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# Optimizing and Automating the Order Handling Process at Rockwool Finland Oy

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<p>The objective of the thesis was to create a proposal and action plan for optimizing and automating the order handling process at the case company. Every year the company handles more sales orders, so to keep up with the increasing workload, the company needs to either streamline and optimize the order handling process or to hire more employees to handle the orders. The business challenge of this thesis was to help the company to reduce repetitive manual tasks by implementing business process automation tools rather than hiring more people to handle the increased number of orders manually.</p> <p>The study was conducted using the case study research approach and used qualitative research methods, such as interviews, discussions, observation, and workshops. The research method was selected with the aim of analyzing the current process and developing it further in cooperation and with the help of input from the internal stakeholders. The data was collected in three phases, first, the current state analysis, second, the review of existing knowledge and best practice, and third, the proposal building and validation of the proposal. The proposal was built by merging the results of the current state analysis and the conceptual framework.</p> <p>The proposal was co-created with the key stakeholders, who provided their input and suggestions during a workshop and interviews. The data gathered from the stakeholders played an important role for the proposal building stage, to ensure a balanced proposal with multiple perspectives. The proposal building stage was a pilot phase, where the assumptions were tested in a real business environment with customers, where possible. For example, seven customers were contacted to initiate an EDI connection, three of them agreed to go ahead with the project. In addition, three customers were contacted to test the e-commerce platform E-Shop and those customers placed 1% of total orders via the online shop during the pilot phase. However, RPA was not possible to test during the pilot phase, instead practical steps were identified to start the RPA project in the future. Based on the findings from the pilot phase, steps to further implement each technology was summarized in concrete suggestions as the initial proposal.</p> <p>The final proposal was validated and approved by the key stakeholders by the end of this study. The final proposal includes the steps listed in the initial proposal and target dates, when steps should be finalized, so it can be used as an action plan to optimize and automate the order handling process at the case company by utilizing three methods, RPA, EDI, and e-commerce.</p>	
Keywords	Business process automation, robotic process automation, RPA, EDI, B2B e-commerce

## Contents

Glossary

List of Tables

List of Figures

1	Introduction	1
1.1	Business Context	1
1.2	Business Challenge, Objective and Outcome	2
1.3	Thesis Outline	2
2	Method and Material	4
2.1	Research Approach	4
2.2	Research Design	5
2.3	Data Collection and Analysis	6
3	Current State Analysis of the Order Handling Process	9
3.1	Overview of the Current State Analysis	9
3.2	Description of the Current Order Handling Process	9
3.3	Analysis and Key Findings from the Current State Analysis	12
3.4	Strengths and Weaknesses of the Current Order Handling Process	15
3.4.1	Selected Focus Areas	17
4	Existing Knowledge and Best Practice in Process Automation and Information Systems for Order Handling	19
4.1	Business Process Automation	19
4.2	Robotic Process Automation (RPA)	23
4.3	Electronic Data Interchange (EDI)	28
4.4	Electronic Sales Channels (E-Commerce)	32
4.5	Conceptual Framework	35
5	Building Proposal for Automating Order Handling Process at The Case Company	37
5.1	Overview of the Proposal Building Stage	37
5.2	Inputs for the Proposal Building and Stakeholder Suggestions	38
5.3	Proposal Draft / Initial Proposal	39
5.3.1	Robotic Process Automation (RPA) for Order Processing	40

5.3.2	Establish EDI Connection with More Customers	42
5.3.3	Utilize the ecommerce Platform	45
5.3.4	Summary of the initial proposal	47
6	Validation of the Proposal	49
6.1	Overview of the Validation Stage	49
6.2	Developments to the Proposal	49
6.2.1	Developments to Element 1 of the Initial Proposal	50
6.2.2	Developments to Elements 2 of the Initial Proposal	51
6.2.3	Developments to Elements 3 of the Initial Proposal	51
6.3	Final Proposal / Action Plan	53
7	Conclusion	55
7.1	Executive Summary	55
7.2	Thesis evaluation	57
7.3	Closing words	57
	References	1
	Appendices	
	Appendix 1. Current state analysis interview questions	
	Appendix 2. Roof project order confirmation example	

## **Glossary**

B2B	Business to Business
BPA	Business process automation
CS	Customer service
CSA	Current state analysis
CF	Conceptual framework
CRM	Customer relationship management
EC	Electronic commerce
EDI	Electronic Data Interchange
ERP	Enterprise Resource Planning
OPCO	Operating company
RPA	Robotic Process Automation
SAAS	Software as a service
SAP	Systems Applications and Products in Data Processing

## List of tables

Table 1. Details of Data collections 1-3 used in this study

Table 2. Internal documents used in the current state analysis, Data 1

Table 3. Strengths and weaknesses of the current order handling process

Table 4. Operating model decision checklist (Asatiani, Copeland, Penttinen, 2022)

Table 5. Key stakeholder suggestions (findings of Data 2) for Proposal building in relation to findings from the CSA (Data 1) and the Conceptual framework

Table 6. Master lists 1-3 of potential customers for automation

Table 7. Master list 4 – Potential EDI customers

Table 8. EDI project phases

Table 9. Action plan for EDI implementation

Table 10. Initial proposal

Table 11. Feedback to Element 1 – RPA

Table 12. Feedback to Element 2 – EDI

Table 13. Feedback to Element 3 – e-commerce

Table 14. Final proposal / Action Plan

## List of Figures

Figure 1. Research design of this study

Figure 2. Current process map of the order handling process

Figure 3. Selected focus areas on the process map

Figure 4. Digital strategy for B2B world (Lancry et. al. 2017).

Figure 5. EDI process (modified from Koskentalo, 2012)

Figure 6. Online Store Success model (Yoon & Kim 2009)

Figure 7. Conceptual framework for guiding the business process automation in a company

Figure 8. Electronic orders in the Nordic OPCOs

# 1 Introduction

Nowadays, companies must deal with many repetitive tasks and processes, involving multiple systems and technologies, which are performed manually by the employees. These repetitive operational tasks can take up a large portion of the employees' time and attention during the workday which could have been used on more creative, productive, and motivating tasks. At the same time, business and management practices show that creativity plays an important role in creating a competitive advantage for the organization. Thus, encouraging and fostering creativity is a strategic choice of most modern organizations today. Therefore, many companies have started automating some of the processes to leave more time for the employees to engage in creative and motivating tasks that will facilitate innovation in the organization and eventually help employees achieve better results and the company reach their business goals.

## 1.1 Business Context

ROCKWOOL is the world's leading mineral wool products manufacturer. The company transforms volcanic rock into stone wool, a versatile material that is used in building, transportation, horticulture, and water management industries. The company that was founded in 1909 is headquartered in Denmark and has more than 11 000 employees globally, with a revenue of 2.7 billion EUR in 2019. ROCKWOOL Group has offices in 39 countries with 46 manufacturing facilities. In 1995, ROCKWOOL moved from being a family-owned business to a public company now listed at Copenhagen Stock Exchange.

The case company of this Thesis, ROCKWOOL Finland, is part of ROCKWOOL Group and has been operating in the Finnish market since 2007. In the past few years, the sales have been growing rapidly in double digits. The turnover of the Finnish organization grew 15,2% in 2019 and 23,5% in 2020. Meanwhile the company employees increased from 27 in 2019 to 34 in 2020. The growth is expected to continue as the construction and renovations industry is also growing in Finland. The thesis researcher is part of the Customer Service department of 3 local employees and a department manager located in Denmark. The role of the thesis researcher as a Customer Service Specialist at the company is to handle incoming sales orders by entering them into the ERP system SAP.



## 1.2 Business Challenge, Objective and Outcome

Every year the company handles more sales orders, so to keep up with the increasing workload, the company needs to either streamline and optimize the order handling process or to hire more employees to handle the orders. The company is aware of this development, and already some steps have been made to try to automate some orders. However, the order handling process is not clearly mapped out and the current automation developments have been incremental and not part of an overall action plan.

The company believes that it would make more sense to have a comprehensive map of the current process, to investigate how to improve the process, and develop a clear action plan that can be then carried out strategically, instead of adding few improvements without having a clear understanding of the whole process.

Accordingly, the Objective on the thesis is **to propose solutions how to optimize and automate the current order handling process.**

The Outcome of the thesis is **the proposal for optimizing and automating the order handling process**, complemented with an action plan. This outcome should help the company reduce repetitive manual tasks by implementing the proposed solutions, such as using RPA technology and utilizing electronic sales channels.

Currently, the Customer Service team is handling more orders than ever before, so it is pushing the team's resources to the limits. The company is now in a crossroad and a decision needs to be made, either to start automating the order handling processes or to hire more people. Now, almost all orders come in via email or telephone, and the Customer Service teams must manually enter each individual order to the ERP system SAP. Some orders are repetitive and simple, so it would make more sense to automate rather than hire people, because most orders are not complex, they are rather repetitive and time consuming. The proposed improvements should help the company to reduce repetitive manual tasks and reduce time on order handling.

## 1.3 Thesis Outline

The scope of this thesis is to optimize and automate the order handling process at ROCKWOOL Finland Oy, which belongs to the international ROCKWOOL Group headquartered in Denmark. The thesis focuses on the Finnish Customer Service

department who are responsible for the order handling orders for the Finnish customers of the case company.

To gain understanding and information about the existing pain points, the current process map was reviewed to select areas of improvement. The investigation involved the key stakeholders from the Finnish Customer Service department, who participated in the analysis of the process through interviews and discussions. After identifying the strengths and weaknesses of the current process and narrowing down the focus areas for improvement, a literature review was conducted to gain better understanding of process automation and information systems that would enable automation of order handling.

This Thesis is written in seven sections. Section 1 is the Introduction which describes the background and gives an overview of the thesis. Section 2 describes the method and material used in the thesis. Section 3 reports on the results of the current state analysis. Section 4 explores literature and best practice in relation to the challenges identified in the current order handling process, so that the identified relevant suggestions could guide the improvements. Section 5 focuses on building and presenting the initial proposal. Section 6 reports on the results and validation of the proposal. Section 7 concludes and summarizes the thesis.

## 2 Method and Material

This section introduces the research approach and research design that were selected for the thesis. In addition, it describes the data collection and analysis methods.

### 2.1 Research Approach

Generally, research can be classified as descriptive or analytical, applied, or fundamental, conceptual, or empirical (Kothari 2004). *Descriptive* research includes survey and fact-finding enquiries for the purpose of describing current affairs in the present moment and the researcher has no control over the variables, whereas *analytical* research seeks to make critical evaluation of information that is already available. *Applied* research aims at finding a solution for an immediate problem, while *fundamental* research is mainly concerned with generalisations and with formulating of a theory. *Conceptual* research is related to developing new abstract ideas and concepts, as opposed to *empirical* research which relies on experience or observation. (Kothari 2004, 2-4.)

There are two basic methods of data collection in research – *qualitative* and *quantitative* methods. Kananen (2013) explains qualitative research methods as methods that are mostly used in cases where the phenomenon cannot be clearly outlined. Using quantitative methods most often demands that a theory or a model of a phenomenon already exists, and research is done, for example, for theory checking. He continues that qualitative research tries to present the phenomenon in words rather than in numbers as quantitative research would do. (Kananen 2013, 31-35.)

While choosing the research approach, the best option is to select an approach which works for the issue at hand at the context of a given challenge. All the different approaches have their strengths and weaknesses. (Denscombe 2010:163.) This study belongs to the realm of applied research and uses qualitative research methods. The research approach is case study. As Yin (2003) points out, a case study is an empirical inquiry which investigates an existing phenomenon within its real-life context, particularly when the boundaries between phenomenon and context are not clear. (Yin 2003: 13). Furthermore, qualitative research methods are selected for this study as it aims to

analyse the current process and develop it further in cooperation and with the help of input from the organization stakeholders.

## 2.2 Research Design

Figure 1. below illustrates this study's research design. The illustration presents the different steps which are taken within this study and shows the result of each step. It also shows the different stages in the data collection.

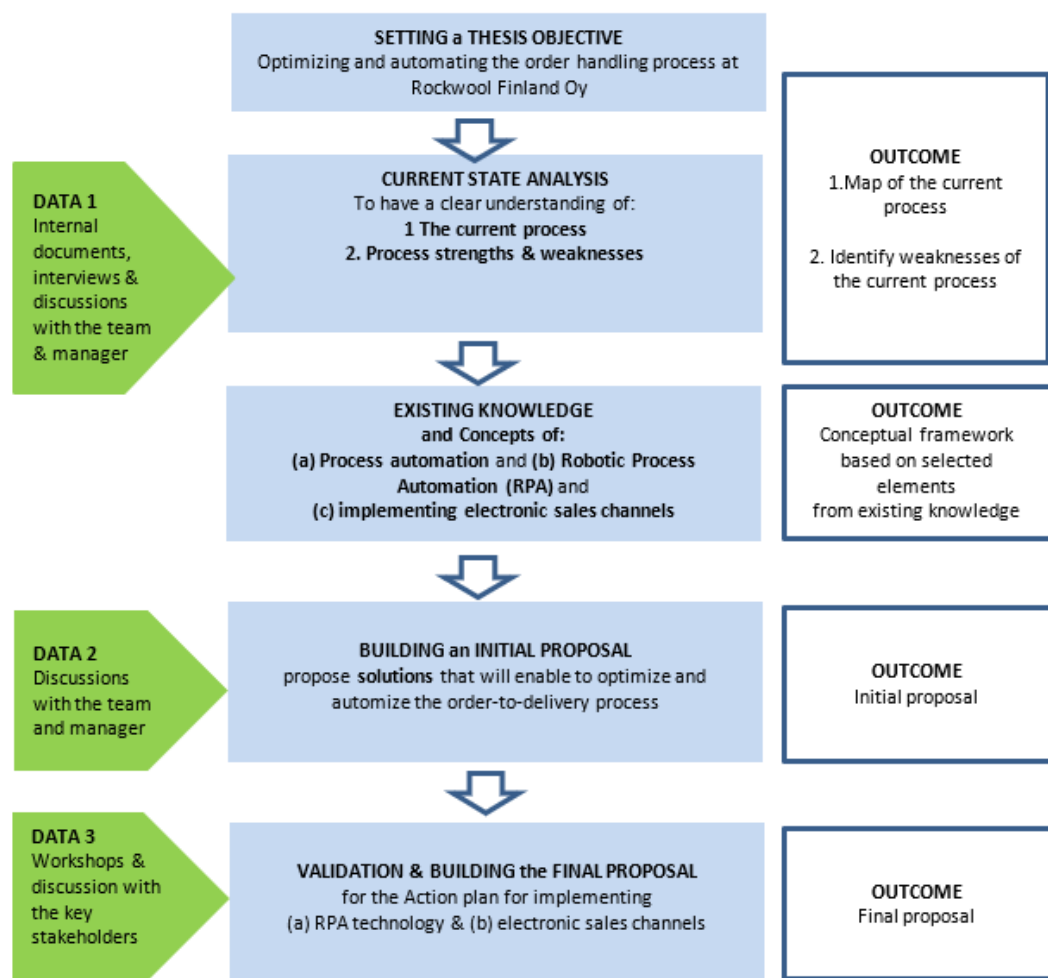


Figure 1. Research design of this study

As seen in Figure 1, the research design is made of five phases. First, the objective of the study is set. In the second phase, the current state analysis (CSA) is conducted. The CSA is based on collecting and reviewing internal documents and by gathering data from

internal stakeholder interviews. Next, in the third phase, based on the results of the CSA, the study focuses on exploring and finding relevant guidance from literature and best practice related to optimizing and automating business processes. The fourth phase is the initial proposal building based on the improvement suggestions from stakeholders gathered via another round of interviews and discussions, as well as the results from the previous phases. The fifth and final phase focuses on validation of the initial proposal and building the final proposal for the case company.

### 2.3 Data Collection and Analysis

This study draws from a variety of data sources, and the data was collected in three data collection rounds. Table 1 shows details of Data collections 1-3 used in this study.

Table 1. Details of Data collections 1-3 used in this study

	Participants / role	Data type	Topic, description	Date, length	Documented as
<b>Data 1, for the Current state analysis (Section 3)</b>					
1	Team manager	Kickoff meeting	Introduction of the topic	March 2021 30 min	Field notes and recording
2	(Finnish Customer Service) Team member 1 Team member 2	Teams meeting	Kickoff: Current state of the process from the specialist's point of view	March 2021 1 h	Field notes and recording
4	Team manager	Teams meeting	Current state of the process from the manager's point of view	March 2021, 45 min	Field notes and recording
	Team member 2	Face-to-face	Individual interview	March 2021	Field notes
	Team member 1	Face-to-face	Individual interview	March 2021	Field notes
5	(Team meeting) Manager Team member 1 Team member 2	Teams meeting	Current state evaluation and focus area selection	March 2021	Field notes
<b>Data 2, for Proposal building (Section 5)</b>					
8	Team manager Team member 1 Team member 2	Workshop/discussion	Proposal building co-creation	October-December 2021	Field notes

	Team member 1 Team member 2	Discussion / workshop	Co-creation of the proposal	October- December 2021	Field notes
	Team manager	Discussion / workshop	Co-creation of the proposal	October- December 2021	Field notes
	<b>Data 3, from Validation (Section 6)</b>				
9	Team manager Team member 1 Team member 2	Group interview / Final presentation	Validation, evaluation of the Proposal, final improvements	May 2022	Field notes and recording

As seen from Table 1, Data 1 was gathered and analysed in the current state analysis phase. The primary data consisted of interviews with internal stakeholders. The data also included internal documents and data and reports related to the order handling process (see Table 2).

In the second round, Data 2 was collected by interviewing the key stakeholders to gather suggestions from the case unit for developing the improvement proposal. This data included workshops, online meetings, and interviews. In the third round, Data 3 was collected when conducting validation of the initial proposal. Data 3 included feedback and further development suggestions for the proposal from the case company and the unit.

In this study, the interviews were conducted in a semi-structured format and conducted online via Microsoft Teams video conferencing application with questions created in advance. The interviews were recorded, and field notes were taken. Question can be found from Appendix 1.

Table 2 shows the internal documents and data and reports that were analysed:

Table 2. Internal documents used in the current state analysis, Data 1

	Name of the document	Number of pages/other content	Description
A	E-Shop Super User Handbook	22 pages / PDF	Manual of the tool

B	E-Orders 2021	Excel file	Progress per month per Nordic country
C	Order monitoring report (Monthly sales)	Excel	Orders per month, per customer

As seen from Table 2, this study also analyzed several internal documents. The documents were analyzed for Data collection 1 round, the current state analysis, to get a clear understanding of the current order handling process, order volume and current E-Shop manual.

The biggest part of data was analysed for the current state analysis, to establish the current state of the order handling process in the company. The findings from the current state analysis are discussed in Section 3 below.

### 3 Current State Analysis of the Order Handling Process

This section discusses the results of the current state of the order handling process in the case company. It is based on the findings from the discussions with the key internal stakeholders, who are doing the daily operational tasks in the organization, as well as the team manager. This section maps the general order handling process and analyses the strengths and weaknesses of the current process, which will be used as the basis for making recommendations to optimize and automate the process.

#### 3.1 Overview of the Current State Analysis

The current state analysis (CSA) was conducted from January to March 2021. To conduct the CSA, the core team including the specialists from the order handling department and the team manager from the case company were involved to get a comprehensive view of the current order handling process. The goal of the CSA was to get a clear understanding of how things are currently done in the order handling department and to evaluate the current process' strengths and weaknesses.

First, team meetings were held where specialists in the order handling department gave their views of the current order handling process to get a comprehensive view of the whole process. The data collected in this round was analyzed and used as input for creating a detailed process map, which became the foundation for the next section. The process map is presented in Section 3.2.

In the next step, analysis, the findings are reported in Section 3.3. This part ends with identifying the strengths and weaknesses of the current process, and points to the identified areas for development.

#### 3.2 Description of the Current Order Handling Process

As mentioned in Section 1.1, the turnover of the Finnish organization grew 15,2% in 2019 and 23,5% in 2020. For the Customer Service department this means more incoming sales order to handle between the same number of employees. In the current process, customer place orders by email or telephone, and only one customer is sending EDI orders, which accounts for 8% of all sales orders. If the growth continues to be double digits year-on-year, then eventually the organization must find a solution how to handle



more sales orders. Since many of the orders are simple and repetitive, the management of the case company is interested in ways to automate some orders, to keep up with the increasing number of orders and allocate more of the Customer Service Specialists time on value adding tasks.

To identify opportunities for automation, the current process was reviewed and analyzed with the stakeholders. Based on the results of the interviews and discussions with the Customer Service team and manager, the following picture of the current order handling process emerged. The high-level process is visualized in Figure 2.

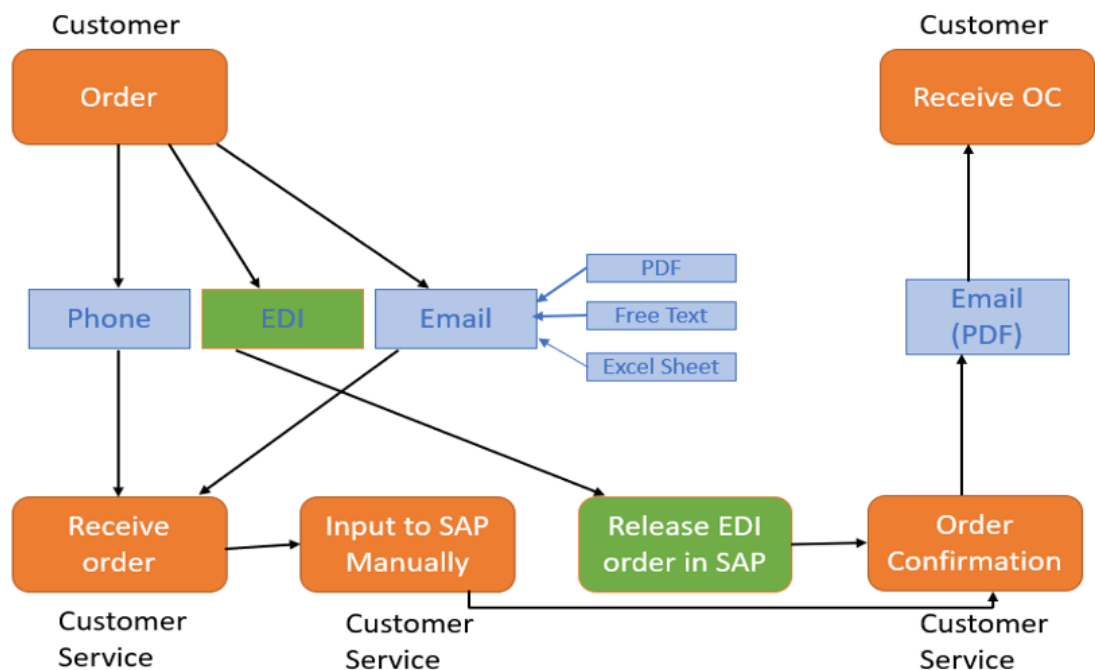


Figure 2. Current process map of the order handling process

As seen from Figure 2, the process starts when the customer service receives orders via three different channels: by phone, electronically via EDI, or by email. Currently, only one customer is sending orders electronically via EDI. This means that most of the order handling is done manually by the customer service team. Even order confirmations are sent out manually by the team. As one team member commented:

“The amount of manual operational work takes a lot of time that we could be using for serving and focusing on the customer needs. I feel like there is more value in communicating with the customers and forming deeper relationships with both internal and external customers, and to find out their needs and serve them even better.” (Stakeholder B)

The second team member agrees:

“The daily work is more operational than strategic and value adding to the business. As the business grows, we need to streamline the operative manual work and process more orders than we currently do at the same time, while also shifting the daily work more towards value adding work.” (Stakeholder A)

In the current process, after the customer service receives the order, either by phone or email, it is then manually entered into the case company's ERP system SAP. After the order is saved, the system gives an order confirmation, which is then manually sent to the customer by email.

There is one customer who is sending orders automatically via EDI. In this process, the order comes to the case company's system automatically, and the Customer Service Specialists review the order and release it. After releasing, the order confirmation is sent to the Buyer by email. This process has been set up mutually with the Buyer by sharing all relevant information from business side, such as material codes, and on the IT side, so that the connection works seamlessly from a technical perspective. By investing time in the setup and coordination with the Buyer, the releasing of the orders takes only seconds and is convenient for both the Buyer and the case company, as it is fast, and mistakes are avoided. A team member commented:

“If there were a few more large customers who would start sending EDI orders, then it would have a big impact in saving time from copying text from emails, Excel or PDF files and avoiding order entry errors.” (Stakeholder B)

Majority of the orders are sent by email. The data for the order is sent as a PDF file, Excel sheet or written as free text to the message body. The Customer Service Specialists copy the data from the email to SAP manually, and the process is both time consuming and repetitive but also human errors can occur in the process.

In the current process, the three Customer Service Specialists are all trained to handle the same tasks, to ensure that order handling is done effectively and professionally even when one member is on holiday or absent due to other reasons. However, in the daily operations, every Specialist tends to have their own area of expertise and will take more responsibility in their own knowledge area. But as a rule, everyone is responsible and trained to handle all types of customer orders and tasks. Some orders are more time consuming to handle than others, for example releasing an EDI order takes under a

minute, while large projects with material requirements of tens of thousands of square meters can take anything from 30 minutes to an hour on average to process.

The document management is handled via email in a shared email box for the customer service department and by maintaining documents on a shared drive on a cloud, that can be accessed only when connected to the company network, for extra security.

Next, the analysis investigates the parts of the process separately.

### 3.3 Analysis and Key Findings from the Current State Analysis

In this section, the current process is analyzed in depth. First, the strengths and weaknesses of the current process are presented. Second, from the analysis, focus areas for process improvement are selected.

The main areas that the team see as problematic are:

#### *A. Manual order entry and Time-Consuming Order Handling*

In the current process, there is very little automation. Only one customer is sending EDI orders, which account for 8% of sales orders.

“There is plenty of unutilized potential in the department to automate and modernize the order handling process. The one customer who is sending EDI orders is already quite a big impact on saving time, so the challenge is to find more customers who could be set up as EDI customers. From industry experience and discussions with customers, not all companies are able or willing to make that investment, so other automation solutions should also be investigated.”  
(Stakeholder A)

Since almost all the order entry is currently done manually, it can be very time consuming, depending on the type of the order. The order entry time depends on the complexity of the order. For example, some customers have a set price agreement that is maintained in the ERP system, some are one time project orders with special price agreements that must be checked with the Sales Representatives. There is a system of maintaining project offers and quotations in the shared folder in the cloud, but even that can take time double check to ensure pricing is correct.

“An automated order entry process would help the team save a lot of time, but also having clear and less complex price agreements would help to reduce the order entry time.” (Stakeholder C)

There are many different types of product categories and respective customer segments.

This also influences the order entry time. As described by a team member:

“Some customers have very simple orders with only a few item lines and in addition, they pick it up from our own warehouse, eliminating logistics related issues. These orders take a minute to a couple of minutes to enter the system. Then we have large roof projects, those take the longest time to handle, since according to the current process, when the customer orders 10 000 m<sup>2</sup> of material, customer service must calculate how many trucks will be needed to deliver the amount and create an individual order for each truck. We have also been providing the customer with an additional service where we create an overview for the customer in an Excel file with the timetables. Sending individual PDF order confirmations per truck would make it impossible to the customer to have a clear overview of the project delivery times, especially when there can be tens trucks coming per week.” (Stakeholder D)

Roof project orders take double work – first the order is entered into SAP and then the project overview is created in the Excel order confirmation template. The example of the roof projects order confirmation Excel that is created manually by the customer service team is in Appendix 2. The time it takes to create the roof project orders depends on the complexity, but on average at least 30 minutes up to an hour is spent on large project orders. Although it can be time consuming for the customer service department, the customers appreciate the extra service, based on the feedback from the annual surveys, the roof customer segment has the highest customer satisfaction rates.

### *B. Errors due to Manual Order Processing*

There are many ways customers send orders, some write a simple email with order details, others send a PDF that is generated by their ERP system, and some customers use Excel sheets with the order details. Especially with the PDF and Excel files, there is a lot of manual copying data from the files to the case company's ERP system SAP that is done manually by the customer service team. Copying the order data from a customer provided file to SAP is not only time consuming and repetitive, but there are risks of human error due to manual handling, for example, some item lines could be copied twice or get overlooked and skipped. Errors in data transfer can be costly for the customer and for the case company because it leads to more logistics costs and more human resources to solve problems later.

“It can be frustrating at times to spend so much time copying and pasting data from a source file to SAP, especially when the customer order template, either PDF or Excel, has the order details provided in an orderly manner, which could easily be automatically transferred with the help of some technology, rather than having to do it manually. The copy-pasting order handling can feel tedious and robotic, I would like to spend my time on tasks where I can utilize my skills and creativity in solving problems and meeting customer needs.” (Stakeholder C)

As the team member points out, it does not make sense to use highly skilled employees time on repetitive manual tasks, which could potentially be automated, increasing the efficiency of the process and increasing the employee’s motivation and allocate time to value adding tasks.

### *C. Customers have low level of control over their projects and orders*

It is common that multiple people from an organization order for their projects, especially for larger projects that span over a longer time, for example site managers, project managers and purchasers can be involved. The customer service team confirms all orders by email. Problems may occur when, for instance, a site manager has placed the orders and goes on holiday or is absent for some other reason, and people who are filling in need up-to-date information about what has been ordered, what has been delivered etc. Customer follow-up inquiries demand a lot of communication and sharing information over the telephone and sending updated order confirmations to all parties who need the information.

“Customers quite often call us to double check what was ordered and what was delivered in the past and to double check all future orders that we have confirmed. There seems to be a clear need for a more transparent way to provide customers an overview of project statuses, which they could access through a customer portal, for example. Our colleagues in other Nordic countries are using E-Shop, which is an e-commerce platform for placing orders, but also allows customers to view order history, upcoming orders and even download invoices and delivery notes. The platform is accessible 24/7 on the web, and not dependent of the Customer Service working hours. Right now, this information is shared with the Finnish customers over the telephone or by email.” (Stakeholder B)

In the current order handling process, the Customer Service has a full overview of the customer’s project and orders, everything is maintained in the ERP system SAP. As described in part B, the roof customer segment receives a more detailed project overview in the form of an Excel file, but most other customers must rely only on the PDF order confirmations that are sent by email. If the recipient of the email has not shared the information, then different external stakeholders might lack an overview, which is a weakness of the current process.

#### D. Too many exceptions and special agreements

In the current process, 92% of orders are manually processed, and due to this, complex price arrangements and exceptions are possible to handle. However, this can be very time consuming and needs special attention from the customer service team. For automation to be successful, the complexities need to be reduced in coordination with the sales team, and an analysis of the customer base is required to determine which customers have a clear and simple agreement with minimal exceptions so that automatic tools can handle the orders effectively.

“To introduce a new technological solution, such as robotic process automation, the orders need to follow a logic, since the system is not able to handle exceptions to rules in the same way humans can. It will be crucial to streamline and eliminate unnecessary complexities to make it possible for a robotic process automation tool to handle the orders.” (Stakeholder D)

In the current process, the Customer Service have full control and overview of every aspect of the process, but in the future, as business continues to grow, it is essential to eliminate complexities as much as possible, to introduce new automation solutions and not have the process so dependent on the customer service team members.

Based on the results from the analysis, the strengths and weaknesses are summarized below.

#### 3.4 Strengths and Weaknesses of the Current Order Handling Process

This section summarizes the strengths and weaknesses of the current process. The results are show in Table 3.

Table 3. Strengths and weaknesses of the current order handing process

Strengths	Weaknesses
1. One customer already using EDI, 8% of all sales orders	1. Manual process, 92% of all orders are manually input

2. Flexibility in meeting customer needs and offering personalized service (e.g., to roof segment)	2. Time consuming for customer service. Many exceptions and special requests that need manual handling
3. CS has high level of control over the order process	3. Risk of errors: e.g., copying the order from Excel to SAP manually
4. Existing e-commerce platform developed in-house. Not yet utilized in Finland, but from a technical perspective, easy to implement.	4. Customers have low level of control and overview of orders

As seen in Table 3, the results include three strengths and four weaknesses.

First, as seen from the current process description and map in Section 3.2, the current state of order management within the case company is relying largely on *manual actions*. Only one customer is sending orders automatically. This customer's orders make up 8% of all orders that are handled annually. Thus, 92% of orders are processed manually by the customer service team of three employees. On the positive side, once customer is sending orders electronically and the cooperation has been successful and reduced the workload of the customer service team, as well as increased the collaboration between the organizations. The positive experience with one customer is an indicator and proof that there is much unutilized potential in automating orders.

The strengths are related to having a *high level of control over the process*, which also allows *flexibility in meeting customer needs and special requests*. On the flipside, having so much control over the process means it is very *time consuming* for the customer service team to manage the whole process manually. In the current process, all data related to the order remains *in the case company's ERP system SAP*, and the customer has no way of checking the order status or stages or documents such as delivery notes and even invoices online, for example in an e-commerce platform. The customer only receives a PDF order confirmation and a text message on the delivery day to indicate an approximate delivery time.

On the strengths side, the case company has an e-commerce platform called E-Shop, which allows customers to place orders online and view order status, transport documents and invoices, but it is not yet in use in Finland. E-Shop is used in the other Nordic OPCOs and planned to implement as a new electronic sales channel during 2021. There is a dedicated development team in Poland, who can provide the technical support to set it up. The author of the study is the selected Super User for Finland. The role of the Super User is to work as a bridge between the development team and local sales organization. The platform could be utilized to tackle the weakness of low level of control and overview of orders by the customers and can increase the transparency of the order process.

Another weakness of the current manual process means that there is *a high risk of human errors*. For example, when a customer sends an order in an Excel file, the customer service team must manually input data from the spreadsheet into SAP and mistakes can occur in that process. The weakness could be addressed by utilizing technology that can do the job automatically. Importantly, when discussing with the stakeholders, the suggestions about introducing Robotic process Automation (RPA) could be used as a process automation tool to tackle this issue and should be investigated further, as suggested by the department manager.

#### 3.4.1 Selected Focus Areas

Based on these finding, this study will focus on the three major focus areas:

1. As seen from the current process map in Figure 2, many orders are coming in as PDF and Excel files. Those orders can potentially be converted to orders automatically with RPA technology – thus reducing time on manual input and saving time. Automating those orders with RPA, also reduces the risk of human errors.
2. Currently, there is only one customer using EDI. The focus should be to establish an EDI connection with more customers, especially large companies who are already using EDI with other suppliers and have the technical readiness to establish a connection. EDI connection should be established between more customers.



3. The case company has developed an e-commerce platform online, from a technical perspective, there is a readiness to start using this tool also in the Finnish operating country. The e-commerce platform, called E-Shop, is already used in the other Nordic countries, Denmark, Norway, and Sweden. The challenge is to identify customers who could be potential users of this solution, then onboard and provide training to selected customers.

The selected focus areas are highlighted on the current process map in Figure 3.

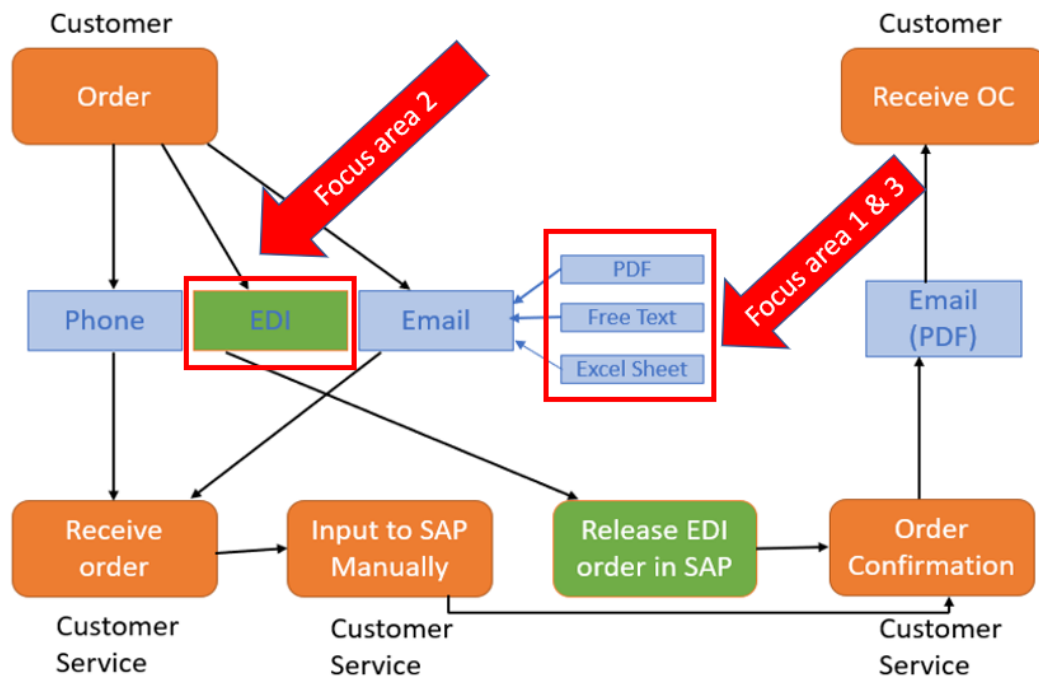


Figure 3. Selected focus areas on the process map

These priorities were selected because they support the ultimate target of the case company, which is to save time from manual work and process an increasing number of orders with the same size team.

The next section investigates the existing knowledge around the topic of process automation and information systems that would enable automation. In addition, best practice from industry is identified and described. The existing knowledge found from theory and best practice are used as a basis to make a proposal for the case company how to improve the current process and automate the manual work described in the selected focus areas above.

## 4 Existing Knowledge and Best Practice in Process Automation and Information Systems for Order Handling

This section goes through existing knowledge based on the available knowledge, theory and best practice on the selected weaknesses identified in the current state analysis, namely the topics of process automation and information systems that would enable automation of order handling.

### 4.1 Business Process Automation

Smith and Fingar (2003) define *Business process management* as a general methodology which supports the improvement, design, and management of business processes to increase the company's productivity. (Smith and Fingar, 2003). A process involves activity in which people and/or machines do things, and it often involves more than one person or machine. A process is a collaborative activity in which a group collaborates to achieve a goal (Ould, 2005). According to Paula Bergman (2014), the following issues indicate that a company needs to add, improve, or restructure processes:

- Productivity does not meet sensible targets
- Continuous misinterpretations in the firm regarding who oversees delivering what to whom.
- Difficulty embedding measurable and reliable improvements
- Fresh employees take too long to reach the expected productivity levels
- A common understanding in the workplace that workers waste a lot of energy and time as they try to complete their daily tasks, or that the process's efficiency could greatly be improved.
- Customers continuously express their dissatisfaction towards the company's insufficient responses to their needs.

- Conflicting results in the output quality, needed resources, time taken to complete process, or other key factors (Ould,2005)

In addition, technological change at the workplace is growing daily at a fast rate, and businesses must keep up with technological change. ERP and CRM systems have slowly been changing businesses for the past couple of decades, and these software solutions are used to manage various processes. In the past decade, another factor for business transformation is access to more data, which business leaders hope would bring a competitive edge. Technology and big data are evolving at a rapid rate impacting almost all industries. As a result, organizations must respond to the technological changes and automate their processes quicker than ever before.

*Business process automation (BPA)* can be defined as “the automation of complex business processes and functions beyond conventional data manipulation and record-keeping activities, usually using advanced technologies. It focuses on “run the business” as opposed to “count the business” types of automation efforts and often deals with event-driven, mission-critical, core processes. BPA usually supports an enterprise’s knowledge workers in satisfying the needs of its many constituencies.” (Gartner, 2021) McKinsey (2020) defines business-process automation as “the use of general-purpose technologies (for example, bots and algorithms) to perform work that was previously done manually, in order to improve the functionality of a company’s underlying systems.” (McKinsey, 2020)

Automating a process can greatly ease back office tasks in procurement, finance, accounting, supply chain management, human resources and customer service, creation of online access credentials, order issuing, or a business process that needs “swivel-chair” access to many systems that are already in use. (IRPA&AI, 2020.) There is a rising trend in automating knowledge work, and this is increasing annually. Replacing human work with software robots brings great opportunity when it comes to cost savings. Business process automation can be achieved using innovative technological solutions in the enterprise application integration or web-services area or it can be tied to traditional IT apps. (Scheer et al., 2004:18.)

The researchers at Bain & Company (Lancry et. al. 2017) provide a strategy development guideline for B2B companies, and it is illustrated in Figure 4.

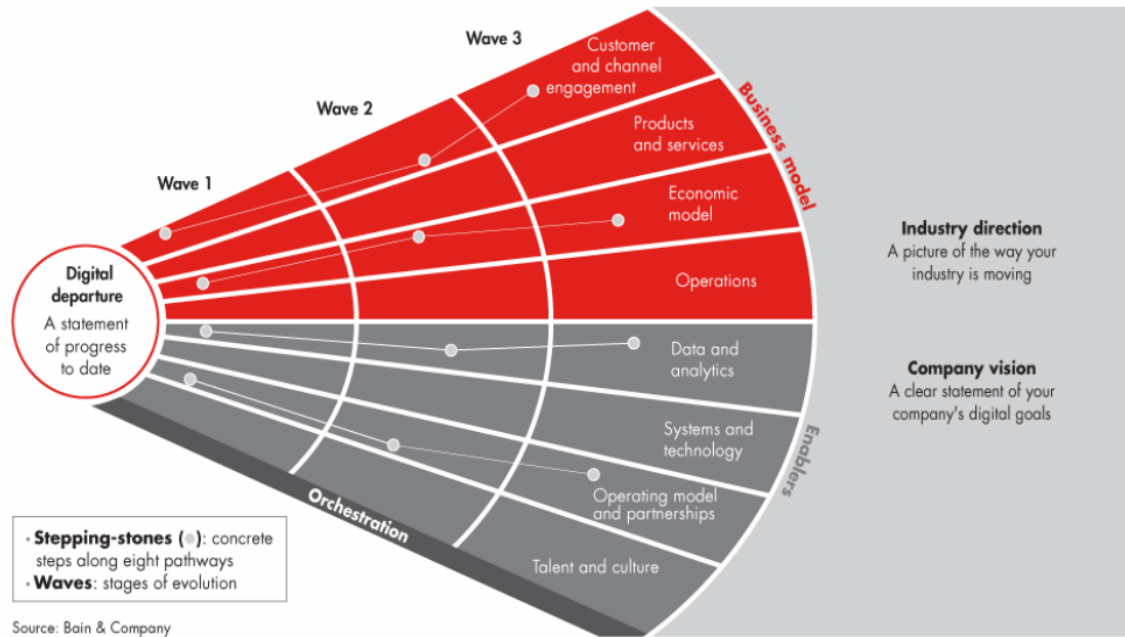


Figure 4. Digital strategy for B2B world (Lancry et. al. 2017).

As shown in Figure 4, the starting point is to assess what the company is doing right already, that is the digital departure, the starting point. Next, the company needs to define a long-term digital destination, the company vision. In addition, the general industry direction should be clearly stated to keep the company vision in line with the direction of the industry. This knowledge will assist in making good investment decisions when planning out actions to reach the long-term goals. Disruption does not happen overnight, but in waves. Each wave represents an innovation of transformation in the industry. Firms need to dismantle their digital visions into a series of steps: small steps that can be taken towards a digital future. These steps can be organized to successive waves, and the general strategy changes as new information surface.

Firms attain the most progress when they focus their digital activity alongside a couple of pathways. For example, the parts of the business model: customer & channel engagement, economic model, products & services, and operations. The others are organizational enablers: data & analytics, systems & technology, operational model & partnerships, and talent & culture. Creating these steps alongside each of these pathways speeds up change, but it is vital to align actions along the way. Initiatives are dependent on each other, and successful digital leaders can determine those dependencies and organize the steps towards digital transformation in synchronization

with each other. When there is a lack of coordination, it leads to wasted investment and effort. (Lancry et. al. 2017.)

McKinsey conducted a survey in 2020, which found that firms that have been able to automate their business processes successfully, have a few things in common. When observing respondents from big companies that have been able to meet their automation targets, all of them have the following points in common: they have their focus on people as much as technology, they put a lot of effort into making automation a strategic priority and they have created an operating model that allows scaling.

1. Focus on people as much as technology

The companies that were most successful in their automation efforts reported that they focused on employee training and capability building. They also included the personnel in the automation development programs and prioritized communication throughout the company while automation related changes were being implemented.

2. Make automation a strategic priority

The companies that defined automation as a strategic priority had a significantly higher success at meeting their automation targets. On the flipside, companies that had not succeeded with automation targets say that they are pursuing automation for reasons such as to keep pace with competitors, for long-term cost saving or to improve the effectiveness of their business processes.

3. Create an operating model that allows scaling

Based on the survey results, bigger companies have usually automated at least one business process in an average of four functions like customer service, IT, and finance. For automation programs to grow and expand in a complex business environment, coordinating activities across the organization becomes vital for those programs to scale. (McKinsey, 2020.)

To survive long term and reach growth, companies need to constantly innovate. Leaders of business process automation suggest that companies should seek to link best and next business practices. Best practices guarantee efficiency, while next practices lead to a competitive edge. Conventional business process automation tools such as CRM, SCM and ERP systems focus on implementing best practices. Next generation process automation implements next practices at a reasonable cost level. (Scheer et al, 2004.)

Systems that enable business process automation include information systems and software to support the business process implementation and development. Choosing the right IT and software solutions enable the execution of the business process and the underlying strategy of the organization. There are many traditional process automation tools such as ERP, and CRM systems that have supported standard business processes in the last 25 years. New business process automation technology, on the other hand, support businesses with innovative and new business processes. Next business practices therefore must be supported by new software architectures – by next generation process automation. (Scheer et al., 2004:8.) The following sections investigate next-generation process automation solutions.

#### 4.2 Robotic Process Automation (RPA)

The institute for Robotic Process Automation & AI defines RPA as the application of technology by which organizations can configure computer software in a way that captures and interprets existing applications for processing transactions and data, as well as triggering responses and communicating with other software or systems. RPA can potentially save time and money by automating high volume transactional processes and boost the capabilities of the organization by allowing employees to focus on knowledge work rather than repetitive transactional tasks. (IRPA&AI, 2020.) By a different definition, Robotic Process Automation covers all tools which are running on the user interface of other computer systems and mimic human activity (van der Aalst et al., 2018). The research and advisory company Gartner define robotic process automation as “a productivity tool that allows a user to configure one or more scripts to activate specific keystrokes in an automated fashion. The result is that the bots can be used to mimic or emulate selected tasks (transaction steps) within an overall business or IT processes”. (Gartner, 2021). Another definition is: “software solution to automate tasks

previously performed by humans that uses rules to process structured data to produce deterministic outcomes” (Willcocks, 2020).

The aim of RPA is to not change the programming language of an information system, which would require deep understanding of programming, but rather to access the system through the presentation layer since most employees interact with computers through the presentation layer. (van der Aalst et al., 2018; Willcocks & Lacity, 2016). In other words, RPA operates on top of a company’s existing information technology infrastructure, rather than requiring the infrastructure to be changed to accommodate the robotic process automation software robots (Institute for Robotic Process Automation, 2015). An RPA tool is used to map out the process that needs to be automated and convert it into an RPA language for the software robot, so it can execute the task within an allocated time (Tornbohm, 2017). RPA can be integrated with basically any software that humans use, since software robots that are configured with the RPA tool can communicate across various information technology systems via front-end instead of back-end like traditional software which require programming (Asatiani & Penttinen, 2016).

For RPA implementation to be successful, some characteristics of the processes need to be met. In general, the processes that can be automated with RPA need to be clearly defined, have structured data and deterministic outcomes and include rules based routine tasks where the subjective human judgment is not required (Aguirre & Rodriguez, 2017; Asatiani & Penttinen, 2016) The tasks which can be automated with RPA often include tipping, coping, pasting, extracting, merging, and moving data from one system to another (Aguirre & Rodriguez, 2017).

Since the software robots can operate fully on top of the existing information technology infrastructure, leaving the IT systems unaltered, it creates flexibility and speed to the implementation. This is a significant advantage over large scale IT development projects that require coding and a substantial redesigning of an existing system. In addition to cost reduction that is mainly based on productivity improvement, the benefits of successful RPA implementations are increasing process speed and error reduction (Aguirre & Rodriguez, 2017). The RPA robots can also help organizations to identify the potential inefficient parts of the processes which can then be optimized with RPA (Institute for Robotic Process Automation, 2015).

The fundamental benefit of RPA from an employee viewpoint is the elimination or reduction of everyday simple and repetitive tasks, that can be tedious and dull (Aguirre & Rodriguez, 2017). As a result, employees can focus on creative problem solving and tasks which require emotional intelligence, so instead of doing boring repetitive tasks, they can allocate more time to projects that are value adding and strategic (Willcocks et al., 2017; Asatiani & Penttinen, 2016). Traditionally, the non-core repetitive tasks have been subject to offshore staffing, especially if the labour hours are full-time equivalent. Alternatively, companies can now gain similar benefits of offshore outsourcing, reduced staff costs and keeping the focus on their core activities, with RPA. Moreover, software robots are much more cost effective than human employees since robots can work 24/7. Using software robots also eliminates issues related to offshore outsourcing such as management costs, communication problems and complicated international legal agreements. Instead of outsourcing simple transactional and data entry tasks to low-cost destinations, companies can avoid the possible backlash of sending jobs abroad with RPA. In fact, RPA itself has potential to create jobs as the automation projects often require highly skilled employees from the fields of software development, management, consulting, and analytics (Asatiani & Penttinen, 2016).

Once a company has identified a process that can be improved and makes the decision to automate it with RPA, the next strategic question is how. Deciding the RPA operating model can generally take place in two paths:

Path 1 – Outsourcing the RPA development project and choosing an RPA vendor

In part 1, the focus is on selecting external resources for RPA development. There is an abundance of vendors and service providers who specialize in RPA and more players are entering the field at a fast pace as an increasing number of organizations in all business areas are noticing the potential of RPA as a quick and inexpensive option for enhancing the effectiveness of business processes (Aguirre & Rodriguez, 2017). The robotic process automation tool landscape is highly competitive and currently there is no one clear market leader. Gartner lists some of the top RPA tool software providers: UiPath, Blue Prism and Automation Anywhere. (Gartner, 2021) Other notable tools include Automation Edge, Work Fusion and Microsoft Power Automate. (Forrester, 2021).



## Path 2 – in-house development of the RPA solution

Path 2 relies on internal resources of the organization for RPA development. At the early stages in an RPA project, using external resources might seem appropriate since most companies don't have workers stand-by with necessary skills to deploy RPA projects. Therefore, outsourcing could be faster, lower-risk and cost-effective option in the beginning stage of starting the project. At the same time, organizations should have a clear vision for the long run. When organizations have goals for scalability, they should invest in developing internal RPA resources that can be utilized in the long-haul. External consultant may be needed for support and expansion, but the organization should focus on developing the core skills and expertise in-house to be able to drive the RPA projects in the future as well. Developing internal resources is necessary because RPA projects require an understanding the details of internal processes, which can be challenging for external consultants to achieve since they don't have the insider knowledge and broader perspective of the organization. Attracting and hiring competent staff may prove challenging, since the RPA experts are highly sought after by headhunters in a hot market where demand is higher than supply (Asatiani, Copeland, Penttinen, 2022).

It is also possible to combine the two paths and employ a hybrid approach, where some parts of the process are maintained by the organization itself and some parts are handled by the third-party vendor.

Deploying any new enterprise software requires careful consideration. To determine which operating model would best suit the business needs and context of the requirements, the following checklist could be used.

Table 4. Operating model decision checklist (Asatiani, Copeland, Penttinen, 2022)

**Who should develop RPA?**

- 1 Who? Does your organization have a sourcing policy or strategy in place that prescribes a specific sourcing model for IT projects?
- 2 What are your organization's relevant software-development capabilities at present?
- 3 What are your organization's relevant process-development capabilities at present?
- 4 Do you foresee a need for rapidly scaling the RPA projects up/down?

**How should the RPA be deployed?**

- 1 How? Does your organization have established practices, policies, or strategies for IT deployment?
- 2 Does your RPA project require direct control over the robot while it is performing the tasks?
- 3 Do you foresee a need for rapidly scaling up/down the number of robots deployed?

**What technology should be used?**

- 1 What? What are the feature requirements for your RPA project?
- 2 What other/add-on services does your RPA project require, beyond the generic features?
- 3 Do developers within your organization prefer to work with any particular RPA technology?
- 4 Do the external consultants prefer to work with any specific RPA technology?
- 5 How sensitive is your project to costs associated with IT procurement?

The RPA operating model decision checklist is aimed to aid RPA managers navigate important questions when they deploy the technology. The checklist should be reviewed in the early stages of the RPA initiative, ideally at a workshop with important stakeholders in the RPA project. The goal of the workshop would be to find answers to all the questions in the table. Those questions that are difficult to answer often reveal areas where stakeholders need more information. The workshop should be repeated until all the necessary information is gathered before making the final decision. (Asatiani, Copeland, Penttinen, 2022.)

The next section focuses on the second promising automation tool for the case company, Electronic Data Interchange.

### 4.3 Electronic Data Interchange (EDI)

EDI is an exchange of business documents from computer to computer, which is done in a standard electronic format among business counterparts. Organizations who share an EDI connection are able to enhance and streamline their efficiency of business document exchange. (EDIBasics.com, 2022)

The EDI process is illustrated in Figure 5.

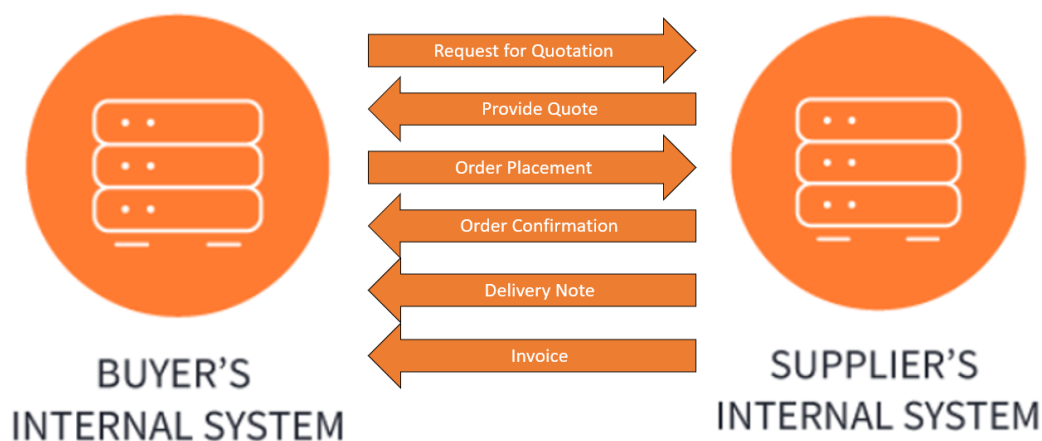


Figure 5. EDI process (modified from Koskentalo, 2012)

This simplified illustration shows that once the EDI process has been set up, it works automatically without paperwork or human supervision. Documents such as orders, order confirmations and invoices flow from one system to another and processing can begin immediately.

EDI delivers benefits such as: (a) Lower operating costs, (b) Optimized operations, (c) Reduction of data entry errors, (d) Increased transaction security, (e) Increased cooperation between business partners, (f) Removal of manual processes, (g) Faster, streamlined communication (Putte, 2003; Koskentalo, 2012). EDI can assist organizations both operationally and strategically and has promising applications, yet it is not as widely used as it could be, and therefore could be counted as a next generation process automation solution.

EDI has been around since the 1960s (Putte, 2003), but still has great potential to meet modern business needs. According to Chwelos et al. (2001), EDI will be at the core of electronic commerce (EC) for years to come. In recent years, IT vendors have taken

advantage of new cloud-managed services and started delivering EDI services that are cloud-based and delivered using the software as a service (SAAS) model and incorporating modern technologies such as web interfaces. (Rocket Software, 2021.)

The adoption of EDI technology in Finland varied from 80% among large companies to 30% among micro companies in 2010 (Koskentalo, 2012: 22). The factors that turned out to have an effect on EDI adoption were management possessing a positive attitude towards EDI, the usage of Just-In-Time and lean procedures and the use of other information systems. (Koskentalo, 2012: 88)

Even though many studies across the world have tried to explain the different factors that lead to adopting EDI, the outcomes of these studies have remained vague. Additionally, many of the studies looking at the factors affecting the use of EDI and its final outcomes have only reported contradictory results. (Koskentalo, 2012.) Although 95% of Fortune 1000 firms in the United States have adopted EDI, just 2% of the remaining six million firms in the US have done the same. Even though the biggest companies have strongly encouraged the adoption of EDI, on average they have been able to get only 20% of their partners to adopt. The rest, usually made of smaller sized enterprises have not been willing to adopt EDI for unknown reasons. (Chwelos et al., 2001.)

When companies make investment decisions about implementing a new technology, it must bring more value compared to the initial investment costs over time. Companies are looking for a competitive advantage through the implementation of new technologies. The general benefits of adopting EDI in an organization are *enhancing the data management, benefits related to business operations efficiency and an increased cooperation between business partners.*

- Data management efficiency benefits include reduced errors due to manual order entry, faster data exchange and better data availability.
- Business operations benefits include reduced data management and data transfer costs due to reducing manual work, reduced supply chain related costs due to increased transparency, increased customer satisfaction and security of supply and availability of goods.

- EDI adoption between business partners can improve and strengthen the cooperation between the organizations, improve teamwork and coordination of activities between the partners. (Koskentalo, 2012.)

EDI adoption changes the organizations mode of operation, working methods and tasks, use of resources, and the structure and operations of the IT infrastructure of the company. The effect EDI has on the company can often be equated directly with the significance of logistics in the company. Adopting EDI does not directly equate to a more transparent supply chain, however, a more efficient information and data sharing between supply chain partners has been found to lead to cost savings up to 35%. (Koskentalo, 2012.)

While there are many benefits to EDI, Jun & Cai (2003) have distinguished different kind of obstacles to EDI success, which they have classified into seven different categories: *legal issues, security, trading partner relationships, human resources management, technical, costs and benefits and managerial leadership*:

- Legal issues. To avoid legal disputes, EDI partners need to make clear agreements of all terms and conditions related to EDI use, including the duration of the contract and who pays for what costs associated with EDI use. (Jun & Cai, 2003.)
- Security issues. Security is an important aspect of communication and partnerships between trading partners. Issues such as the disclosure of messages, modification of message sequence and sender masquerade, to name a few, are serious concerns for EDI users
- Trading partner relationship issues. Companies who want to implement EDI also need to convince their trading partners to use EDI and reach an agreement with them about the terms associated with EDI use.
- Human resource management issues. The effectiveness of EDI depends on the time and effort it takes for employees to learn and use it. Insufficient education and training can be a critical barrier to successful implementation of EDI.

- Technical. Companies need to integrate their existing IT and software systems with EDI, which can cause technical issues, especially when there are incompatibilities between the company's internal systems and between business partner's systems.
- Perceived costs and benefits issues. The company must weigh the costs of implementing the new technology versus the benefits to be received. Implementing EDI brings substantial financial costs for the system itself and for the ongoing expenses during the usage. Thus, the high costs could be limiting factor for smaller companies, since they cannot obtain the economies of scale as fast as large companies with higher transaction volumes.
- Managerial leadership issues. Top and middle management can be an obstacle for EDI implementation. Their understanding of EDI and the support play an importance role since EDI influences an organizations interaction with business partners, affects the business operations, and impacts the competitive positioning of the company.

For setting up an EDI connection, there are two paths:

Path 1 – Outsourcing EDI operations to a third-party vendor. The service provider will provide the expertise, technical infrastructure, and process support. This path is an optimal solution for organizations that lack the in-house technical expertise or resources to set-up and maintain the EDI process.

Path 2 – In-house set up and maintenance of the EDI process. This path is suitable for companies that have the in-house expertise and resources to set up and manage the EDI process. This path is more viable for larger companies, and for companies that have multiple EDI partners, and prefer to develop the skills to manage the process in-house. (Cohen, 2014).

Like setting up RPA operations, it is also possible to combine the two paths and employ a hybrid approach for EDI set-up, where some parts of the process are maintained by the organization itself and some parts are handled by the third-party vendor.

The next section focuses on the third promising automation tool for the case company, e-commerce.

#### 4.4 Electronic Sales Channels (E-Commerce)

B2B e-commerce is an abbreviation for business-to-business electronic commerce which implies to transactions between businesses through online channels. In the beginning of 21<sup>st</sup> century, access to the internet became available around the world, and it has shifted the sales of goods and services from traditional physical stores to online channels. Even though users have rapidly adopted online sales channels, business to business buyers have been much slower with this shift. Recently, B2B buyers and sellers have been forced to go digital because of the Covid-19 pandemic.

According to McKinsey survey (Bages-Amat et.al., 2020), an excess of three quarters of sellers and buyers currently prefers digital self-serve over face-to-face sales. The research shows that digital sales has established itself as B2B buyers are becoming more comfortable with making large purchases online. E-commerce used to always be considered as a platform for fast moving parts and small ticket items. Now, that has changed, as 70% of B2B decision makers say they are willing to create completely self-serve or remote purchases valued at more than USD 50.000, and 27% are willing to spend more than USD 500.000. (Bages-Amat et.al. 2020.) The significant increase in digital adoption brings a good opportunity for B2B firms to improve sales efficiency while pleasing clients who are demanding newer ways of interacting and buying from suppliers.

E-commerce contains more than just pure transactional functions. The four dimensions of e-commerce are defined by Kalakota and Whinston (1996) which can still be considered as valid after more than twenty years.

1. Communication function: products, services, information, or payment delivery through electronic solutions
2. Business process function: to apply technology in automating business workflows and transactions
3. Service function: cutting costs while adding quality and speed to the service
4. Online function: selling and buying information and products online

The two most notable e-commerce business models in B2B e-commerce are the *direct* and the *marketplace* model. In the direct model, firms set up their own platforms and sell to buyers directly. The marketplace model is an existing platform where firms are able to sell their items along with the competitors. Examples of the marketplace model are Amazon, Alibaba, Rakuten, some of the major players in the global B2B e-commerce market. The global B2B e-commerce market was over 5 times that of the B2C market in 2020, valuing over US \$14,9 trillion. (Statista, 2021.)

The industry adoption levels of e-commerce vary among different types of customers. Larger company customers have dedicated buyers who are using an ERP system to place orders. They are usually comfortable with various IT systems and software and thus, more open to e-commerce sites for placing orders. The buyers, however, are not working on site and order on behalf of their colleagues who work on the construction sites. In smaller companies it's more common for the construction workers to make the purchases directly from suppliers, either by telephone or by email. These customers have lower levels of e-commerce adoption compared to large customers with dedicated buyers. Some small to medium size companies are used to placing orders via a dedicated salesperson, who can provide a more personalized buying experience and can also answer additional technical questions and suggestions to meet customer needs.

For the case company to reach a higher volume of online sales, or any company trying to establish an e-commerce sales channel, it is necessary to understand the customer base, their individual needs and ordering behavior. The shift towards online sales is not straightforward and simple, because it requires a change in customer behavior and a coordinated effort from sales and customer service, to introduce the new way of ordering to the customer. Personalization of the online platform to provide customers content that is most relevant to them is an important factor for contributing to the success of the online store. Kaptein and Parvinen define personalization as mixing technology, marketing, and psychology in "the act of specifically selecting content, in the sense of Web page or other digital content, for individual customers based on properties of the customer with the goal of increasing business outcome for an e-commerce platform" (Kaptein & Parvinen, 2015). However, personalization requires information of each customer. The data about customers should be maintained in a customer relationship management software, otherwise, personalization cannot be meaningfully employed. (Kaptein & Parvinen, 2015.)



Yoon & Kim (2009) imply that system quality, service quality, information quality and customer trust and loyalty are the main points which determine the success of online stores. The online success model is illustrated in Figure 6. This model also showcases the relationship between the different points.

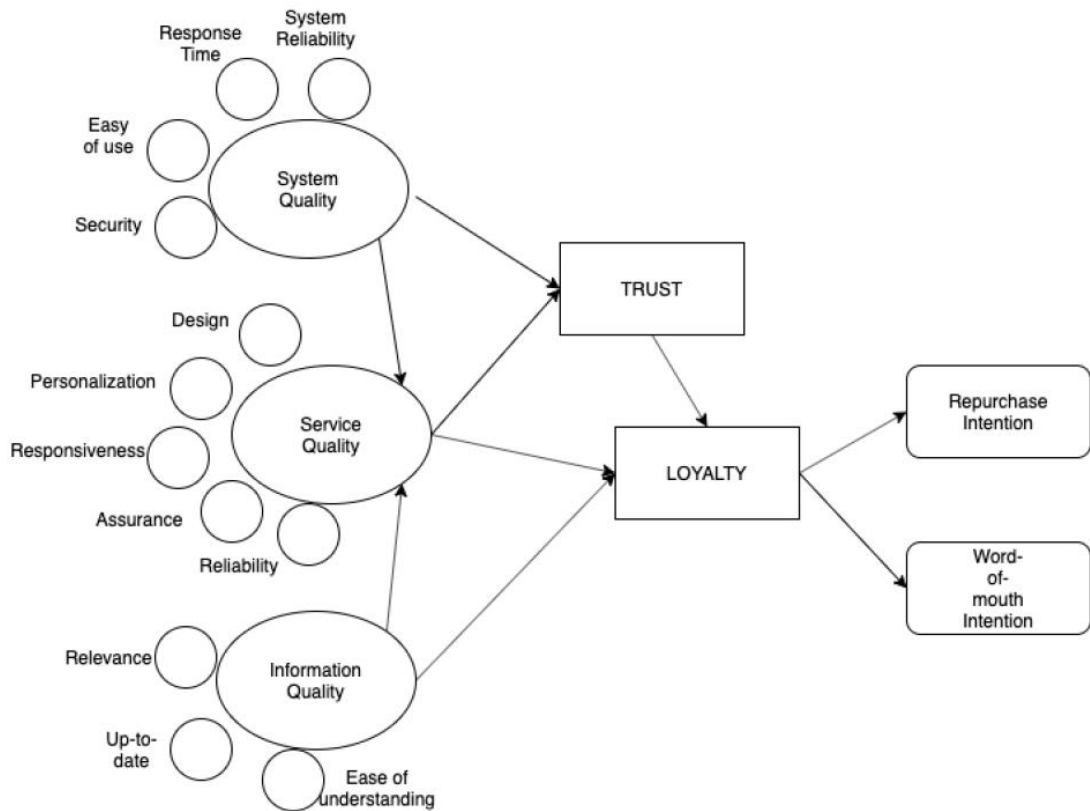


Figure 6. Online Store Success model (Yoon & Kim 2009)

System quality includes four measures – system reliability, response time, ease of use and security. System quality has a direct effect on trust.

Service quality includes the measures of design, personalization, responsiveness, assurance, and reliability. These measures are related to the ease of use of the e-commerce platform, which is significant given that online stores are based on self-service technologies. When utilized successfully, they increase the customer loyalty and trust, which translate to repurchase intention and word-of-mouth advertising intention.

Information quality consists of three measures: relevance, up-to-date information regarding goods and services and ease of understanding of the product offering. The quality of information has been found to significantly influence on the customer loyalty

and service quality and therefore information quality plays an important role in the online stores' success.

Quality in service, information, and systems all universally affect users' perceived quality of an e-commerce platform. (Yoon & Kim, 2009.)

Summing up, the previous parts in this section have covered some of the next digital process automation solutions, such as RPA, EDI, and e-commerce platforms. Companies can utilize these solutions either by developing the expertise in-house or by outsourcing the development to a third-party vendor, or in case of an e-commerce platform, utilize the marketplace model, where many sellers offer their goods to buyers. Selecting the appropriate automation tool and the operating model is an important strategic decision for an organization. In the next part, the conceptual framework is formulated, to assist in building the proposal for order handling automation for the case company.

#### 4.5 Conceptual Framework

The conceptual framework (CF) of this thesis is visualized in Figure 7, highlighting three main elements related to the focus areas that were selected in the CSA. The main elements – RPA, EDI, and e-commerce, that were examined in the previous sections and will be used as a basis to build the initial proposal for business process automation at the case company.

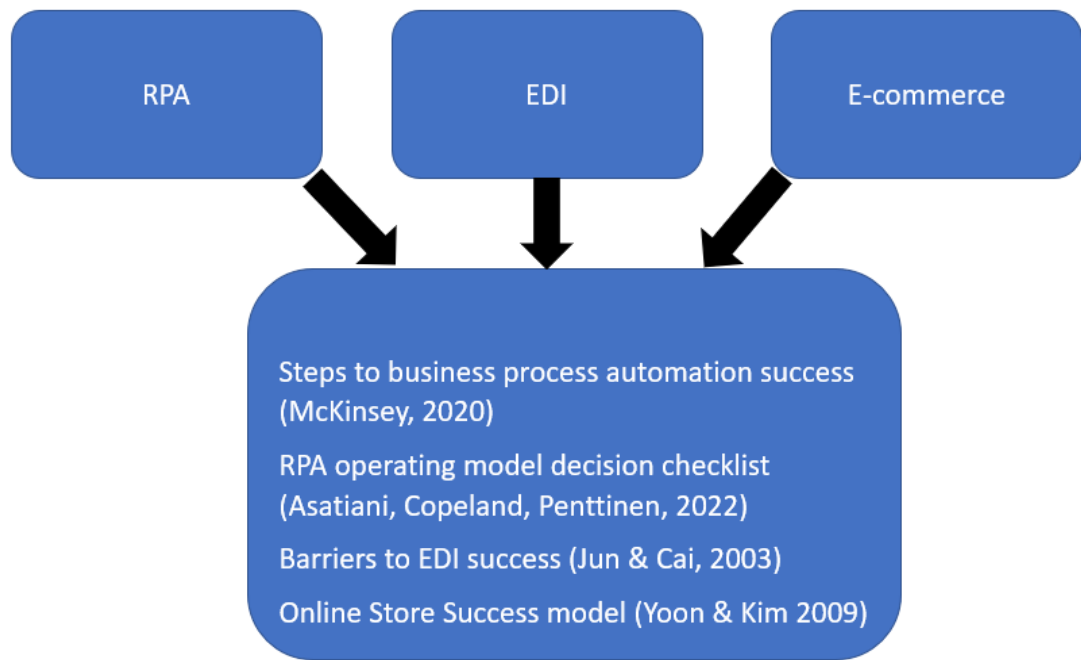


Figure 7. Conceptual framework for guiding the business process automation in a company

As Figure 7 shows, the conceptual framework consists of three different methods for business process automation – RPA, EDI, and e-commerce.

Companies can choose to utilize just one of the three automation tools or combine two or all three of them. The decision depends on the company's strategy and automation targets. To identify how to choose the right tool, the best practice is to follow the steps to business process automation success (McKinsey, 2020)

Together, these three elements, supported by the best practices and the digital strategy, provide the foundation for the initial proposal in the next section.

## 5 Building Proposal for Automating Order Handling Process at The Case Company

This section merges the results of the current state analysis and the conceptual framework towards the building of the Proposal for automating order handling process at the customer service department. The initial proposal is developed in co-creation with the case company based on Data 2.

### 5.1 Overview of the Proposal Building Stage

This section shows the steps in the proposal building for this study. In Section 3, CSA, the current order handling process was described and mapped out. Then, the analysis of strengths and weaknesses was conducted. As the CSA revealed, order handling is mostly done manually, only 8% of all orders are currently processed automatically via EDI. Based on the findings from the CSA, the focus areas for improvement were selected and they are:

1. Find solutions to automatically process the orders that are coming in by email in Excel or PDF format by utilizing the RPA technology,
2. Establish an EDI connection with more customers to reduce manual order entry,
3. Utilize the ecommerce platform to reduce manual order entry.

The proposal also relies on selected suggestions from literature and best practice that are described in Section 4. To keep the proposal building focused, it relies on the conceptual framework based on the main findings of Section 4 that is presented in Section 4.4, best practices, and strategy for implementing RPA, EDI and B2B e-commerce for business process automation.

In addition, the Data 2 data collection was conducted. Data 2 was gathered in workshops and interviews with the stakeholders, which are presented in Section 2.3 Data Collection and Analysis. The data gathered from the stakeholders played an important role for the proposal building stage, as each participant shared ideas, suggestions, and expectations from their perspective, and it was valuable information to build a balanced proposal for improvements for the order handling process and automation.

## 5.2 Inputs for the Proposal Building and Stakeholder Suggestions

The main inputs for the proposal building included: Data 1, findings from CSA earlier, literature review and conceptual framework, as well as Data 2, which was gathered from the stakeholders in this round. The proposal is based and inspired by these inputs.

Data 2 collection focuses on identifying suggestions from the stakeholders. The strengths and weaknesses of the current process were discussed in Data 1. In Data 2, stakeholders were involved to get suggestions and ideas about solutions, suggestions about improving the process and eliminating weaknesses. Data 2 also includes suggestions from literature and best practice on automating order handling process.

Key stakeholders' suggestions and the conceptual framework for automating the order handling process and building a proposal for the case company are emphasized in Table 5, highlighting the key focus areas from CSA (Data 1), inputs from literature (CF) and suggestions from stakeholders for the proposal (Data 2).

Table 5. Key stakeholder suggestions (findings of Data 2) for Proposal building in relation to findings from the CSA (Data 1) and the Conceptual framework.

	<b>Key focus area from CSA (from Data 1)</b>	<b>Input from literature (Conceptual Framework)</b>	<b>Data 2 Suggestions</b>	<b>Description of suggestions</b>
1	Find solutions to automatically process the orders that are coming in by email in Excel, PDF format or "free text" email	a) To successfully automate business process: make automation a strategic priority, focus on people as much as on technology and develop and operating model that enables scaling (McKinsey, 2020)	a) Analyze the customer base and create lists of customers who send Excel or PDF format orders  Identify customers who send "free text" orders by email.  b) Identify the "low hanging fruit" – selected few customers from the lists and test automation solutions for initial market feedback  c) Investigate RPA technology and the possibility to use	a) The task is to create master lists of potential customers whose orders can be automated. List 1 – Customers who send Excel orders  List 2 – Customers who send PDF orders  List 3 – Customers who send "free text orders by email  b) Selection from the list – which customer could be a potential ecommerce platform user, whose orders can be automated with RPA. If possible, test the assumptions in real business environment and gather feedback

		b) Select an appropriate operating model: outsourcing or in-house development of the technology (Asatiani, Copeland, Penttinen, 2022)	for automation process	order c) Detailed description of best practice and implementation
2	Establish EDI connection with more customers	There are seven categories of barriers to EDI success which need to be countered (Jun & Cai, 2003)	Identify and create a list of customers who could be potential EDI partners	List 4 – Potential EDI customers. Analyze the list and contact customers with potential. Establish an EDI connection with at least 1 more (large) customer to increase % of automatic orders
3	Utilize the e-commerce platform to reduce manual order entry	The success of an online store depends on five factors: system, information and service quality, customer trust and loyalty (Yoon & Kim, 2009)	From data (list of customers) that's collected in part 1, select a few customers who could be pilot customers to try and test the e-commerce platform. Gather feedback.	Analyze lists 1-4: identify and approach the selected customers and onboard them to the platform. Gather feedback for validation phase in Section 6

As seen from Table 4, the case company's customer base was analyzed, and multiple master lists of customers was created. These lists are the basis of selecting appropriate solutions for automation for each customer. The key factor for the proposal is to aim for testing the assumptions by involving the customers and gathering feedback from them.

The proposal is pulled together as the initial proposal draft in the next section.

### 5.3 Proposal Draft / Initial Proposal

Based on Table 2, the initial proposal focuses on three concrete ways the case company can automate the order process: first, using RPA technology, second, by establishing EDI connections with more customers, and third, to utilize the e-commerce platform that has been developed in-house by the Group. The approach for the initial proposal is to

pilot test the suggestions for automation in real business environment, and the key results and findings are summarized in Section 5.3.4.

### 5.3.1 Robotic Process Automation (RPA) for Order Processing

Based on the findings in 4.2, RPA is a software solution that uses rules to process structured data to produce deterministic outcomes. For the case company, this means to automate the order entry process. RPA can copy and paste data from one system to another – from Excel files, PDF files or email to the ERP system SAP.

Based on the analysis of the customer base and discussions with the stakeholders, a Master List of potential customers was gathered and is presented in Table 6. The customers were listed based on the method of sending orders. List 1 includes customer who send the order data in Excel files, List 2 of customers who send orders in PDF files and List 3 send free text emails. These customers were selected because they send the orders in a structured way, including material names and product codes, which make it easier to automate with RPA.

Table 6. Master lists 1-3 of potential customers for automation

List 1 – Excel orders	List 2 – PDF orders	List 3 – email orders
Company x1	Company y1	Company z1
Company x2	Company y2	Company z2
Company x3	Company y3	Company z3
Company x4	Company y4	Company z4

Company x5	Company y5	Company z5
Company x6	Company y6	Company z6

The case company can take one out of two paths to establish an operating model – 1) to outsource the automation process to an RPA vendor, or 2) to develop the RPA solution in-house. To assist in making this decision, the RPA operating model checklist in Table 4 was presented.

Action plan for RPA project includes 2 workshop series:

1) RPA operating model checklist review

According to the best practice, the checklist should be reviewed with the key stakeholders in the early stages of the project. All the questions in the checklist should be answered in workshop(s) before making final decisions and proceeding with the project.

The pilot phase for this study was November-December 2021. In that time, an RPA workshop was not conducted due to limited time resources. However, the RPA workshops will be included in the action plan for future implementation.

2) Digital strategy workshop

In relation to the RPA workshop, the business managers should also evaluate how likely they are to meeting their automation targets, by asking three important questions at a workshop, as suggested by McKinsey (2020):

1. Is automation a strategic priority?
2. Are we focusing on employee training and capability building as much as on the technology itself?



### 3. Are we developing an operating model that enables scaling?

Organizations that successfully automate their processes have answered these questions and made these steps a priority, together with selecting the right tools. The goal of the workshop is to align the business leaders and agree on the digital strategy and automation efforts going forward.

#### 5.3.2 Establish EDI Connection with More Customers

As previously mentioned in the CSA, there is only one customer who currently send orders via EDI. This one customer accounts for 8% of all sales orders, thus only 8% of orders are processed automatically.

EDI has potential to increase that number significantly, since large retail distributor customers order large volumes for their chain stores across the country. They also have the technical capability to establish and EDI connection. The downside of starting new development project with these large companies, is that projects can take a long time to finish, thus quick validation and testing are not possible.

A master list of potential retail distributor customers was drafted. The list is presented in Table 7.

Table 7. Master list 4 – Potential EDI customers

Company name	Date of contact
Company (Ksp)	November 2021
Company (O)	October 2021
Company (A)	October 2021

Company (K)	October 2021
Company (W)	December 2021

As seen in Table 7, there were 5 companies that have the most potential for EDI implementation.

Onboarding new customers to EDI happens in phases and is shown in table 8 below.

Table 8. EDI project phases

Request connection	Customer service manager approaches the customer to request an EDI connection between the trading partners
Connection approved	Customer approves the connection request
Customer ready	Customer has allocated resources and is ready to begin the project
Master data exchange	Case company sends the master data (material names, codes, units of measure) to the customer
Requirement clear	Customer updates the master data in their ERP system and trading partners are

	clear on the requirements and expectations
Connection ready	Trading partners establish a technical connection
Testing	Customer sends test orders and case company reviews and gives feedback. Repeated until orders are as expected
Go live	Customers start sending orders via EDI instead of previous ordering method

During the pilot phase, all customers in Table 7 were contacted, and plans were made for further action. Three of the companies in the list agreed to go ahead with establishing the EDI connection. Projects were started with each company to establish the connection but were not finished by the end of 2021. Thus, the effect on the overall electronic order processing was not determined by the end of this phase of the project. However, there is a clear path to moving forward with onboarding new customers to EDI.

Table 9. Action plan for EDI implementation

	Request connection	Connection approved	Customer ready	Master data exchange	Requirement clear	Connection ready	Testing	Go live
Company (K)	Green	Red	Red	Red	Red	Red	Red	Red
Company (O)	Green	Green	Green	Green	Green	Green	Red	Red
Company (A)	Green	Green	Red	Red	Red	Red	Red	Red
Company (K)	Green	Green	Green	Green	Green	Green	Red	Red
Company W	Green	Red	Red	Red	Red	Red	Red	Red

As seen in the action plan, the connection request was approved by 3 customers and should be followed through the project phases to complete the onboarding.

### 5.3.3 Utilize the ecommerce Platform

The case company has developed an e-commerce platform called E-Shop. The platform has a dedicated development team and are constantly improving the platform based on the customer needs. The platform is in active use in many of the operating countries in North America, Asia, and Europe.

The E-Shop platform has been under development since 2020 in Finland, but due to limited resources, no significant progress was made. More focus was put on the project in 2021. Pilot testing with the first selected customer began in Nov-December 2021.

Selected customers from list 1-3 were:

Company x5

Company y2

Company y3

Customer service contacted the customer by email and sent them the login details and asked the customers to try out the platform. During the pilot phase November-December the customers placed orders through the platform that accounted for 1% of the overall orders. In the pilot phase, one customer continued to place some orders in their previous method, by sending Excel files to the customer service email. According to the online store success model, a customer will repurchase if the shop has system, service, and information quality, that create trust and loyalty in a customer.

The model should be used to identify from customer interview/questionnaire, where the customer perceives quality and what could be improved. The interview/questionnaire questions based on the model by Kim & Yoon (2009)

### **1. System quality**

- Please rate the system/shop reliability
- Please rate the response time of the system
- How easy or difficult is it to use the system?
- How secure is the shop in your opinion?

### **2. Service quality**

- Please rate the design of the shop
- Is the shop personalized to your needs or is it generic?
- How responsive is the shop?
- Please rate the professionalism of the shop
- Please rate the reliability of the shop

### **3. Information quality**

- How relevant to your business is the information found in the shop?

- Is the information on the shop up to date?
- How easy or difficult is it to understand the information provided?

The customer feedback will be valuable to further develop the platform from a technical point of view. But in addition, a change in customer behavior requires some additional *incentives*, for example, the case company could offer additional discounts or other benefits for customer that place orders on the e-commerce platform. Furthermore, the platform offers more than purely transactional functions, it should be marketed as a *customer platform*, rather than only a web-shop, because the platform provides additional value, such as order history overview, invoices, price lists, and information about the product offering. Going forward, the marketing materials should reflect the additional benefits of the platform, to incentivize customers to log-in and experience the added value from having 24/7 access to the service.

#### 5.3.4 Summary of the initial proposal

The outcome and summary of the initial proposal in the three focus areas is presented in 10 Table below.

Table 10. Initial proposal

RPA	EDI	E-commerce
- Master List 1-3	- Master List 4	- Master List 1-3
- RPA operating model review workshop	- Follow the implementation steps with selected customers	- Gather customer feedback in the form of interview or survey
- Digital strategy workshop		- Incentivise use by offering discounts or creating a campaign (collaborate with Sales)
		- Create marketing materials that promote the platform as a customer portal,

		rather than only an online shop
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This section presented the findings of pilot testing and the initial proposal in the three selected areas, RPA, EDI, and e-commerce. The validation of the proposal is discussed in the following section.

## 6 Validation of the Proposal

This chapter gives an overview of the validation of the proposal. It discusses the feedback received from the key stakeholders, shows the results of the validation stage and points to further improvements to the original proposal. This section ends with the final action plan.

### 6.1 Overview of the Validation Stage

This section validates the proposal developed in Section 5. The goal of the validation is to develop a final action plan for automating the order handling at the case company through the application of three selected focus elements: RPA, EDI, and e-commerce. Validation refers to piloting, testing, try-out, or key stakeholder evaluation (expert judgement) of the initial proposal in Section 5. In this study, expert judgement was utilized for validation.

The validation phase was conducted in a workshop with the key stakeholders, including customer service specialists and the department manager. The initial proposal was presented to the stakeholders and department manager, who is responsible for developing the improvements for the customer service department and establishing the overall strategy for customer service at the case company.

### 6.2 Developments to the Proposal

Data Collection 3 concentrates on expert feedback and suggestions proposed by the validation key stakeholders to the Initial proposal in Section 5. Data Collection 3 is focused on the proposal contents and seeks to finalize it based on the company feedback.

Expert feedback and suggestions in the three selected focus areas, RPA, EDI, and e-commerce is discussed in detail in the next sections.



### 6.2.1 Developments to Element 1 of the Initial Proposal

For the first element RPA, pilot testing was not possible in the previous project phase, due to lack of resources. However, the key stakeholders found this technology promising and the feedback was positive and neutral, as seen in table 11.

Table 11. Feedback to Element 1 - RPA

RPA	Feedback
- Master List 1-3	- Approved
- RPA operating model review workshop	- Positive
- Digital strategy workshop	- Positive, neutral

As seen in the table above, the master lists were approved as a basis for selecting potential customers for automation in the future.

“The customer base has been analyzed and the lists provides a good starting point to implementing a new automation process with selected customers.” (Stakeholder D)

The proposal for an RPA operating model review workshop was positively received.

“A professional and detailed approach for moving forward with this technology.” (Stakeholder A)

The proposal for a digital strategy workshop received positive and neutral feedback.

“Business process optimization is part of a bigger picture in the organization, and it makes sense to involve managers from other functions to align and formulate a common vision and plan.” (Stakeholder B)

“The technology can be approved, but also needs people’s agreement and willingness to make the investment and required changes.” (Stakeholder A)

“The technology itself sounds very promising, but it can also be costly. The technology can be successful if it will get the support from management to allocate extra resources. It needs approval from upper management who need to see concrete financial benefits.” (Stakeholder C)

The outcome for Element 1, RPA, was validated according to plan, through *Data 3*, and is considered successful.

### 6.2.2 Developments to Elements 2 of the Initial Proposal

The second element, EDI, was found to have strong potential and response from customers was positive in the project pilot phase. The EDI process was initiated with 3 customers in 2021 but was not finished by the end of the year. However, the customers selected for EDI are large retail distributors with many suppliers, which means processes can take time.

Table 12. Feedback to Element 2 - EDI

EDI	Feedback
- Master List 4	- Approved
- Follow the implementation steps with selected customers	- Positive

As seen in table 12 above, the stakeholders were satisfied with the outcome and had only supportive and positive feedback.

“The project phases are well described, and good progress was made with the three customers in the pilot phase. The path forward with the selected customers is clear and will be followed until completion.” (Stakeholder A)

“The pilot phase gave a good kick-start for onboarding more customers. Since the selected customers place a large volume of orders annually, it will certainly improve order handling efficiency.” (Stakeholder C)

The outcome for Element 2, EDI, was validated according to plan, through *Data 3*, and is considered successful.

### 6.2.3 Developments to Elements 3 of the Initial Proposal

The third element, e-commerce, gave some promising results in the pilot testing period during Nov-December 2021. Three customers were placing orders via the E-Shop and gave 1% of electronic order processing increase to Finland. Together with the 8% EDI orders, 9% of all orders in December 2021 were placed electronically. The goal for the case company is to process 50% of all orders in the Nordic OPCOs (operating companies) Finland, Norway, Sweden, Denmark. As seen in Figure 8, by the end of 2021, 45% of orders were processed automatically in the Nordic OPCOs.

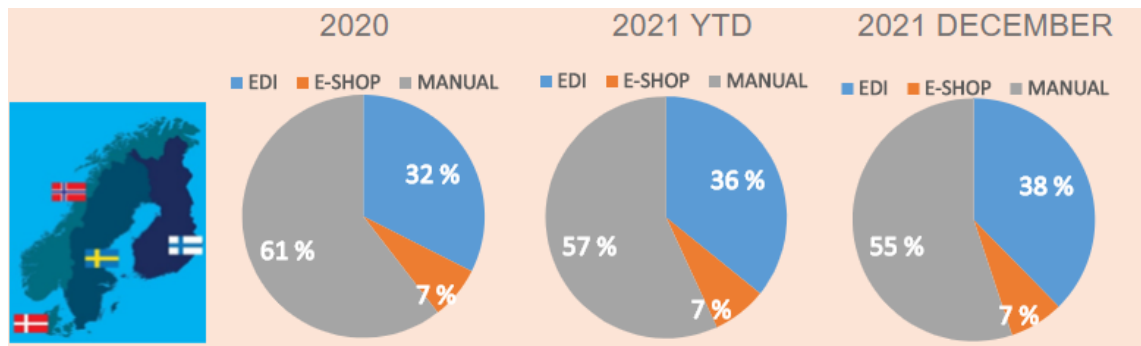


Figure 8. Electronic orders in the Nordic OPCOs

While Finland contributed only 9% of electronic orders to the Nordic OPCO, there was a rise in electronic orders in the OPCO, and 45% of all orders came in electronically in December 2021. With some further actions, and with the support from the Finnish OPCO, the overall goal of 50% of electronic orders should be reached in 2022.

The e-commerce platform plays a key role to reach the target in 2022, since the platform is already developed by the case company.

Table 13. Feedback to Element 3 - e-commerce

E-commerce	Feedback
- Master List 1-3	- Approved
- Gather customer feedback in the form of interview or survey	- Approved
- Incentivise use by offering discounts or creating a campaign (collaborate with Sales)	- Approved
- Create marketing materials that promote the platform as a customer portal, rather than only an online shop	- Approved

As seen in the table 13 above, stakeholders approved the initial proposal and shared supportive comments.

“It is great to have interview/survey questions prepared and in the next phase, the customers feedback can be used to improve the platform.” Stakeholder C

“It is better to get feedback from real users rather than guessing what should be improved or what customers think.” Stakeholder A

“To make the platform successful it will take a cross-department collaboration with Marketing, Sales, and IT/Developers.” Stakeholder D

The outcome was validated according to the plan, through Data 3, and is considered successful.

### 6.3 Final Proposal / Action Plan

The initial proposal was validated in this phase and will be used as an action plan to optimize and automate the order handling process at the case company. The Final proposal includes target dates of when steps should be finalized and are marked in yellow in the final proposal below:

Table 14. Final proposal / Action Plan

RPA	EDI	E-commerce
- Master List 1-3	- Master List 4	- Master List 1-3
- RPA operating model review workshop (September 2022)	- Follow the implementation steps with selected customers (Due December 2022)	- Gather customer feedback in the form of interview or survey (September 2022)
- Digital strategy workshop (December 2022)		- Incentivise use by offering discounts or creating a campaign (collaborate with Sales) (October 2022)
		- Create marketing materials that promote the platform as a customer portal, rather than only an online shop (October 2022)

The customer lists were generated in Section 5 and were approved by the key stakeholders. The action plan includes practical steps, supported by best practices, to successfully carry out business process automation at the case company. The plan was validated by the key stakeholders and is ready to implement in the planned steps. The target for 2022 is to reach 50% electronic order handling at a Nordic level.

## 7 Conclusion

This chapter of the thesis summarizes and evaluates the study from the objective definition to the outcome.

### 7.1 Executive Summary

The objective of the thesis was to create a proposal and action plan for optimizing and automating the order handling process at the case company. The company is the world's leading mineral wool products manufacturer headquartered in Denmark with offices in 39 countries globally. In the past few years, the sales of the Finnish organization have been growing rapidly in double digits. Every year the company handles more sales orders, so to keep up with the increasing workload, the company needs to either streamline and optimize the order handling process or to hire more employees to handle the orders. The business challenge of this thesis was to help the company to reduce repetitive manual tasks by implementing business process automation tools rather than hiring more people to handle the increased number of orders manually.

The study was conducted using the case study research approach and used qualitative research methods, such as interviews, discussions, observation, and workshops. The research method was selected with the aim of analyzing the current process and developing it further in cooperation and with the help of input from the internal stakeholders. The data was collected in three phases, first, the current state analysis, second, the review of existing knowledge and best practice, and third, the proposal building and validation of the proposal. The proposal was built by merging the results of the current state analysis and the conceptual framework.

The current state analysis was carried out to get a comprehensive view of the current order handling process at the case company. Internal key stakeholders were interviewed to determine the strengths and weaknesses of the current process to then define focus areas for improvement. The results of the current state analysis showed that there is very little automation in the current process, where 92% of orders are handled manually, which is time consuming, repetitive and with high risk of errors. Since many orders in the current process are coming in as PDF and Excel files, the selected focus area was to automate those orders. In addition, one customer is already using EDI, which accounted

for 8% of all sales orders, so the second focus area was to include more customers to EDI. The third focus area was related to utilizing the e-commerce platform that is already existing and developed in-house by the case company, but not yet used in Finland.

After the current state analysis, the conceptual framework was created based on the existing knowledge and best practice around the topics of business process automation and systems that enable business process automation. The solutions and methods that were investigated include robotic process automation, EDI, and e-commerce platforms. Best practice and literature were explored and provided the foundation for the proposal to automate the order handling at the case company.

The proposal was co-created with the key stakeholders, who provided their input and suggestions during a workshop and interviews. The data gathered from the stakeholders played an important role for the proposal building stage, to ensure a balanced proposal with multiple perspectives. The case company's customer based was analyzed and multiple master lists of customers were created. The purpose of the lists was to find suitable automation solutions for each customer. The proposal building stage was a pilot phase, where the assumptions were tested in a real business environment with customers, where possible. For example, seven customers were contacted to initiate an EDI connection, three of them agreed to go ahead with the project. In addition, three customers were contacted to test the e-commerce platform E-Shop and those customers placed 1% of total orders via the online shop during the pilot phase. However, RPA was not possible to test during the pilot phase, instead practical steps were identified to start the RPA project in the future. Based on the findings from the pilot phase, steps to further implement each technology was summarized in concrete suggestions as the initial proposal.

The final proposal was validated and approved by the key stakeholders by the end of this study. The final proposal includes the steps listed in the initial proposal and target dates, when steps should be finalized, so it can be used as an action plan to optimize and automate the order handling process at the case company.

The outcome of this thesis is the action plan for automating the order handling process at the case company by utilizing three methods, RPA, EDI, and e-commerce. The pilot phase gave some promising results from two of the methods, EDI, and e-commerce, from real business environment and feedback from the customers. The final proposal

and action plan includes steps and target dates, by which the organization can automate the order handling process with selected customers by the end of 2022. Automation is urgently needed, as order volumes have been growing in double digits in the past few years and the outlook for growth remains positive for the coming years.

## 7.2 Thesis evaluation

The objective of the thesis was to create a proposal and action plan for optimizing and automating the order handling process at the case company. The outcome was an action plan with three solutions and methods, robotic process automation, EDI, and e-commerce platforms, to enable the automation of the order handling process. The action plan includes lists of customers who were selected for the automation initiative, based on how they send the orders in the current process. The outcome of the thesis met the objective of the study.

Thesis evaluation includes the main criteria for research quality in qualitative research, which are *credibility*, *dependability*, *transferability*. The *credibility* of the thesis was ensured by conducting several data collection rounds from multiple trustworthy high-quality sources. *Dependability* of the thesis was strengthened by validating the proposed improvements with the key stakeholders, and *transferability* by focusing on the clarity of the research design and analysis. *Authenticity* was selected as an additional criterion, to indicate fairness and including all relevant key stakeholders in the development of the study.

The study provides the case company a practical action plan that is based on best practice of business process automation by methods that are relevant and can be implemented in the organization based on the needs of the organization, as well as the capabilities. The data collected and information gathered for this study were from reliable sources and key stakeholders, which makes this study credible and reliable.

## 7.3 Closing words

The final section is dedicated to my own reflection on the thesis and the thesis writing process, which has been a long yet rewarding journey. The business challenge is relevant for many modern organizations, who seek to reduce manual work, so that



employees would have more time for strategic and value-added tasks. Technological advancements have brought automation opportunities to the workplace and automation is becoming a common element of every business. To reap the benefits and opportunities of automation, business leaders and employees must come together to design and lead the changes, as well as operate and monitor new systems. Change will not happen overnight, it will require human engagement and oversight, as the current technologies are not fully independent or autonomous. It is exciting to be part of the technological shift and participate in modernizing the business processes of my own workplace. It has been an honor to take on this challenge and work with my talented colleagues to propose practical solutions and help the department and organization reach the next level in the digital business environment. I hope my contribution has been useful and will have a long-lasting impact for the organization's daily effectiveness. I am grateful for the opportunity to grow professionally and for the support along the way from my colleagues, as well as the guidance and mentorship from the staff at Metropolia University of Applied Sciences.

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### **Current state analysis interview questions**

1. How would you describe and rate the current order handling process?
2. What are the strengths of the current process?
3. What could be improved?
4. What parts of the process could be automated?

