Automated Repair item creation	3	14	Procurement	2
Process 9	VAL item price update from online supplier shop	11	8	Procurement	2
Process 10	Automatic price-book update from quote	3	14	Procurement	2

The SME and Management proposed the above processes during the interviews.

Proposal viability was accessed before initial process selections in the next section, based on the parameters discussed earlier. Some processes can be discarded by simple deductions and do not need deeper involvement from the SME, as the processes are not mature enough to be considered rule-based or do not provide enough benefit to consider development.

The interviewed subject provided information about the process's estimated time, its benefit, the programme used for it, and how long it has been used. This information was used to calculate the process feasibility with the estimation tool the vendor provided.

4.3.2 Initial Processes Suitable for Automation

Based on the calculations and vendors' recommendations, the item was excluded if it did not satisfy viability or impact categories. The selected example had its process logic drawn out, as this chapter shows. Furthermore, the research uses it for a more descriptive presentation.

The processes in this section were all viable, but their impact was accessed in a later stage, with more extensive scrutiny by Management and selected specialists.

Elements of the current process were adapted or removed, based on whether automation was possible. Exploration of initial promising proposals appears in the items below.

a) Process 1. Item price update

Item price maintenance from quotes is part of procurement processes and includes maintaining the current supplier prices in the new ERP system. Procurement personnel updated the price manually to complete the process. Procurement receives information in various ways, such as by phone or email, but Internal SCM is the most interesting for automation, as it is in a standard format and the most used in terms of occurrences.

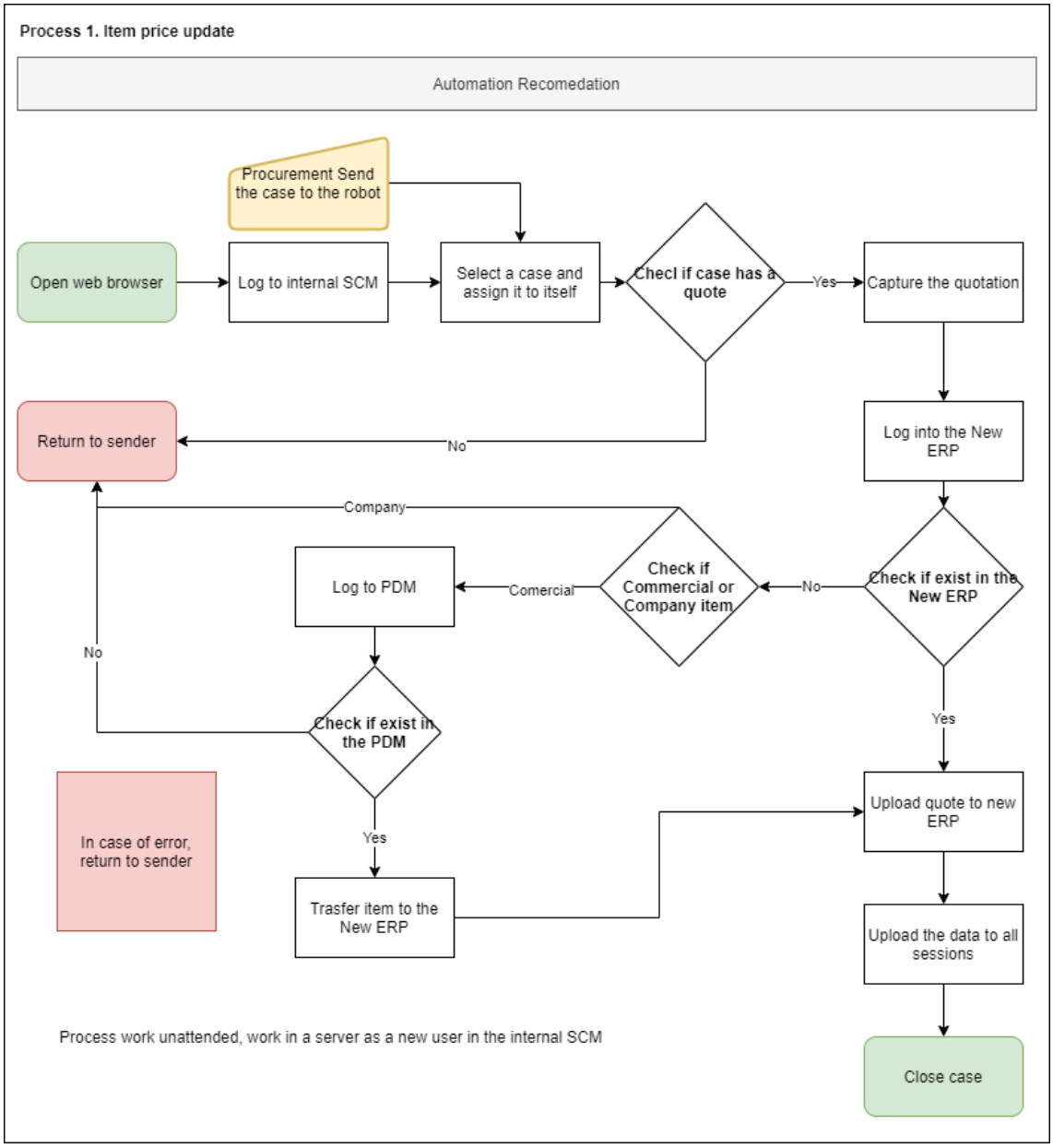


Figure 9. Process 1. Item price update

The automatic update of price in the ERP system from PDF quotes seems like a tedious, simple task that would free time for the procurement personnel to work on other tasks. However, it also provided more outstanding data quality. Its effect would benefit all individuals in procurement and data management, making it the ideal process to automate.

Automation addresses the slowness of the ERP; it would bypass the use of the software by the user and remove one step in the maintenance of quotations. Furthermore, it should speed up other users of the new ERP; instead of several dozen users updating the ERP, only one would be operating it.

The process addresses a problem in the simple task of transferring information from one system to another. Both buyer and item specialist use a disproportionate amount of time, as this does not create much value for the company or the user. Automation would free the user for more value-added tasks of their function. Therefore, this was an exemplary process for automation by its simplicity, and the stakeholders it would affect demanded it (Meinel & Leifer, 2019).

Nevertheless, it was rejected in favour of substituting one of the systems and changing the process. Still, the organization should revisit it if the new system cannot automate the process.

b) Process 2. Data Correction

The Master Data Specialist irregularly cleans the current ERP of data maintained incorrectly, by downloading all the data in a specific session. Comparing it against the data standard, the correction is manually made and then uploaded into the ERP.

The value of this process is difficult to calculate. Still, incorrectly maintained data in the ERP will make some deliveries or other methods perform poorly or affect other processes.

In principle, automating this process is straightforward, simple data processing. First, it is checked and compared to existing data, the standard correction is made, then it is uploaded back to the ERP. In its interview, Data Management wanted to check the product, as an error in this process could stop all case-company functioning worldwide.

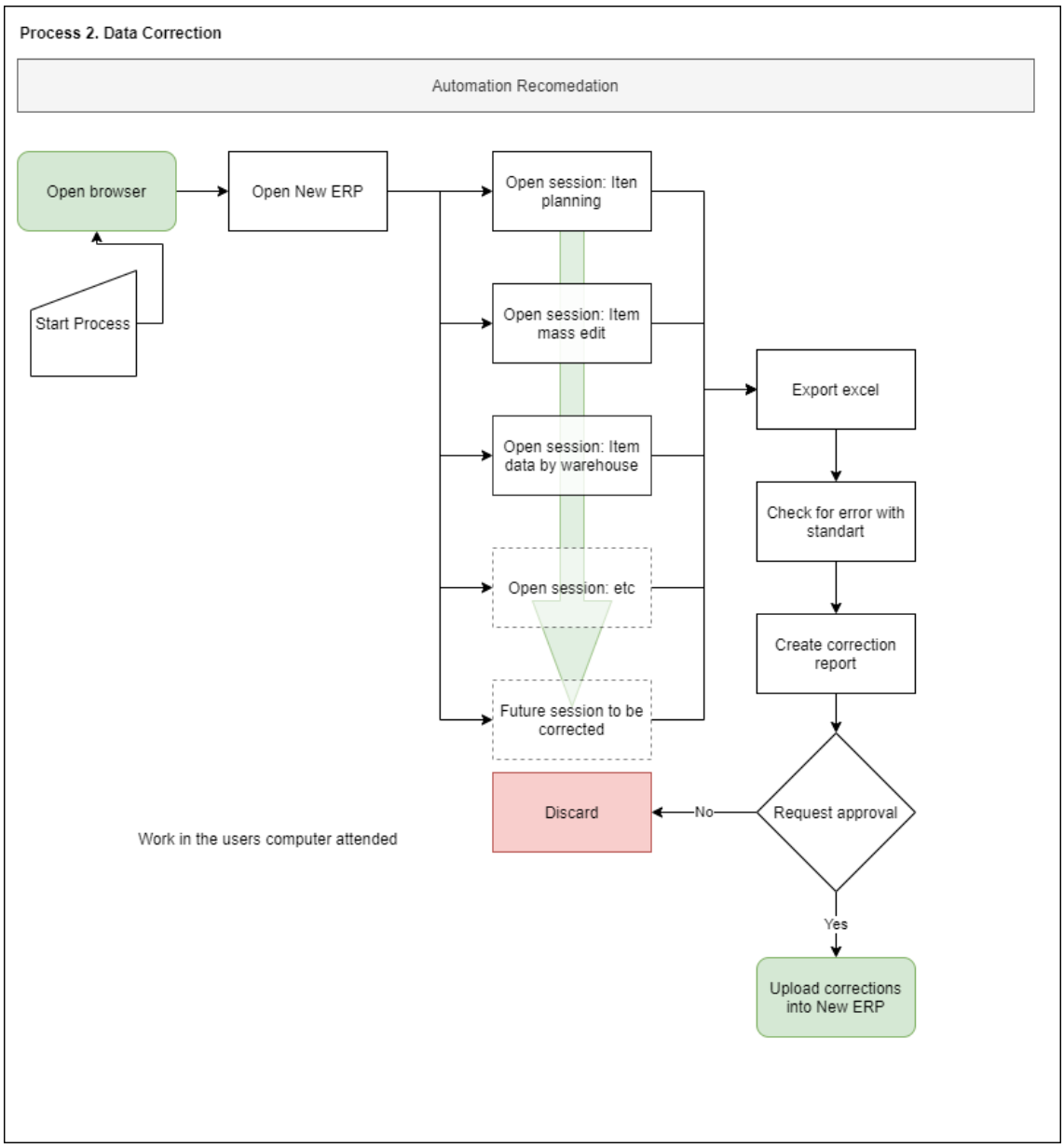


Figure 10. Process 2. Data Correction

The Data Management team must maintain a standard in the ERP for it to function. Incomplete data in the ERP may cause the non-creation of a purchase order or a manufacture prompt, creating a significant problem for the salesperson responsible to the client. Automation would be a quality solution to this issue and would result in better morale as it increases trust in the system. This process is commonly automated (Dilmegani, 2017), for it is a rule-bound process, and after the SME creates the initial rules, the SME performing the process does not increase its value.

c) Process 5. Automatic quotation request

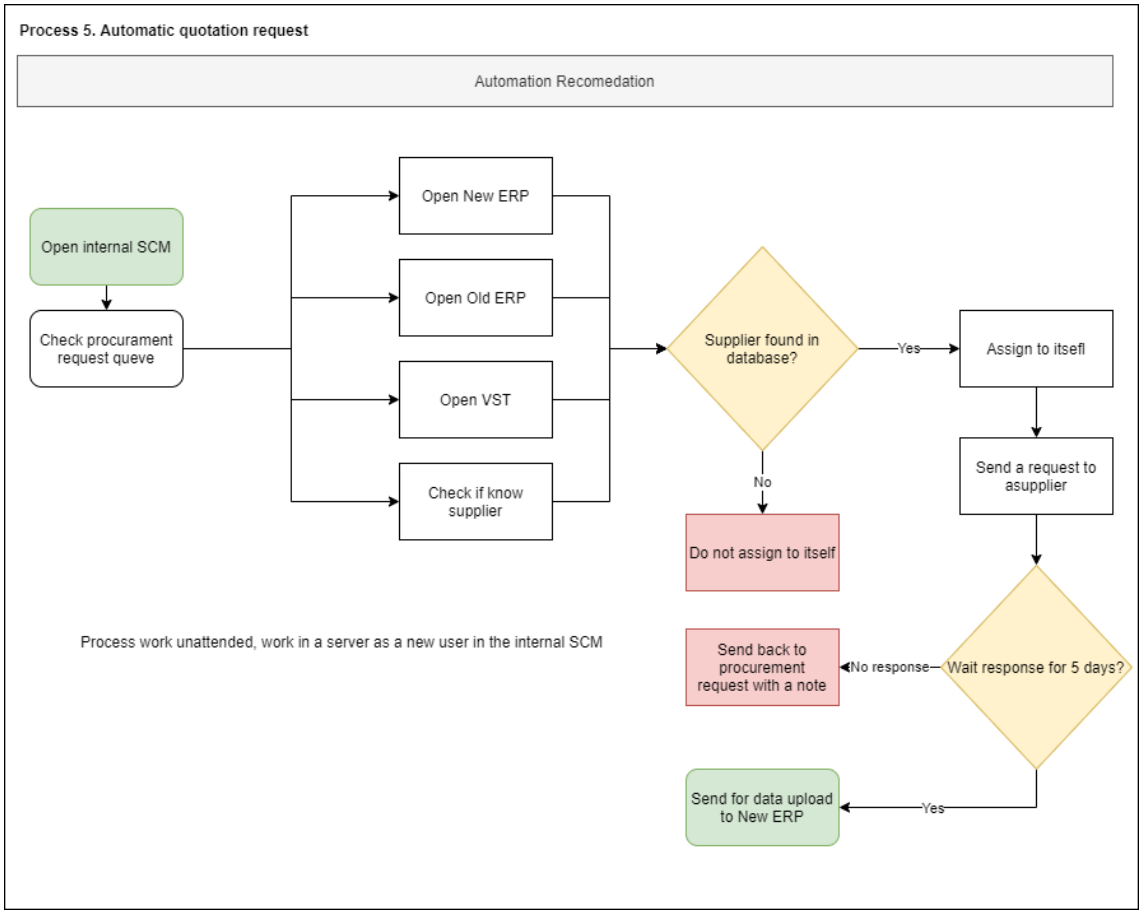


Figure 11. Process 5. Automatic quotation request

As needed, automation automatically sends the supplier a request, based on standards, quotation history and other rules. Thus, its development would create the possibility of expediting the commercial product's procurement process.

This poses the possibility for an increment in automation in time, with the addition of better rules of selection. It is also an RPA solution; developing other programmes to perform the same task would be more expensive. It is primarily an interaction between several programmes, to make a decision.

The process poses the possibility of extensive scalability, but estimating its impact is difficult, due to its not being a fully developed process. Still, it would alleviate work pressure for several users, though not significantly. This automation would improve the KPI by reducing the workload of the buyers on this front.

d) Process 7. Delivery follow-up process automation

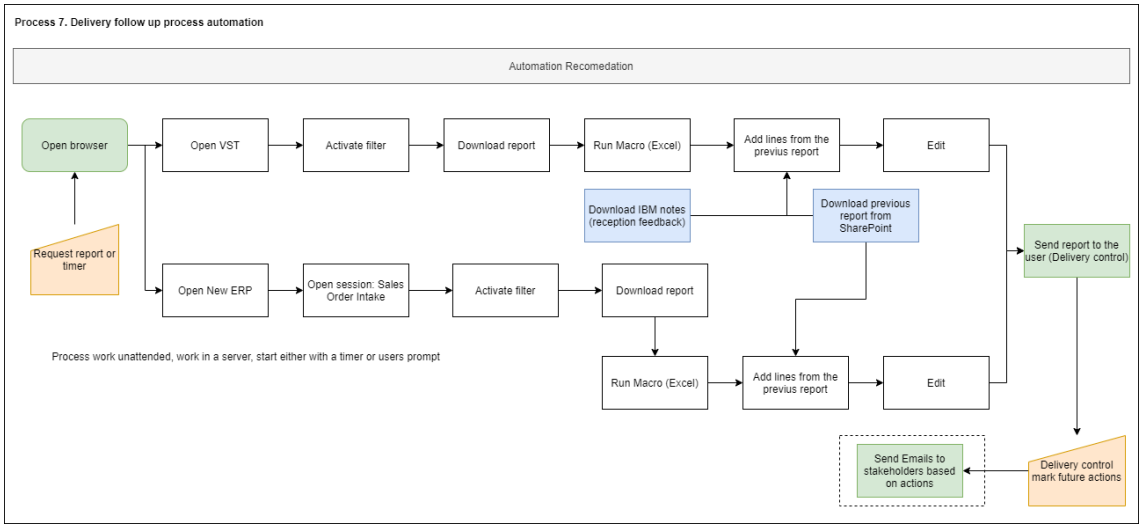


Figure 12. Process 7. The current diagram of the Delivery follow-up process.

This process creates a report regarding order fulfilment, based on the data found in various systems, such as VST, New ERP, IBM Notes; then, it informs the relevant stakeholders of items with critical statuses.

Compilation of data and informing its stakeholders is a task for which RPA is usually used, and the example improves a new and not-yet-developed process. Though it uses various programmes negatively, the RPA provides existing clear, unambiguous rules for automation. Moreover, it can be divided into smaller tasks if necessary. As with Proposal 2, although this follows the rules the SME created, the SME performing the task does not provide additional benefit.

The researcher used the workshop with Management to select the final item based on the closer alignment with its designs and future organisational development. The next chapter will discuss the result further.

4.3.3 Cost Considerations

During the preparation of the previous session, it became clear that any process required considering the average labour cost in the case-company industry. The business justification of any of these processes is easy, as workforce cost is high compared to this

solution (Valmet Oyj, 2019). The average saving per employee is between 40 and 60 thousand euros per year (Moring, n.d.).

The tools for creating a business proposal as Chui et al. (2015) recommend—by the labour cost—make possible calculating the payback time for automated processes. Of course, the calculation will change depending on the industry and location, but in this context, it is safe to assume saving the development cost of between 40 to 60 thousand euros per person-year, an acceptable estimate for the case organisation.

The final business proposal should take the cost of deploying RPA into account, including the cost of project management from the company in question, maintenance cost and cost of training personnel to operate the system, plus the cost of creating the documents. As discussed, automation should achieve a two-year payback time for the project to be considered viable in most circumstances, given the average rate at which the operating systems are updated (Taulli, 2020).

The price of development and comparison to a full-time worker's cost makes this concern almost secondary. For example, even a very complex robot would have a payback time of fewer than two years, to save a one-year initial comparative cost estimation, as Figures 13 and 14 show.

This estimation agrees with the existing literature regarding RPA, presented previously, and the researcher notes that this is an estimate. Still, the final quotation was provided and is close to the estimate. The final proposal discusses this.

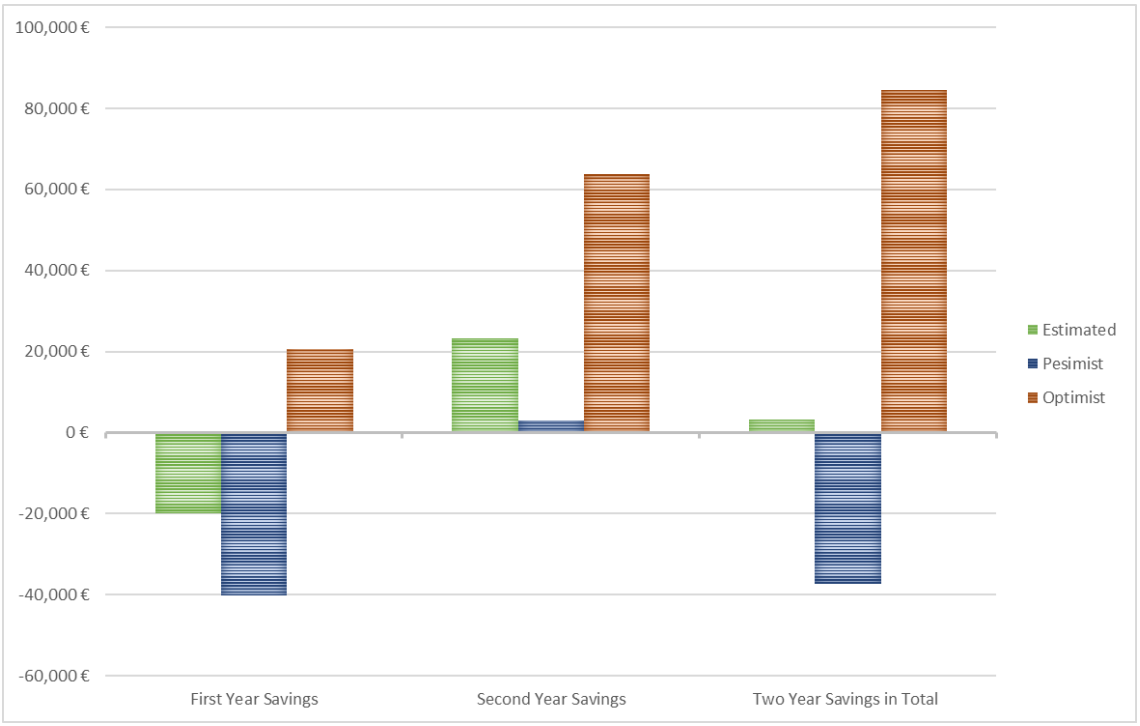


Figure 13. Cost comparison table and person-hours assuming 40 thousand euros a year labour cost

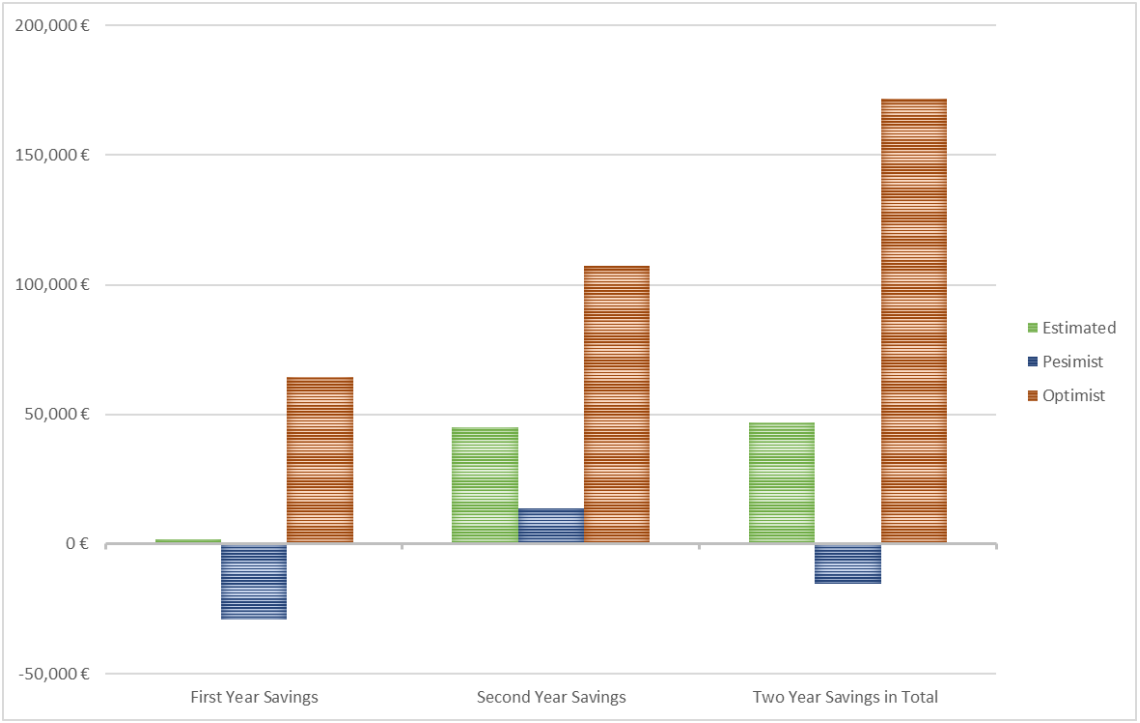


Figure 14. Cost comparison table and person-hours assuming 60 thousand euros a year labour cost

Metropolia

As shown above, relative to the cost of a human user, automation is easy for the organisation to justify, for even a complex robot that can save one person-year equivalent of work. This estimate corresponds with previous studies on the subject. Of course, in real cases, the actual limit is how much capital is available for development projects, and the possibility of cost overruns and other failures. Another element that implementers should not ignore is the difficulty of estimating the actual saving in person-hours for a task.

A consequence of this, shown in a survey by Chui et al. (2015), is that as worker wage does not predict automation potential, it is easier to justify on financial grounds the automation of high-earning workers' tasks as complex automation becomes tenable.

Cost is specific to the agreement with the vendor, and guidelines are attempted here. Still, realistically, they are context-specific; different vendors pose different pricing styles. In this context, the company acquires the entire process, and maintenance has a service fee (Taulli, 2020).

4.4 Summary of Automation Potential and Selected Work Task

The findings show that the biggest limitans are the programme's development cycle, as it affects what is sensible to develop. For example, the cost of a very complex robot may prove prohibitive, but implementing a medium or straightforward process would always be sensible, as long as it is possible.

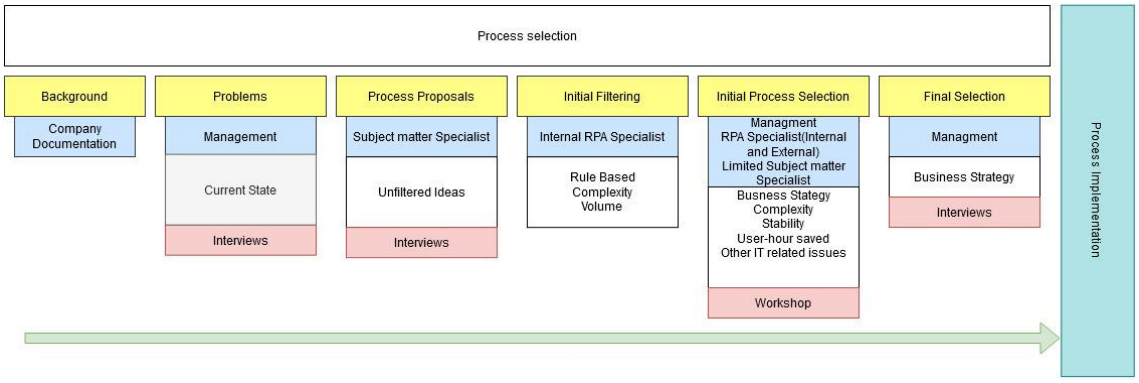


Figure 15. Process selection process

Nevertheless, the fast development cycles will stop most robots' viability as they would not function for more than a year. Considering the development times of 3 to 12 months before deployment, this would not make sense.

As the company is updating most software, existing communication issues should be solved after its implementation.

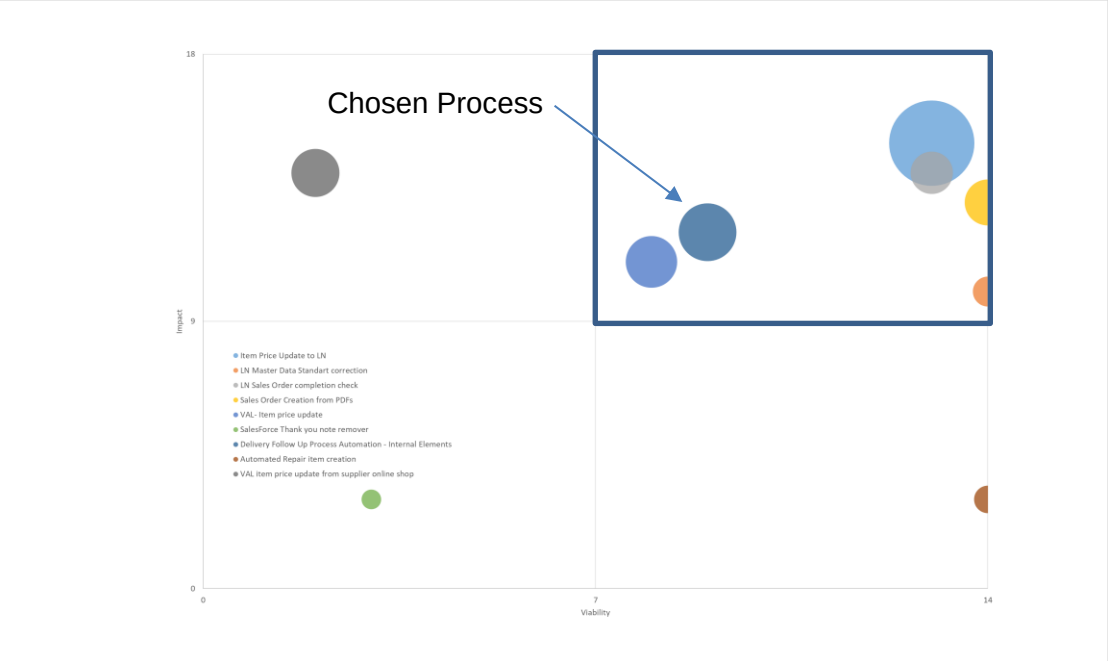


Figure 16. Summary of the task in the final selection process.

The committee excluded the other items for reasons explored in the previous chapter. Though they are not always permanent, they can develop after addressing some significant issues. As the figure above shows, all items in the second quadrant indicated by blue are valid circle size and demonstrate savings in person-years.

Based on the information we could acquire at this stage, we could remove items based on their viability for RPA. However, as chapter this chapter explains, criteria for the selection were presented to the management and the SME. The need to find agreement with the leadership (Lacity & Willcocks, 2016) and the SME is why such selection is now harmonised with all stakeholders concerning the proposal's success.

During the selection stage, the committee participants provided additional information about the maturity and development cycle and future development, which excluded some projects that would not be viable or had low guarantees.

The delivery-control robot is the most aligned with the management strategy and most viable of the valid options presented. Therefore, those proceeded, with document creation related to its process function and a more exact estimation of its work cost and viability, according to the standard that Taulli (2020) sets.

4.5 Key Findings from Starting Analysis

The most pressing issues are the fast development of new tools, making the life of existing software inside the company relatively short; when software matures, its substitute is explored. In some cases, this schedule limits the possibility of RPA.

The considerations above are also affected by the secrecy concerning what will be implemented next. The organisation this study explores does not know when the case company will substitute the software.

Also, when the process matures, the software already is at its limit of development, and inferring that a substitute is in the early development phase is possible.

Cost is usually an issue, but their business case can be easily justified, at least on capital grounds, because the cost of labour is high compared to development cost.

Lacking the desired organisational impact justifies its development as the closest to being entirely finalised in one automating process. Thus, scaling the robot for sister organisations with relative ease is possible. The leadership views scalability favourably and would be on the side of the implementer, to get more resources in the future for the process (Chui et al., 2015), as well as the possibility of the SME increasing its effective addressing of concern about substituting automation (Hjorth & Sturesson, 2019).

The reasons to follow this method are as follows.

First, as the previous chapter shows, the task meets the requirement that an RPA implementation will be possible.

Second, this has the highest chance of existing in a stable environment through another process that might live in such an environment. The organisation cannot certify this to the same extent as the chosen process, as it wholly owns this process.

5 A Proposal for Automating a Selected Work-task

Based on the viability and stability of the process, automating Delivery Control was chosen. It presented the area most unlikely to be disrupted by other organisations or ongoing development, and running it cost enough human resources to justify further development of the proposal.

5.1 Overview of this Data Stage

Based on management's suggestion, this part of the organisation (Delivery Control) was in the most dire need of optimising its task and proving itself useful, by increasing quality improvement in the whole organisation.

Other considerations are that other processes do receive updates from outside the organisation, but the chosen process is wholly dependent on the organisation (Srivastava, 2017), so there is no concern regarding environmental stability.

Based on the above, the proposal begins with the description of the selected task, Followed by a discussion of the viability of removed elements and how the concerns of the stakeholders are accounted for during this stage, followed by the tentative implementation proposal, finalizing the chapter with guidelines for further automation within the company using experience acquired so far that provides the logic for further automation creation.

5.2 Automation of Selected Task

The complete delivery process is too complicated to be automated immediately, so the researcher divided the process into three distinct steps: macro automation, data distribution and automatic email. As the last step, automatic email needs human input; this process is not fully automated. However, it will cut most human interactions, two of which

the developers can develop in parallel, as the email handling and the rest do not depend on each other.

Using interviews and recording the process, the researcher created a document to help with the cost estimations. Small process descriptions appear below, and a complete version can be found in the PDD.

The automated process creates sales orders (SO) and purchase-order (PO) reports from the ERP, VST and reports that the logistic unit has written.

Essentially, they are two distinct reports (PO and SO) that the user divides into sections for a more effortless user experience. They also must reference the old report uploaded to the server, so the operator can know what has been done about the item in question.

Below, a process flow chart for the robot, based on how a human user interacts with the process as recommended in the software developer's literature, is created (Taulli, 2020; Tripathi, 2018).

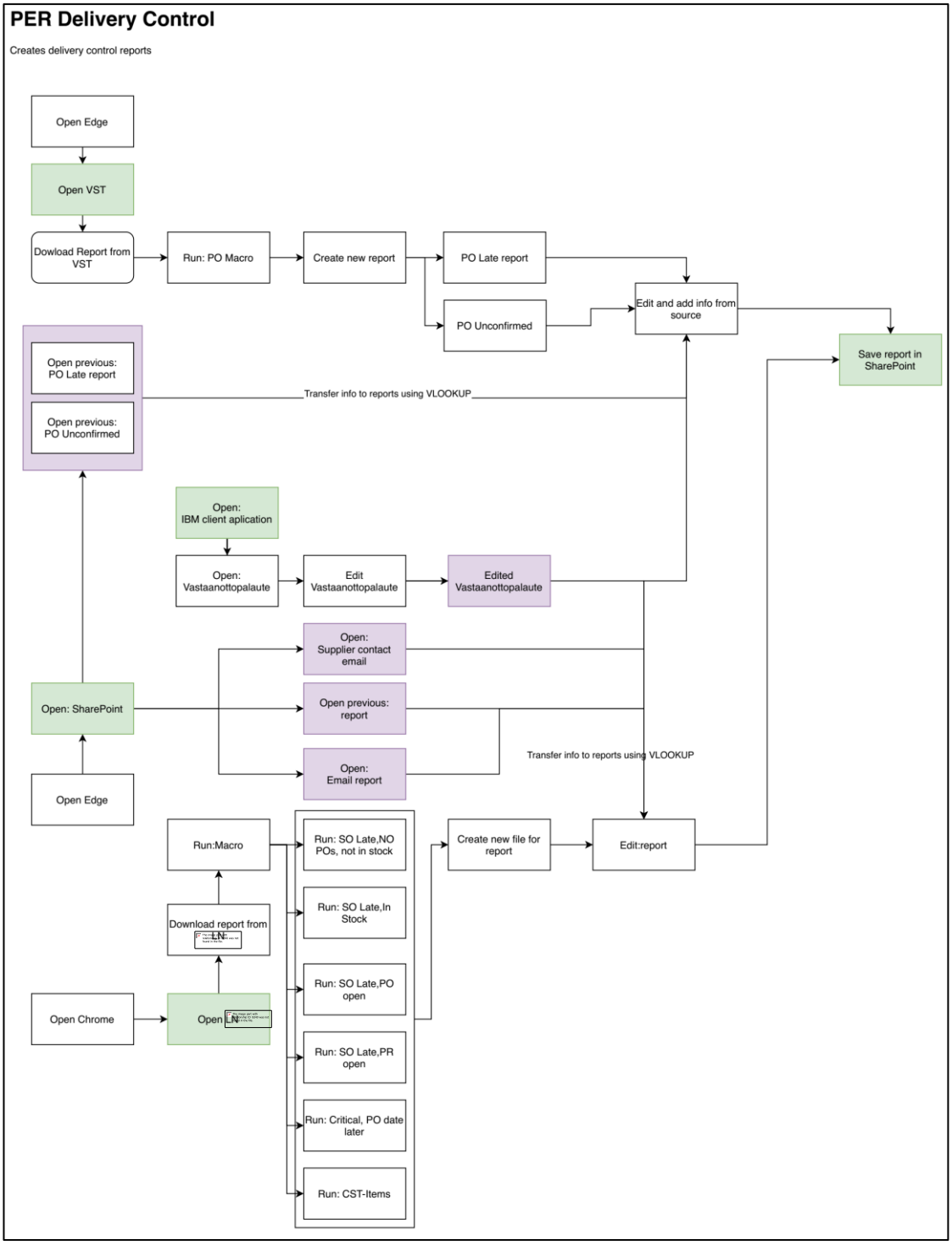


Figure 17. Selected process logic revised detail.

The proposal removed the automatic email from the process to save time. However, the management should consider its development when resources are again available; it is a straightforward task to automate.

Creating the PDD file proved that some unaccounted-for step in the initial stage had created additional complexity that the researcher did not initially note during the interview with the Delivery specialist.

The researcher accomplished the PDD through multiple step-by-step interview/recording sessions, and the user's manual was adapted to suit the PDD design as the chosen supplier required. In addition, the document was reviewed not only by the supplier but by the area specialist, as Taulli (2020) recommends.

The implementer's other problems in integrating macros in the robot for service level description (SLD) reasons increased complexity; therefore, prices rose by more than 50% for development that the researcher had not considered during the initial stage. For RPA internal and external specialists, the issue was not insignificant. The desire was to automate the macros using the UI path, to transfer the whole responsibility of maintaining the process to the vendor. This arrangement would increase the cost but, in theory, would provide safety, according to the vendor. The management rejected this.

For Management, the issues are that the cost of development for a pure RPA solution is high, with limited possibility of control. In addition, its unique characteristic can create exciting problems, such as changing the background colour or resolution of an application, that will cause the robot to fail.

The solution streamlined the RPA to the absolute minimum. Most data already exist in a form that standard tools can access and simple Visual Basic for Applications (VBA) programming and native Excel tools can automate. So, instead, the robot focuses on an element that these tools cannot accomplish and automatically gets data from the ERP. This solution is in line with the recommendation from Davenport (2019) to avoid using RPA when not necessary, as other tools might be more effective.

The operational expert confirmed other inputs related to the time-saving aspect of this automation. The different selection committee members deemed these inputs acceptable, so they were used during the research and in the management's revised business proposal, to accept the request for funds. With the future time this proposal will save, the leadership should transfer extra resources to create quality service within Delivery Control. This input also permits the SME to further validate the proposal. The inputs from the stakeholders are described on Table 10 below:

Table 10. Key stakeholder suggestions for building the proposal.

#	*Element*	*Issue*	*Description*
1	Viability	Software development	Pricing manager and Master Data specialist A particular aspect of the new ERP is being revised; this would affect the element regarding data update Affected process:
		Risk	From Master Data Specialist Mass editing of all data should be performed at such a high level of scrutiny and reliability because of the possibility of catastrophic failure
		Software development	Senior Manager and Pricing Manager Current CRM will be updated shortly. Future development should not proceed currently Affected process:
		Responsibility	Clarify which organization is responsible for the maintenance
		Failure	From Senior Manager There was some reservation from Management, especially concerning using automation with the new ERP
2	Strategy	Business proposal	From Senior Manager It is easier to justify the development of a new process if we can explain the removal of personnel
3	Impact/Strategy	Business proposal	From Senior Manager: Delivery control is an area where investment provides quick return and positive feedback as we had the data from the short period when this element was not working
4	Impact	Scalability	There is a real possibility that this solution should be adapted to other organizations. Is this a real possibility

Based on future expansion plans, the management wants greater scalability and modularity with the reports if ‘Delivery follow up’ must be replicated in sister organisations soon. This organisation will start operating more similarly as the main one starts using the new ERP system. If the proposed solution could address this issue, it would be a more attractive option to finance. The future beneficiary of the automation does want the removal of this task from her work role.

The management sees the complete automation of one person-year, saving time in small increments from several operators, as difficult to measure in practice. However, on the other hand, there is a desire to show fast improvement of one task, so the organisation savings could quickly justify the capital investment.

The examples the vendor gave and their extrapolation show that as its stands, this project would not be ready for next year’s reporting period, so the vendor should shorten development time or divide the task using internal resources.

If the RPA uses existing systems, how can the vendor maintain the automation fully? The PDD should specify the internal systems maintenance personnel, and the document should clearly define their roles, to avoid future problems.

5.3 Tentative Implementation Proposal

This section will describe how the researcher implemented the RPA hybrid solution and the steps taken towards these solutions.

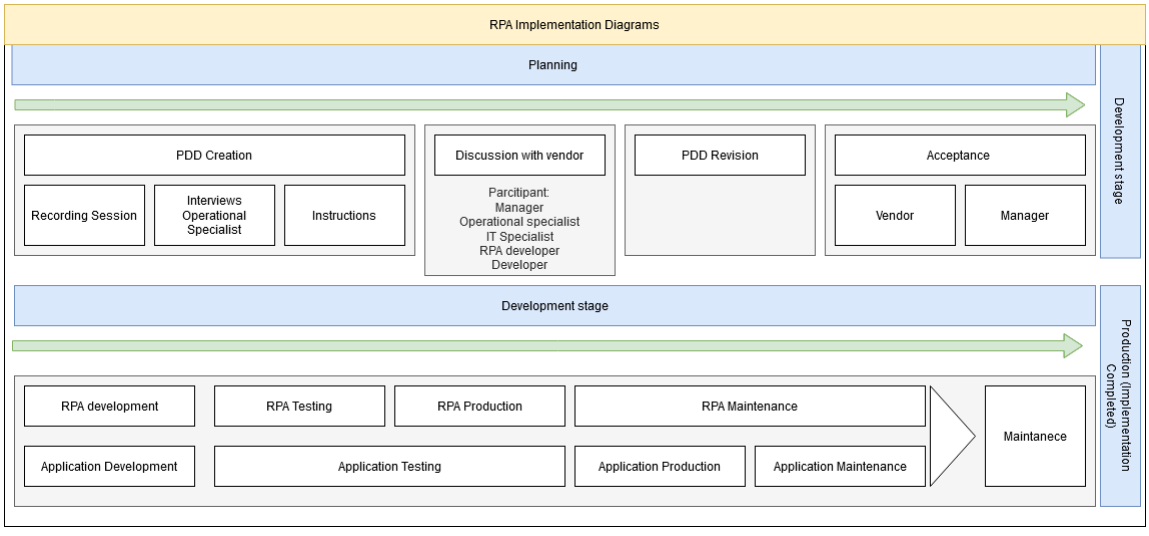


Figure 18. Explanation of implementation steps

Per established best practice, the creations follow the confirmation that the project will go forward.

Figure 18 show the steps used in the Planning stage where the PDD is the first step; this involves the description of the task as it now and how it should work in the future and all relevant documentation for the operation to work such as relevant databases, exception handling, process design and relevant contact persons. The vendor is informed of the desired output and can comment on how the developer should implement this, and the document is revised to take into account the vendor concern, then all the parties have an opportunity to accept or reject the project.

The development stage involves the developer creating the product, a testing phase in an isolated environment, and a production stage where the developer tests in the production environment and later monitor the product in maintenance before leaving development handling the product maintenance to the next operator.

5.4 Guidelines for Other Work Tasks

Based on the difficulties in implementing the demo project, is it possible to give an internal guideline on what can be implemented inside the organisation rapidly and what step needs implementation beforehand (Taulli, 2020)? Using the lesson of a small implementation, it is possible to predict the effect of a larger one and find the roadblock for the developer to clear.

Defining the element that needs improvement mainly depends on the case organisation's financial limitation. The initial automation should be evident to its intended audience, so the strategy will be of greater importance than other aspects in making it easier to approve future processes. This element is in line with the observation from Meinel and Leifer (2019), who see this as a limitation of hierarchical organisations in practice processes that need leadership harmonisation.

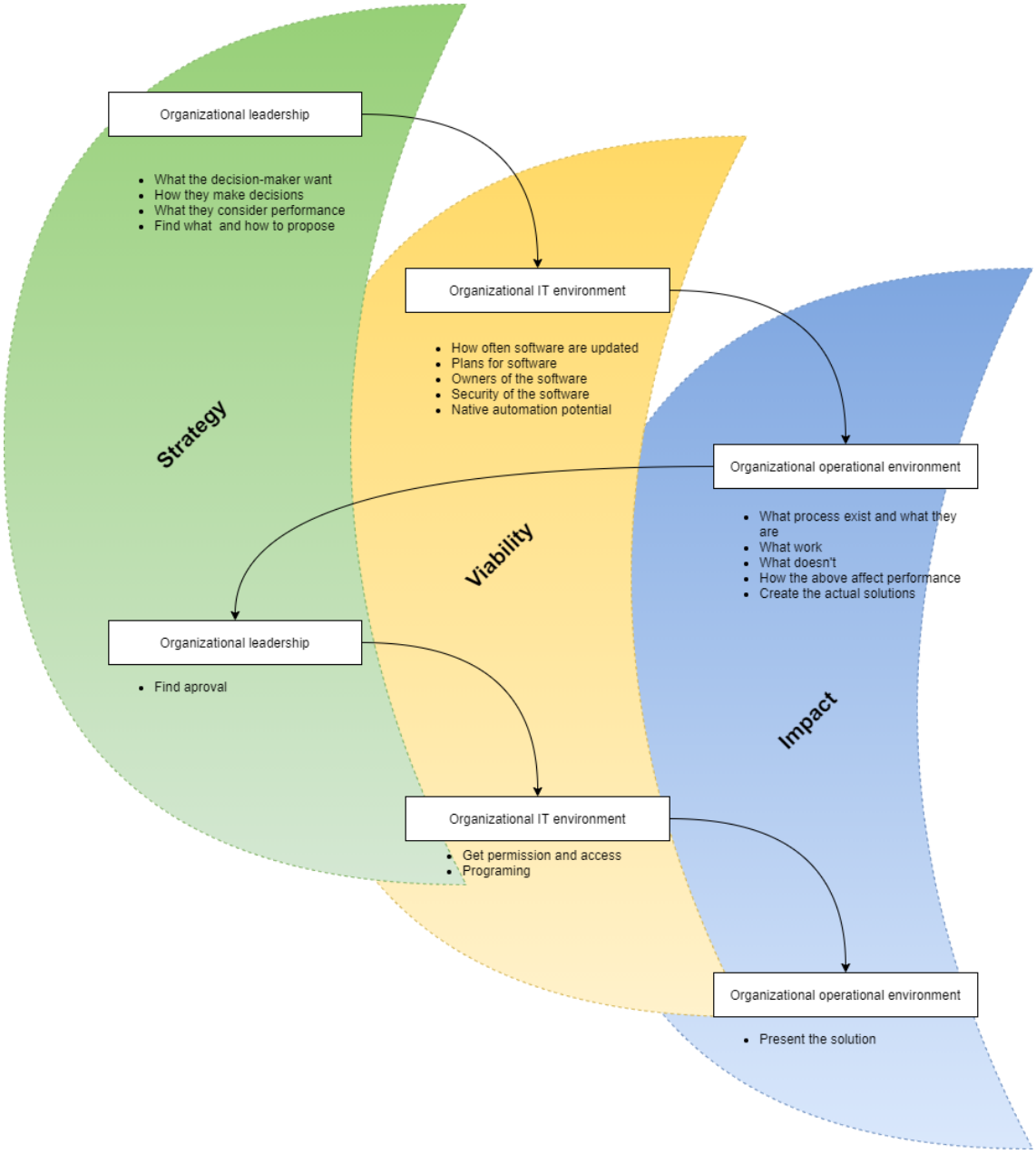


Table 11. Guideline for fast implementation framework

Suppose we see the leadership as the individuals authorised to make decisions concerning the development, whose performance depends on the organisation's performance in this context. In that case, they are most relevant to the strategy.

In practice, the need to match automation with the objective of the leadership is essential. It is the most crucial aspect, as this is a value proposal, for which some form of capital will be used for the automation creation. Understanding what the leadership considers

value is essential for quick implementation. It is also necessary to know the limits regarding what the organisation in question is allowed to develop.

IT should be consulted; neither leadership nor operational workers necessarily understand the software aspect outside of its functional context. Viability can offer the best access with the information these individuals provide, for such aspects as software updates, the possibility of native automation and the software security necessities. This must be done to find proper ownership of the process. Either SME or IT (Edlich & Sohoni, 2017) is preferred, when possible, to have an SME who can improve the process more effectively since IT initially possesses only mechanical skills.

The proposal should consider all the individuals and organisations that do not perform operational work but exist to support the software's function. Nevertheless, they should be available to explain the system infrastructure to the SME, so they understand the tools used, not just perform them in a black box (Edlich & Sohoni, 2017).

In this way, understanding the limits of the organisation where the task is done is possible, and it is easier to present realistic options to the operative workers on how automation can solve their problems. Then, the organisation can assess the actual impact on the operational worker, and the developer can use its problems to create solutions.

Depending on the adoption of automation, many potential tasks can be automated under first analyse present attractive value-proposal. Still, the longer the automation process takes, the more challenging finding further gains will be (Srivastava, 2017). The initial step is usually easier to find and implement, but more significant benefits are found when automation is a normal part of the process design.

6 Validation of the Proposal and Demonstration Project

The developer created a short two-part demo project, one RPA, the other using Excel and VBA / Microsoft Visual Basic Scripting Edition (VBS), in the simulated environment the company provided. The chapters hereafter cover the Implementation Stage, dealing with the framework demonstration and validation.

Validating the proposal's validity required knowing if RPA software could retrieve data from the new ERP, so the researcher automated the simple first step of the selected task internally, the results of which are discussed in later sections.

The workshop used a relatively complex case for automation; other options did not provide enough stability to develop a case. The chosen process was Delivery Control, which aligned with Management's immediate objective for measuring success easily.

The selected initial task was automated entirely using the vendor's RPA tools, but it was deemed too expensive, so other avenues were explored by dividing the task into sections based on function.

6.1 Overview of the Validation Stage

During the meeting, Management and end-users accepted the final proposal's acceptable schedule and cost. The researcher programmed a small demonstration to show how to accomplish this task and improve the final proposal.

The individual needed to develop the final proposal was the Delivery Control specialist, who used clear correspondence with the researcher to improve its PDD, so the vendor could provide an offer.

6.2 Findings of the Workshop

A workshop with Management, the selected specialist and the vendor was organised to further develop the selected process. The internal developer showed the interim demonstration to Management, to show that the New ERP works fine with RPA and that other solutions exist for automation. The result are presented in the Table 12 below:

Table 12. Last workshop summary

#	*Element*	*Issue*	*Description*
1	Viability	Failure	There was some reservation from Management, especially concerning using automation with the new ERP
		Documentation	From Delivery Control specialist Where detailed working instruction has recently been created
		Documentation	From vendor: “Is there documentation regarding the macro used in this process…” They would prefer to recreate the macro in UiPath rather than use the macro for maintenance reasons
2	Strategy	Business proposal	From Senior Manager “It is easier to justify the development of a new process if we can explain the removal of a worker from the process….”
3	Strategy/Viability	Uncertainty investment climate	From Senior Manager: As we are currently freezing new investment and hires because of the uncertain situation cost have to be drastically cut, though using our resources is still possible
4	Impact	New processes	From Delivery Control specialist We would like, if possible, to be able to create new reports and increase the number of reports created per week

Further changes addressed the workshop's findings to the tentative implementation proposal; in the next section discusses these changes.

6.3 Developments of the Proposal Based on Findings of Workshop and Demonstrator

Based on the new environment after the previous round of workshops, a new solution was developed by dividing the process into two parts, using idle internal labour to establish the automation. These distinguishing elements are part of the discussion in the following subsections; they serve as PoC for the selected automation (Taulli, 2020). In addition, the following two sections include a discussion of the PoC that is also part of Taulli's recommendation.

6.3.1 RPA Demonstration

To create a Proof of Concept for the RPA element, IT designed a server where this process would operate, and senior Management designated the responsibility to maintain this server.

To show that RPA was a reasonable solution, we had to extract data from the New ERP. This step demonstrated the possibility; all the other automated elements already had a practical demonstrator available. The developer could also demo IBM Notes, but it is not an essential part of the process. In case of failure, the developer could remove it. The element of the demonstrator is shown in Figure 19 below:

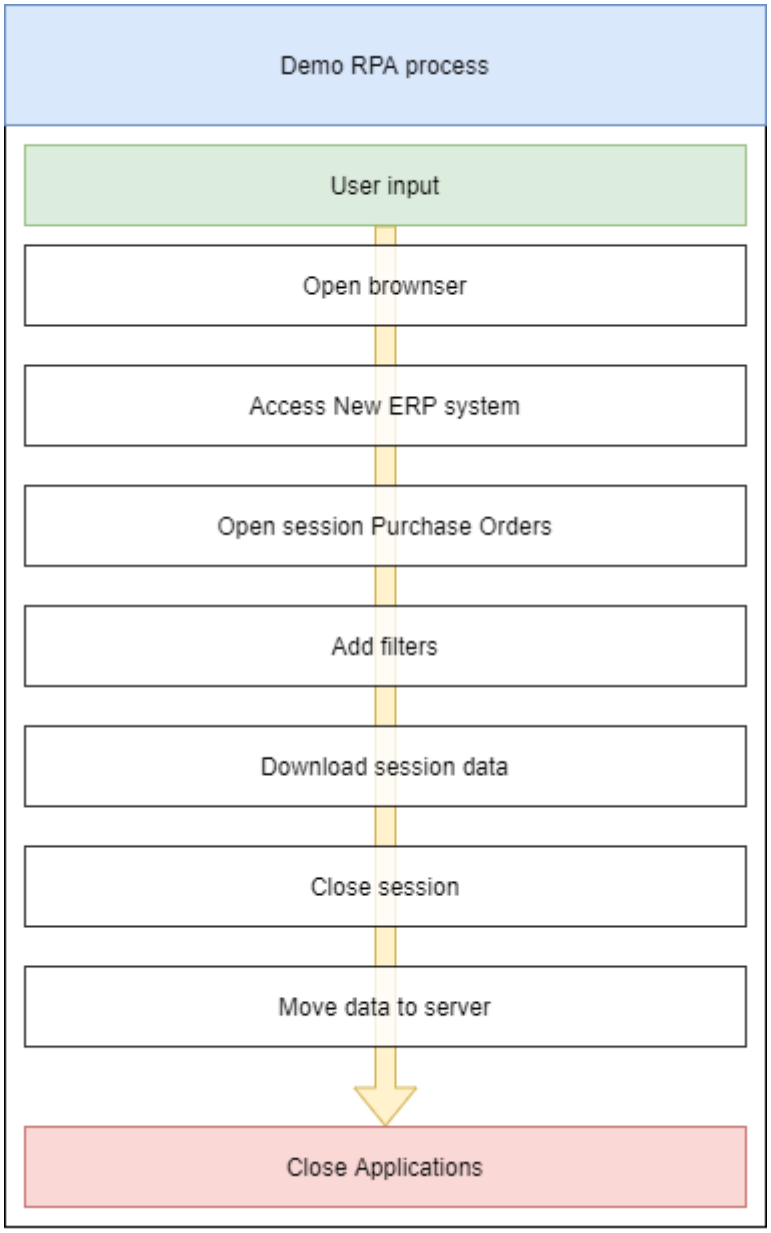


Figure 19. Summary of the demonstration RPA

After the researcher successfully deployed the RPA demo, it can be used in the final product, though in practice, vendors use their solution for this problem—the current arrangement does not permit sharing of RPA parts.

The developer tested the demo in the training environment of the new ERP, and in a closed server created for this task, the developer used the software UiPath orchestrator for the testing, according to instructions found in the manual (Tripathi, 2018).

6.3.2 Programming Demonstration

For internal development skill validation, a proof of concept was created for this part of the implementation, using existing processes to create one small part of the process to automate one report and any script that users can run reliably with data from the server. If successful, this step would also serve to scale the project for the other reports.

The result of this Power Query solution was satisfactory. However, it corrupted itself because of its server, which was not resolved but could be bypassed, by accessing backup files. Still, for the moment, full automation is not possible because the backup file needs manual access.

Figure 20 explains using this programming solution:

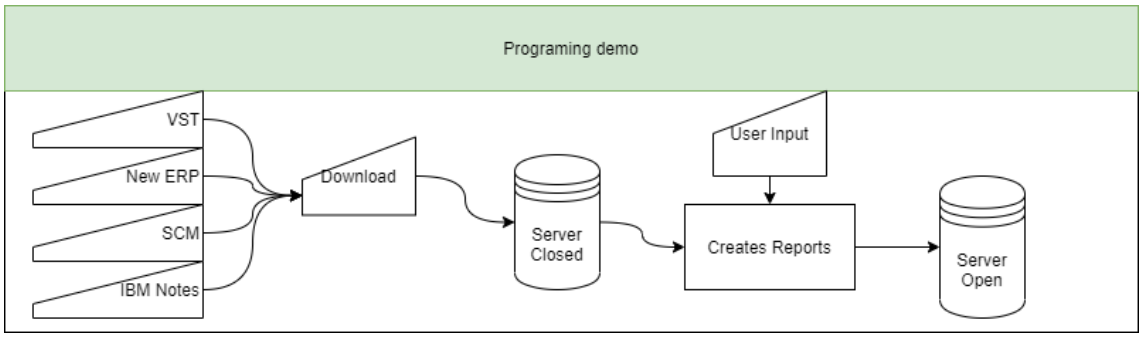


Figure 20. Summary of the programming demonstration

The programme did create the intended report. Therefore, the final proposal became several versions of the demo run concurrently. Without the RPA, several practical steps had to be taken manually for this solution to work. Still, the Delivery Control specialist deemed the end-product satisfactory; replicating the macro created the report faithfully.

6.4 Final Proposal

This section presents the final proposal for working automation, with lessons gathered during the demonstration creation and the stakeholders' concerns.

Implementation was divided into a three-part development plan. This section addresses the concern of the stakeholders, followed by an RPA plan addressing issues related to RPA and the vendor. Finally, internal development is proposed.

6.4.1 Development Plan

Further integrations of RPA tools can be attempted when new tools are available and mature, as future implementers can improve them. Based on stakeholder suggestions, we implemented the recommendations.

a) Cost Concerns

Drastic capital-investment reduction was possible, thanks to existing available resources and redesignation of the process. This option also allows the organisation access to the data for future developments. The future implementer should understand this to avoid solution redundancy; this information is made available internally.

b) Using existing solution

It was impossible to use the exact macros that lack clear ownership, created and maintained by one individual. However, its functions could be used in a new programming solution to facilitate future maintenance.

c) Responsibility distribution

RPA should only be attempted when the software is mature, even with short development times. For new software, its benefits are too limited for the time it would be working, resulting in resource bleeding unless the organisation can affect its development.

As with the demonstrator, the final proposal was divided into two sections, developed by the vendor and internally. With the vendor having full responsibility for RPA maintenance, the developer of the programming became the liaison between the case company and the vendor. The developer was also assigned as the process owner. Again, this concern follows guidelines in the conceptual framework (Edlich & Sohoni, 2017).

d) Viability concern

The demonstrator was used to address concerns regarding the viability of mainly internal development and, to a lesser degree, the RPA development (Taulli, 2020). Development also was used to justify the time it will take to develop solutions internally.

6.4.2 RPA Plan

Compared to the initial design, the RPA plan reduced its focus on providing data to the second part of the plan. In addition, all elements that could be automated using an internal and native solution were excluded from the RPA plan, limiting capital cost by over 80% and permitting the investment.

6.4.3 Programming Plan

The company performed this step internally. The plan could be developed in parallel as the end-product of the RPA part. It can be tested separately, but final testing requires that both parts be ready; this step addresses solution redundancy. As Davenport (2019) states, existing IT is used and consulted for this element as 'firms need employees' help to implement automation technologies'.

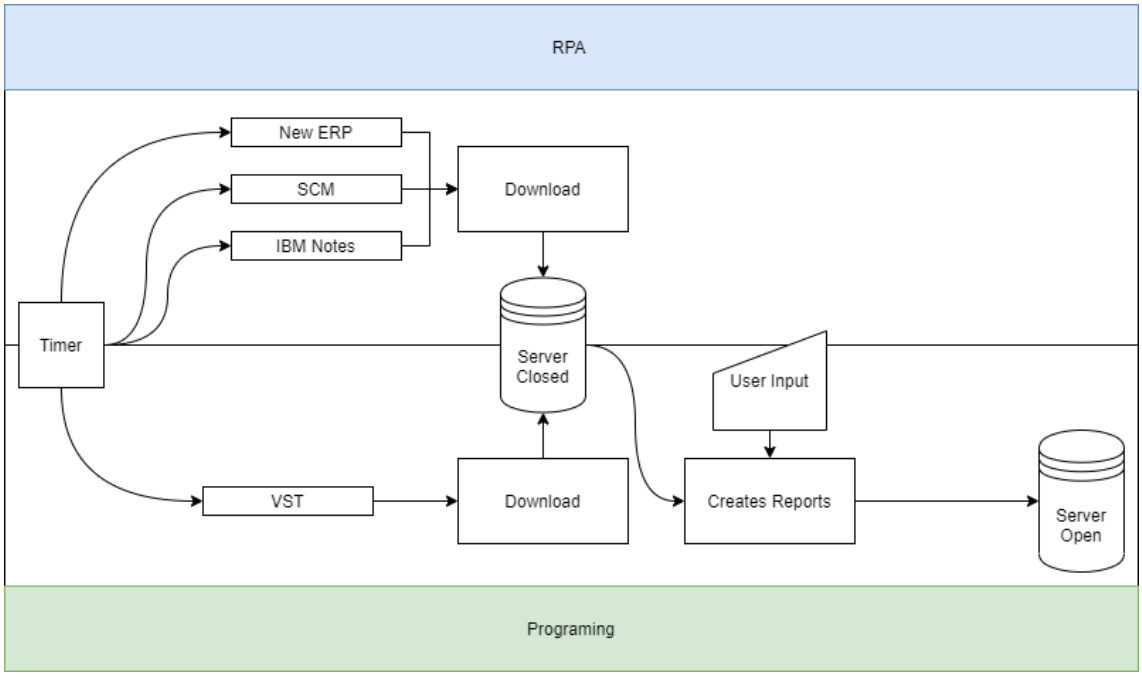


Figure 21. Simplified diagram of the final proposal

The task starts with a timer requesting downloading the content, as most of the warehouse work ends at midnight to get satisfactory data before starting work at seven. Therefore, the download happens during this period.

As the diagram in Figure 21 shows, the RPA mainly provides the data, but as VST supported a natively timed download to the server, that solution is used instead, saving cost. In addition, the download of the raw material is sent to a closed server so only selected people can modify it, making maintenance easier.

The end-product of the report is sent to a company SharePoint website, so all stakeholders can access it.

The only input from the user is to order the programme to create the report; because the data is only updated once a day, it makes no difference when this step is finalised.

This part was estimated to equal 40 hours of labour with an additional 10 hours of testing.

6.4.4 Proposal summary

The result of the final proposal is presented below in Figure 22:

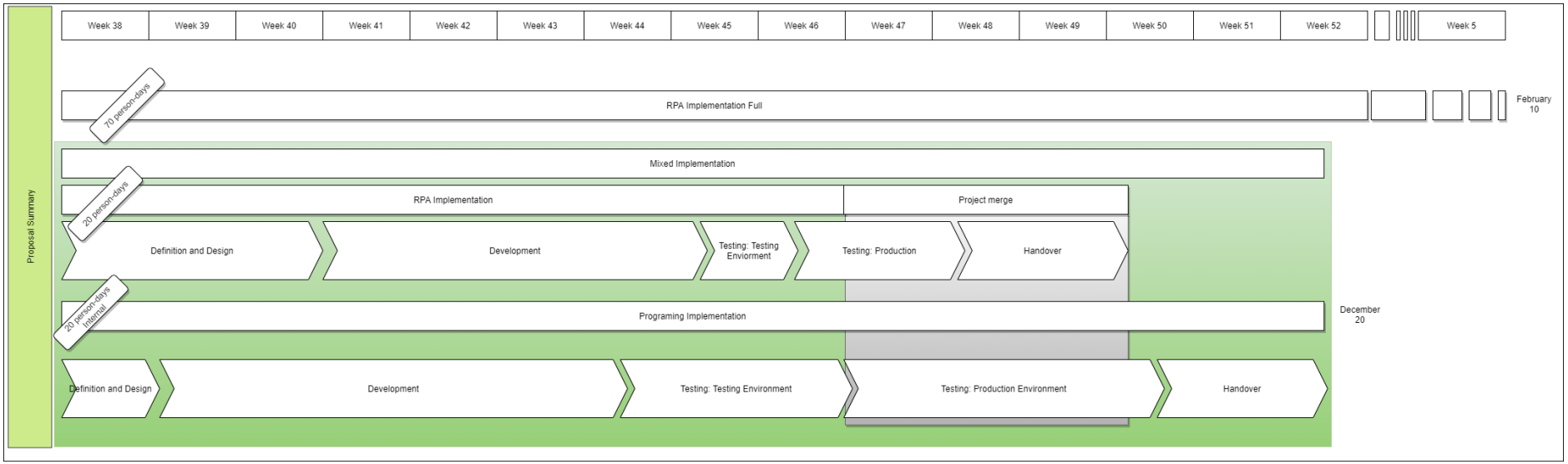


Figure 22. Summary of the Proposed Solution.

Metropolia

Management concern regarding schedule was handled by a parallel development proposal that saves time and uses internal resources. For comparison, Figure 22 presents a full RPA solution, showing its schedule and estimated cost in person-hours. It shows the reduction in person-hours by the new proposal, though the development of the programming section takes longer as its developer performs operative work during this process. Until the RPA implementation is in production, it cannot be tested thoroughly.

A similar summary was presented to the management for final decision-making. The case organisation accepted the proposal; the relevant stakeholder deemed that the proposal satisfactorily addressed its concerns regarding the initial attempt.

6.5 Recommendations for Future Automation

RPA currently used and distributed, represented as Robotic Step/Task automation, is not efficient in automating entire processes, especially in large organisations. Its real advantage would be in small or medium organisations without dedicated IT personnel.

Management should attempt better training or awareness of existing tools to create the possibility of further automation. For example, most report automation is possible with Excel's own automation, or other software's native automation and a databases.

A recommendation for immediate action would be a workshop that gives a simple task for operative workers to automate, just as an exercise in creativity. The workshop would open their minds to the possibility of RPA, costing one day of work and helping to start ground-up development of improvements.

6.5.1 Future Automation Recommendations for the Case Company

Based on the findings of this research, this section discusses the following process that the case organisation should automate.

The automation shows the so-called 'low hanging fruits' of the case organisation in 'Processes 1 and 5' if they were to be implemented by RPA. They complement each other—one finishes where the other starts, and both strategies have enough impact and strategic potential to reduce the procurement workload significantly.

Regarding some internal development, finalising the Delivery Control process with email should be the logical next step. Also, the case company can use existing tools for internal development of automating part of data quality, similar to the proposed ‘Process 2’.

6.5.2 Organisational Aspects

In practice, the company has assigned Financial IT as the RPA champion. This has resulted in finance-organisation gains, but diffusing these processes to other areas has been more difficult, due to a lack of familiarity with other organisations.

Local champions can address this situation, along with a tour of the concept and creating a more centralised group to handle assisting with the technical aspect of automation implementation, not just RPA. Furthermore, the new group would facilitate other organisations becoming part of this journey, according to best practices that Lacity and Willcocks (2016) discuss.

7 Discussion & Conclusion

This chapter summarises what this research accomplished and how it might affect the case organisation and beyond. It also explains the organisation's leadership wanting to partake in a similar journey. Finally, the research ends with an evaluation of quality and validity and the researcher’s closing statement.

7.1 Executive Summary

The objective of this thesis was to identify the automation potential of work tasks in the case context and propose how to automate a select work task.

The objective was accomplished by interviewing the subject matter expert in the organisation, concerning the process used in daily work, and accessing the viability of automation ideas with the help of RPA specialists and Management.

Though limited, the information available for research managed to provide a framework for finding the best process to automate, by looking at its viability, impact and, more importantly, strategic considerations.

Result:

Compared to acquiring more labourers, the cost considerations are very favourable for automation, and a low-complexity task can justify itself financially by a 0.2 person-year saving; a more complex task could yield a saving of one person-year.

Finding a suitable task by interviewing operative workers is a fast way to find ideas, but starting a culture of automation development is more important than concentrating on finding ideal cases; most will have positive outcomes for morale and fiscally.

RPA is an easy-to-implement tool. Still, most software the company uses has native automation potential not currently in full use. In addition, the primary software seller is implementing an RPA-like solution in its portfolio.

The result of the selected automation demonstrator was satisfactory, using more internal solutions than depending unnecessarily on an external vendor. RPA was used only in essential parts; in retrospect, limiting the use of RPA even further was possible.

The selected stakeholders deemed the selection process satisfactory; the selected process aligns with leadership's vision, and its business proposal was considered valid.

The automation satisfied the partial result, staying within its budget and performing its supposed task. Possible further development and expansion depend on maintaining current systems' use.

The implementation of this process allowed improved Delivery Control processes and creating a report to focus on other parts of the process in less time. Unfortunately, the cultural impact cannot yet be observed, but leadership desires to implement further automation, a desire the operative worker does not necessarily share.

7.2 Managerial Implications and Recommendations for Implementation

First, a larger organisation's management should explore the idea of hiring its RPA developer. As its programming is not as tricky as other tools, this developer could train some staff on RPA software. This addition would provide an organic flow of ideas and a simple robot while the RPA developer would help with implementations.

Second, company ownership of the robot library is the next step. Currently outsourced, the organisation does have the end-product and its documentation. Still, no library of RPA elements exists for this organisation (for example: open LN session item 360, would be a step needed for many automation but a third party will have to recreate it every time). This arrangement would facilitate the design of new processes and faster process changes.

Third, the operational worker could apply the RPA robot even on an individual level. If the promise is to implement the entire organisation, an inexperienced individual can implement a simple robot, but its reliability would need an experienced user's help.

Another alternative is creating a general automation group that would help implement the RPA solution and improve working knowledge of general automation with existing software. The workforce loses a significant amount of automation potential through ignorance of the tools available.

Better awareness of organisation IT and developer infrastructure is hard-to-find information for each software application. Understandably, IT experts cannot be burdened by answering common queries, but they should be available when possible.

Presenting the functionality of used software beyond its minimum enables a user to think of better processes than the current one. Lack of awareness of the capabilities hampers bottom-up development and wastes the average worker's potential for increased competence and programming literacy.

The next step could be the normalisation and availability of tools to automate individual work. The RPA lead could present introductory classes, and the company could provide some automation tools for everyone. Still, most of the personnel that could benefit from using it is unaware of it; normalising its use could lead to normalising comprehensive automation in the organisation.

7.3 Thesis Evaluation

The objective of this thesis was to identify the automation potential of work tasks in the case context and propose a way to automate a select work task. The case company has already applied some elements, though cultural changes and use of the guidelines are not yet observable.

The result was a proposal that the company accepted for financing; its development was complete and put into use. The objective included creating a demonstrator that would help the proposed solution, also accomplished.

The data collection and the contemporary situation increased workshop and interview challenges, thanks to the effects of the COVID-19 pandemic in 2020, which heavily increased the workload and lowered the interest in any long-term development and capital use. The criteria for evaluating the thesis are logic, relevance, reliability and validity.

7.3.1 Criteria 1 Logic

The element of logic moves directly from problem to solution. The text explores most of the concepts from the literature. A reader could take issue with a lack of exploration of the morale consequences that the thesis did not heavily explore. However, the main aspect, such as viability and impact, are explored. There could be more dedicated to the strategic aspect, considering the context of the test. The mechanical aspect is mentioned and used in the demonstrator but not explained in great detail, making the text too diffuse. This assessment follows the logic (University of Jyväskylä, 2021) that it should be considered reasonable.

7.3.2 Criteria 2 Relevance

The company was looking specifically to use RPA to automate a process. The case company financial organisation had successfully implemented this tool in the past; this research provided an opportunity to use RPA for a task but also to remind the case organisation of the significant amount of automation potential currently available to it.

This study provides a path for further automation and reminds the organisation that RPA is just a tool and not a solution; other options should be explored in further automation. Another favourable aspect is saving resources for further automation when the proper milestones are achieved.

7.3.3 Criteria 3 Reliability

The repeatability of this study is partially satisfactory regarding viability and strategy. Still, an element related to impact is difficult to replicate. The two aspects are not based on hard facts, such as FTE and person-hour savings; simulation of the processes was conducted under ideal conditions.

The low number of operative workers who participated in the proposal creation also affects it, but they did not provide useless data. On the contrary, there is good reason to think that all participants gave their information in good faith.

7.3.4 Criteria 4 Validity

According to Taylor (2013), validity requires clear performance criteria—in this case, the functionality of the automation and documentation of the argument—to arrive at a conclusion that the intended target can understand. Further, the audience can infer beyond the information presented in the text.

Using internal documents unavailable to the public is detrimental to the thesis, but there is no real solution. The text presents all the information that the researcher used to arrive at conclusions. Therefore, it could be called satisfactory, as the text shows why the organisation selected an item and why it ultimately accepted the final proposal.

7.4 Closing Words

The significant discovery made during this exploration was that automation in general, and especially RPA, should not be seen as a complex subject. Anyone can accomplish simple automation; the software available is user-friendly and an online community stands ready to help. These are just tools, no more complicated than making tables in Excel.

The demystification of automation should be one of the main tasks of younger members of the workforce. It will show rapid results and impress the more traditional element in an organisation. Therefore, software automation will be a trend that soon accelerates the simplification of automation.

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