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Functional Specification for Enabling Efficient Workshop Manual Creation Process for Wärtsilä

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BACHELOR'S THESIS

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Abstract

This thesis work is made on behalf of Wärtsilä, Maine Power, for the department Workshop Operations Development in Vasa, Finland. The company have about 17 500 employees and focus on the Marine and Energy market, in 2021 Wärtsilä net sales were 4,778 billion euro.

The purpose of this thesis was to create a functional specification for enabling efficient collecting of documents to be able to make the process more efficient and automated. The process used today takes a lot of time and is done manually.

The methods used in this thesis are meetings and discussions with managers and employees within Wärtsilä to gather information about the existing systems and investigate the possibilities. Internal systems were also used to collect needed data for the project. The theory is based on literature and research on the internet.

The result of this thesis work is a proposal for a functional specification that can be used when automating the current process. Some chapters in the thesis will not be published due to sensitive material. These chapters are marked "Confidential" and are not visible for the public.

Language: English
Key Words: Process Improvement, Flowcharts, Functional Specification, Documents

EXAMENSARBETE

Författare:	Simon Sandholm
Utbildning och ort:	Produktionsekonomi, Vasa
Handledare:	Eva-Lotta Enges, Wärtsilä Finland Oy
	Mikael Ehrs, Yrkeshögskolan Novia

Titel: En funktionell specifikation för att möjliggöra en effektiv process för skapande av verkstads manualer för Wärtsilä

Datum: 30.5.2022 Sidantal: 34 Bilagor: -

Abstrakt

Detta examensarbete är gjort på beställning av Wärtsilä, Marine Power, för avdelning Workshop Operations Development i Vasa, Finland. Företaget har omkring 17 500 anställda och fokuserar på marine- och energimarknaden, 2021 hade företaget en omsättning på 4,778 miljarder euro.

Syftet med detta examensarbete är att skapa en funktionell specifikation för att möjliggöra effektiv insamling av dokument för att kunna göra process mera effektiv och automatiserad. Eftersom processen som används idag tar väldigt mycket tid och utförs genom manuellt arbete.

Metoderna som används i detta examensarbete är möten och diskussioner med chefer och anställda för att samla in information om existerande system och undersöka möjligheterna. Interna system användes också för att samla in data för arbetet. Teorin är baserad på litteratur och forskning på internet.

Resultatet av detta examensarbete är ett förslag på en funktionell specifikation som kan användas vi automatisering av nuvarande process. Vissa kapitel i detta examensarbete kommer inte publiceras eftersom de innehåller känsligt material. Dessa kapitel är märkta ”konfidentiell” och kan inte ses av allmänheten.

Språk: Engelska
Nyckelord: Process förbättring, Flödeskartor, Funktionell Specifikation, Dokument

Table of Contents

List of Abbreviations

WS	Workshop
WS Manual	Workshop manual, manual used by workshop operators when doing an overhaul.
WAMS	Workshops Activity Management System
TKB	Technical Knowledge Base, documents are stored
Drawing View	Drawings and documents are stored
ToR	Table of References, a list of reference documents possible needed for the WS Manuals
PRT	Product Reference Type, for example engine, propulsion equipment
SPWV-Code	Service Product Workshop Volume, standardized WS service products
PBI	Power BI
WV-Code	Workshop Volume Code
SRS	Software Requirements Specification
RPA	Robotic Process Automation

1 Introduction

This thesis work is made for Global Workshop Operations team, Wärtsilä Finland and is a part of the Marine Power Business. The team is newly founded on 1.7.2020 and focuses on the way of working in the workshops to deliver the best possible services. From 1.2.2022 the team was renamed Workshops Operation Development.

This chapter will explain the background and purpose area of this thesis work. After that the problem area, delimitation, confidentiality, and disposition will be presented.

1.1 Background

Today a big part of the documents needed when doing an overhaul are found in Technical Knowledge Base or Drawing View. The Workshop operators, Team leaders and Field service coordinators all use these documents. It takes a lot of time just to search for the documents, when they need to find the needed documents by manually searching. To speed up the job preparation process and to make it easier for the workshop operators the Workshop Manuals concept was created. This process can be divided into three different steps. Collecting Table of References, Creating checklists and Useful manuals.

The idea is that my thesis work covers the first step in the process chain, Collecting Table of References. This step is the most important step going forward because these documents are the foundation of the workshop manuals. In a test project in Hamburg the job preparation time was reduced a lot when the needed documents were provided in a list. By having all the references collected in one place can save a lot of time on a yearly basis.

Today Table of References is collected by manually searching in Technical Knowledge Base and Drawing View and after that inserted in an Excel document. The documents are inserted with necessary information about the document. The problem with working in Excel is that the collected references do not stay up to date and are not so reliable if something happens to the Excel file. The references are shown by using Power BI.

1.2 Problem area

The current system used today consists of two databases, Technical Knowledge Base and Drawing View where most of the needed documents are found. The reference documents and drawings are found by searching by a specific ID, name or, by some filtering options. The problem with this system is that you cannot filter by the standardized workshop service products (SPWV-code) in Technical Knowledge Base or Drawing View, so when the Workshop operators, Team leaders and Field service coordinators are looking for a document it takes a lot of time to find the information when "googling" around.

Today nobody can say what the right documents to use are. When all workshops are searching for the documents by themselves without guidelines there are a lot of different documents used. The language skills also impact the results when searching for documents and all have different skills in English. The searching is like googling for them and with more specific searches more relevant documents are found.

The problem was found during my summer trainee period when we started to collect the Table of References. It takes a very long time to do it manually and the other problem is that the documents collected need to stay up to date.

1.3 Purpose

The purpose of this thesis is to make the workshops more efficient and digitalized. By making the information more available and in one place. This will be done by creating a specification on how to collect and maintain the Table of References. Providing them with Table of References will support getting a more standardized way of working because today many workshops use their local instructions or printed copies. Another important thing is that the collected references stay up to date, so the users got the right instructions if changes are made.

By creating this, the information is easily accessible to the Workshop operators, Team leaders and Field service coordinators. All workshops also get the same pre-checked list of documents which contributes to better control of used documents. This is very important because the overhaul needs to meet the same standards in all Wärtsilä workshops around the world. The purpose is that the finished product should be easily accessible and easy to

use for every user. Even that you only should need to look at one place for the documents which speeds up the overhaul time and make the process more efficient for the whole chain.

Today the process is completely manual, and it takes a lot of time to search for the documents. The aim is to deliver a specification that can be used when automating this process in the future. This will be done by investigating existing systems in the company to make the information easier accessible so it's possible to make the hole or parts of the process automated.

1.4 Delimitation

This thesis work is ordered from Wärtsilä, Workshops Operation Development to find a way to improve the current concept used when collecting Table of References. It is limited to investigation of a possible concept to get a more automated and up-to-date system and focuses only on Technical Knowledge Base because most of the needed documents are stored in this database. This thesis will therefore not include the software part.

1.5 Confidentiality

Confidentiality materials are the Current situation, Method (Salesforce part), and Result chapters, because they contain internal and sensitive information about the company.

1.6 Disposition

Short description of the content in each chapter.

The first chapter gives the reader a better understanding of the background, purpose, problem area, and delimitation of this thesis work.

The second chapter gives a short presentation of Wärtsilä as a company from the start until how it looks today. It also presents the Field Service and Workshops business unit in more detail.

The third chapter presents the theory part of this thesis and in the fourth chapter, the current situation where the process is explained and shown in more detail.

In chapter five the methods used during the project are explained and in chapter six the result of the thesis is presented together with the future development ideas.

In the last chapter, the thesis work is discussed.

2 Wärtsilä

Wärtsilä was founded in 1834 as a sawmill in Tohmajärvi. After that, the company has changed its business many times. The start of today's business started in 1954 when the company decided to start building their first own diesel engine in Vasa, Finland. Today Wärtsilä is a global leader in innovative technologies and lifecycle solutions for both the marine and energy markets. (Wärtsilä, 2022)

The company focuses on two markets marine and energy. Today Wärtsilä has about 17 000 employees in 68 countries and more than 200 locations, about 20% located in Finland. In the 2020 second quarter the company segments changed and are today divided into four segments: Marine Power, Marine Systems, Marine Voyage, and Energy. (Wärtsilä, 2022A)

Håkan Agnevall is Wärtsilä's CEO from the beginning of 2021 when he replaced Jaakko Eskola. In 2021 the net sales were 4.778 billion EUR and are listed on Nasdaq Helsinki. The services sales were 52% and equipment sales 48% in 2021. (Wärtsilä , 2022E)

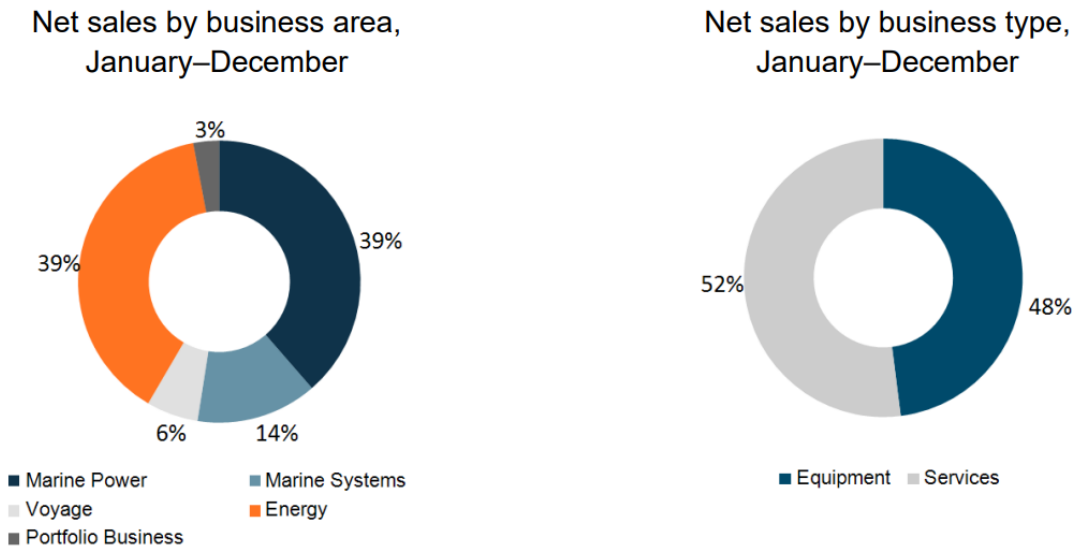

Figure 1. Net sales by business area and business type 2021. (Wärtsilä , 2022E)

This thesis is made for Marine Power, the portfolio includes engines, hybrid technology, integrated powertrain systems, and propulsion system to decarbonize maritime. For the customers Marine Power can offer a lot of expertise, life cycle solutions, and performance-based agreements. (Wärtsilä, 2022B)

Field Services and Workshops

Field Services and Workshops is a business unit in the Marine Power. The unit focus on the way of working and the tools within the company to give the customers the best possible services. They offer a range of services that can be seen in Figure 2 and have bases in 38 countries for Field Service Engineers and Workshop Operations in 34 locations. (Wärtsilä Corporation, 2022)

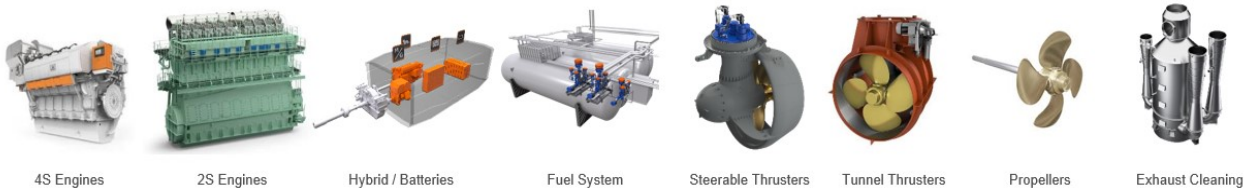

Figure 2. Main products that Field Services and Workshops Serve, from Wärtsilä FS&WS EXTERNAL presentation April 2022 (Wärtsilä Corporation, 2022).

The Field Services and Workshops organization functions can be seen in Figure 3. It includes Global Expert Operations, QuantiServ & Workshop Development, Business Unit Development, FS&WS Business HR, FS&WS Legal support, Business Control, and five Services Regions. (Wärtsilä Corporation, 2022)

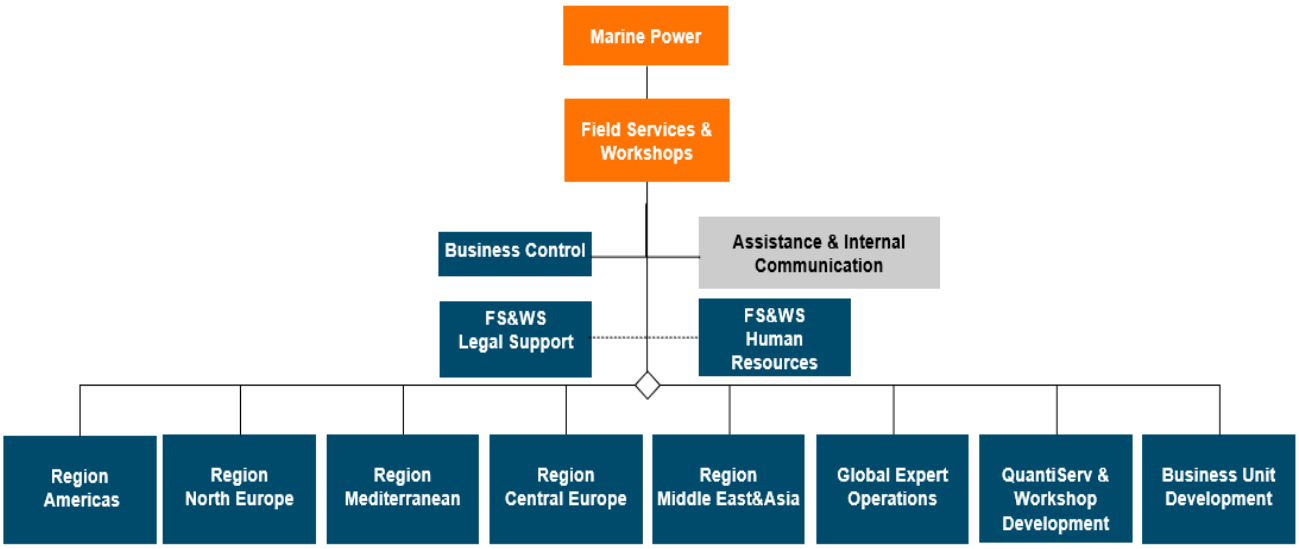

Figure 3. MARINE POWER - Field Services & Workshops Management Team, from Wärtsilä FS&WS EXTERNAL presentation April 2022 (Wärtsilä Corporation, 2022).

QuantiServ and Workshops Development (QS&WD)

QuantiServ and Workshops Development is a part of the business unit Field Services and Workshops in the Marine Power. QS&WD working on improving and developing the way of working and the tools used in the Workshops to deliver the best possible services for the customers. Also works as the center of excellence for the different workshop operations. The function is also in charge of the QuantiServ brand within the company. (Wärtsilä Corporation, 2022)

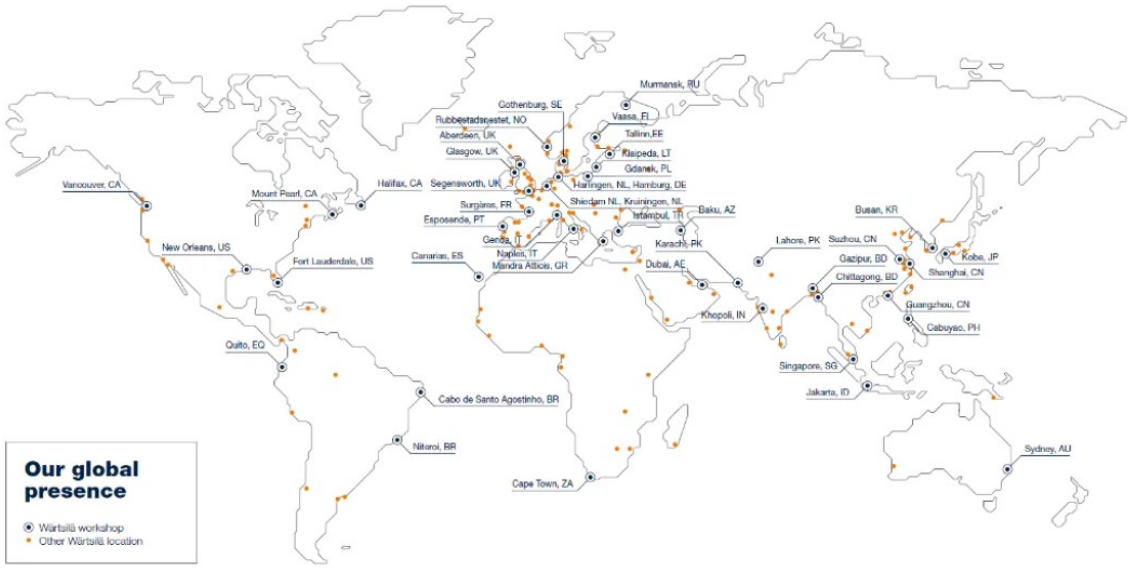

Figure 4. Global map (Wärtsilä, 2022D)

Wärtsilä has close to 3000 Field Service Professionals in 70 countries. Figure 4 shows the location of the Wärtsilä workshops around the world. Today there are 48 active workshops globally. The service volume is around 65 000 components yearly. (Wärtsilä, 2022C) (Wärtsilä, 2022D)

3 Theory

This chapter presents the theory that is relevant to this thesis and works as the foundation. The theory is based on books and websites. The theory is divided into chapters for the different subjects. The first subject is Process improvement after that Flowchart, Specification, and Process Automation.

3.1 Process improvement

Boutros & Cardella (2016, p. 2) describe a process as follows:

"A Sequence of linked tasks or activities that, at every stage, consume one or more resources to convert inputs into outputs."

An example of this can be a company that manufactures steel pipes, in this case, the input is steel and the output are steel pipes. The resources can be machines, time, and money. (Boutros & Cardella, 2016) Processes are something we all use or are a part of every day both at work and at home. (Dan, 2005)

A process contains five elements:

- Inputs
- Activities
- Outputs
- Resources
- Controls

Processes are very important for all types of companies in all areas and help the company manage the work and find different problems in the company. (Dan, 2005) A process always includes three elements which are inputs, activities, and outputs. The level of controls and resources depends on the process in question and is different from case to case. To make the process as efficient as possible all these elements need to be combined with each other in the best possible way. (Boutros & Cardella, 2016)

A process can also be categorized into three types:

- Business Processes
- Support Processes
- Management Processes

Business processes are a process consisting of the main activities that bring value to the company. It often begins and ends with the customers therefore the focus is on the customers and creating value for them. Business processes can include activities like installation services and product development. (Boutros & Cardella, 2016)

Support processes are what the name says a process that supports the core processes. This process ensures that the company works and takes care of tasks within the company like finance and accounting and involves back-office processes. (Pratt, 2022)

Management processes work a bit like the steering wheel in a car, it helps the company to stay on track and in the right direction. Setting the strategies and targets to reach the goals. (Boutros & Cardella, 2016) It can also include the type of measurement of different activities within the company, this type of process works more in the background with internal tasks. (Pratt, 2022)

Process improvement is described as follows by Boutros & Cardella (2016, p. 8):

"Process improvement is the act of making any business process or procedure more effective, efficient, or transparent."

To get started with a process improvement the first step is to find something in the process that is broken. There are many reasons why companies start with a process improvement which can be everything from unhappy customers to many errors. (Dan, 2005)

In this case, the process takes a too long time and needs a lot of manual work. Process improvement is not only rebuilding entire processes as the first thought often maybe. Often it can be small adjustments in current processes to meet the customer's needs, cost savings, and improve the work environment. A small change in a process can contribute to

big savings over time and every improvement is important for a company. (Boutros & Cardella, 2016)

To get the best possible result it is important that all employees follow the new process and work with it and not against it. Process improvement helps the company work and act in a more organized way which for example can reduce errors, costs, injuries, and workload which leads to better efficiency and less costs for the company. Over time, it also can help the company to keep the market shares and expand into new ones. (Boutros & Cardella, 2016)

3.2 Flowchart

A flowchart is a diagram that shows the different steps in a process and how they are connected to each other. From the beginning, the flowcharts were used as a tool to show programming logic and algorithms in computer science. (Visual Paradigm, 2022)

The diagram is easy to understand and can be used even if the process is more complex. Flowcharts are a useful tool to investigate how processes work, they can be used to find bottlenecks, improve processes, troubleshoot problems, map processes, and standardize processes. (Boutros & Cardella, 2016)

When creating a flowchart there are some steps to follow, these steps will be presented now. Start by identifying the process, and its start- and endpoint. The process is the linked activities done from start to end. To get started with this you can start with drawing a map of the main elements of the process. The next step is to list all required activities and organize them in the right order from start to end. When the activities are in the right order insert arrows between them to display the workflow. (Boutros & Cardella, 2016)

A flowchart consists of many different symbols, arrows, and words to show the process. All symbols represent one step in the process. A flowchart can be made in different ways vertical or horizontal. The most common is to read it from top to bottom (vertical) or from left to right (horizontal). (Dan, 2005)

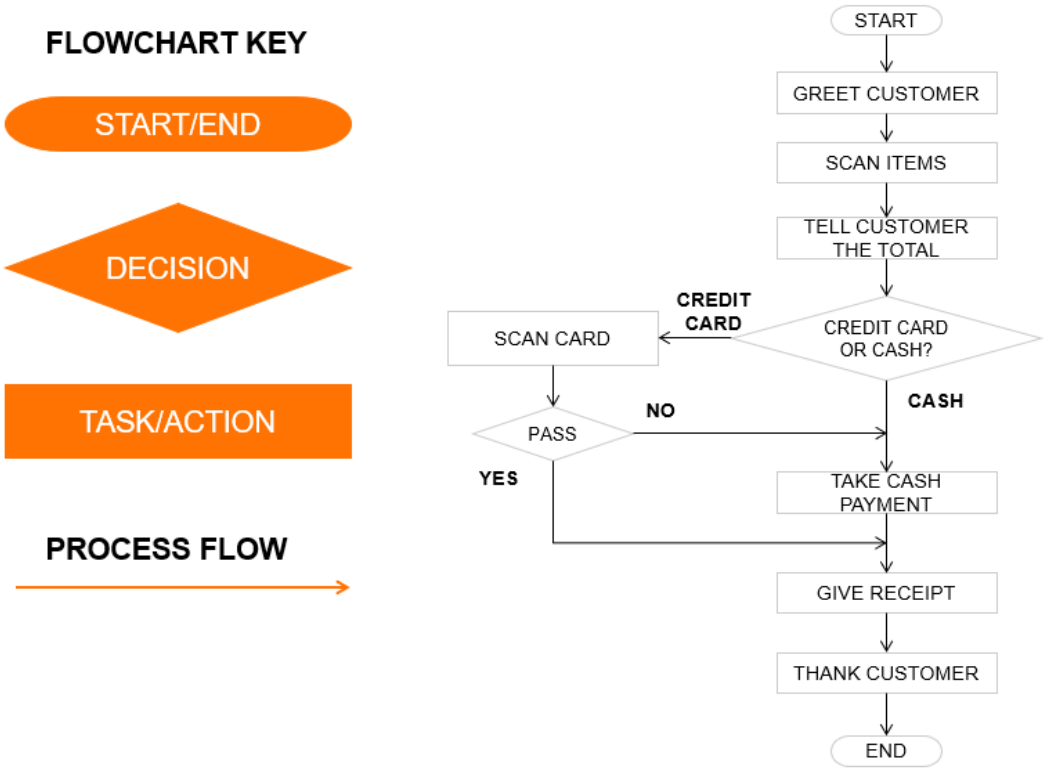

Figure 5. Flowchart example. (Boutros & Cardella, 2016, p. 51)

In Figure 5 the most basic symbols are presented. The first symbol is an oval and it's used to display the start and stop of a process. The second symbol is called a diamond and represents a decision that will split the process into two directions. The third symbol is a box which represents the activity. Within the symbols, a short text also describes the activity in a few words. The last arrow represents the direction of the flow in the flowchart and connects the different activities with each other. (Dan, 2005)

Flowcharts have a wide area of uses and can be created with simple methods. They are also describing the process very well and give the big picture of the process easily. Help to make decisions and see where the problems or steps that are unnecessary in the processes are. (Boutros & Cardella, 2016) (Visual Paradigm, 2022)

In this thesis, flowcharts have been used to identify and understand the process. In the beginning, the current process was identified by creating a flowchart of the main elements to make it possible to develop and create a new process that can be automated.

3.3 Specification

This thesis work is to create a specification/concept that can be used when automating the process. To understand and describe the current and coming process in this thesis work flowcharts and specifications have been used.

Weele (2010, p. 32) describes the functional specification as follows:

"A functional specification describes the functionality which the product must have for user"

A practical example of this specification can be greenkeeping. In a simple case like this, it is also important to be very specific otherwise it can lead to big problems. To give an example of this it can be to move the grass once a week. If the time is not more specified than this, it means that it will be done once a week until the contract is over even in the winter. So even if the task is very basic it is very important to be accurate and clear in the specifications. (Weele, 2010)

The functional specification is a document that can be used when developing a process. The functional specification contains information about the product like layout and properties. This specification works like the framework and guide when the software is created by the developer. (Rosencrance, 2019) It can easily be explained as the instruction manual and needs to be followed from start to end by the software developer. (Study, n.d.)

The functional specification can be in different formats:

- Business Requirements Document (BRD)
- Functional Requirements Document (FRD)
- System/Software Requirements Specification (SRS)

(Rosencrance, 2019)

In this thesis, the most central format for the functional specification is the software requirements specification. The SRS is describing how the software should work and deliver. It also helps the involved employees to understand the details of the project. (Jama software, n.d.)

The benefits are many with using a functional specification. But one of the most important benefits is that it describes the requested inputs and outputs of the software and helps the software developers when creating the software which can reduce the costs and time. (Rosencrance, 2019) (ProfessionalQA.com, 2019)

The functional specification can be compared with the brain of a human. This is because it supports the process by describing how the different steps work together on a more detailed level. The idea with the specification is that a general employee can understand it without any preparation or knowledge. (ProfessionalQA.com, 2019)

3.4 Automation

The word automation has been used for a long time already and means self-acting. Already in the middle of 1940, it was used by the U.S. automobile when moving parts between different machines in the production. From the start it was used for very simple tasks but when computers became more normal it made it possible to do more advanced solutions. (Gupta, Arora, & Westcott, 2017)

Gupta, Arora, & Westcott (2017, p. 2) describes automation as follows:

"Automation is the process in industry where various production operations are converted from a manual process to an automated or mechanized process"

Process automation is used to reduce the human input in a process and to make it more efficient by combinate software tools, processes, and people. There are two different types of automation which are Process Automation and Robotic Process Automation (RPA). The biggest difference between these two is that process automation is more complex and includes more resources and is often used for example in a production line. The robotic process automation can be compared with a human because it learns by the human how they do it. (Tibco, n.d.)

Automation can be implemented in many different types of businesses like manufacturing, facilities, and information technology. One important thing to think about is that the automated processes still need human input with knowledge and maintenance even when they are up and running. (Techopedia, 2022)

The goal of automating a process is to improve the different steps done during the whole process to get better quality. The company can also respond faster to the needs of the market. (Gupta, Arora, & Westcott, 2017)

3.4.1 Advantages and disadvantages of automation

Advantages of automation will be listed here:

- Improve the work environment for the employees and minimize risks of injuries. (Britannica, 2019)
- Possible to have smaller facilities when the production line is optimized. (Gupta, Arora, & Westcott, 2017)
- By automating processes, the company can reduce the costs of the manufacturing and improve the quality of the products then all products are made the same way, and the risk of human mistakes decrease. (Britannica, 2019)
- Easier to measure and control the process when it is more digitalized. (Gupta, Arora, & Westcott, 2017)
- The utilization of employees increases when they can spend more time on more important and valuable tasks. (Tibco, n.d.)
- The process can be running even if the employees are at home. (Gupta, Arora, & Westcott, 2017)

Disadvantages of automation:

- It can be difficult to do some changes in the process if needed due to the flexibility. (Britannica, 2019)
- Can contribute to unrest for the employees in a company. (Gupta, Arora, & Westcott, 2017)
- Higher costs than with an old manual machine which contributes to higher maintenance costs for the company. (Britannica, 2019)

- Often very expensive investment and can take a long time to get the spent money back but depends on the automation type. (Gupta, Arora, & Westcott, 2017)

- Time-consuming and bigger processes need to be divided into parts to not make the whole business crash. (Tibco, n.d.)

This thesis project only includes the preparations before automating the process. Since robotic process automation most likely will be used when automating the process in the future, a short explanation of the RPA will be presented.

3.4.2 Robotic Process Automation RPA

This chapter includes general information about Robotic Process Automation and is presented because it will be used later when creating the software part. Robotic process automation is a technology that enables process automation by robots. Robots are often used to reduce simple manual work that normally is done by employees. By removing these simple tasks, the workload reduces and can be spent on more important tasks. The robot can be taught to do different digital tasks like copy and paste data and search in systems. (UiPath, n.d.)

The robot can work in all types of systems and applications. The robot can be set up by learning the human actions and by rules and can after that do the tasks. (Automation anywhere, n.d.) Some examples of software that can be used when automating this process are UiPath and Camunda.

UiPath is robotic process automation (RPA) software company that was founded in Bucharest in 2005. From the start, the company consisted of a team of ten people and today there are more than 40 offices around the world. The software is called UiPath Studio and is the program used to build the process automation. (UiPath, n.d.)

Camunda is another automation platform that was founded in Berlin, Germany, and is today a global organization. With the program it is possible to automate processes, activities and to design business processes and improve the processes. (Camunda, n.d.)

4 Current situation (Confidential)

Classified

5 Method

The methods used in this bachelor's thesis to reach the result and gather data will be presented in this chapter.

This project was ordered by Wärtsilä, Workshops Operation Development in the autumn of 2021 and have been made in the spring of 2022. The project was presented by my supervisor from Wärtsilä in a meeting after my summer trainee period. The problem was founded during my summer trainee period when this collecting process for Table of References was introduced.

The idea of this thesis is to create a concept/specification that can be used when automating the collecting process in the future. Collecting the references is very time-consuming and you quickly get bored doing it, to speed up the process this project was started. This process is also never-ending because there are new documents created.

The problem and purpose were presented and discussed in a meeting with the supervisor from Wärtsilä. Later a common meeting was arranged with the supervisors from Wärtsilä and Novia and the project was started. The thesis is limited to finding a possible specification that can be used to get the process more efficient and automated later, therefore it does not include the software part.

5.1 Choices

At the beginning of this thesis, it was hard to get started because I had no experience with this type of project or task before. The problem with this thesis is that the problem is very complex and company-specific so it is quite hard to find inspiration or ideas from other cases. The current process is described and shown in chapter 4, Figure 6.

The biggest problem with the current process was all the manual work to find relevant documents. For some product reference types, there can be a lot of documents and for some almost nothing. This is a problem when identifying rules and teaching the robot how to work and collect the documents. It is not possible to just say to the robot take the five first documents on the document list. To simplify the searching part for the robot and document collecting. I began to think of new methods that make these parts easier and smoother.

Through meetings and discussions an idea came up. A new way of how the robot will search for the documents was introduced. The idea is based on the Workshop Operations and information from a database. The other idea is based on logging data like the web browser history function in your web browser. In this way, the documents are found and a list of them is possible to get.

5.2 Meetings

The meeting in this case was held as Teams meetings internally within Wärtsilä because of the Covid-19 situation. These meetings have been more like discussions to get more information and knowledge about the existing system within Wärtsilä to be able to develop a new way to collect the Table of References. Much of the information is from interviews.

The problem is very complex and from the start it was difficult to handle the problem and find information. This type of case was also new in Wärtsilä because no one has done this before. Through discussions ideas were found and the way to solve the problem was chosen along the process.

Meeting about Technical Knowledge Base

Technical Knowledge Base is a central part of this process because it is the database where the documents are stored and where the users find the documents when doing an overhaul. The problem is that there are so many documents to search among.

A meeting with the Manager for TKB, Process Development was set up to get more information about the system and find out what's possible to do with the current system. During the meeting the project and problem were presented to the manager.

The meeting started with a discussion about the Technical Knowledge Base in general to get a better understanding of how the database works and what the possibilities are with the current systems. Possible ways to get the needed information out of the Technical Knowledge Base were also discussed.

One idea of my solution was logging data from the Technical Knowledge Base. This idea was presented during the meeting and discussed. A new system was introduced to me called Salesforce.

5.3 Salesforce (Confidential)

Classified

5.4 Data

The data used in this project is internal data within Wärtsilä. The data were collected from internal systems in Wärtsilä like Salesforce. The other source data was collected from is Technical Knowledge Base which is the database where all the documents are stored and found when doing an overhaul.

6 Result (Confidential)

Classified

7 Discussion

The purpose of this thesis was to find a concept that can be used when automating the Table of References collecting process for Wärtsilä, Workshops Operation Development. The team is a part of the Marine Power Business.

The project was introduced in the fall of 2021 and made in the spring of 2022. The idea of this thesis is to create a specification that enables a more efficient process of collecting documents. The thesis is limited to the specification part and will not include the software.

From the beginning, it was hard to know where to start because the problem is very complex. Another thing that complicates the work and research is that nobody has done this before in the company so there is limited information and people to ask about ideas and knowledge.

The Covid-19 situation has also impacted the work by working remotely and all meetings were held as Teams meetings with the supervisors and other employees. This made it quite challenging sometimes to arrange meetings also but has in general worked well, since the employees were used to working remotely.

From the start, it was also very unclear how to get to the result. By investigations of current systems, meetings, and research ideas emerged. An investigation of the current process was made to get more knowledge about the different steps and problems to be able to create a specification that can be used to automate the process. The theory chapter of this thesis is based on literature and websites. To get more knowledge about the current systems and possibilities meetings and discussions with employees and supervisors were held.

By a combination of these, the new concept was created and works as the result. The result of this thesis is a proposal of a functional specification that can be used when automating the process. In my opinion the result of this thesis is good, and it is a good starting point when starting to automate the process in the future. Parts of this thesis will not be visible to the public due to sensitive material.

Alternative future developments are discussed in the result chapter together with ideas for the future layout of the finished application. A small investigation is also presented.

This project has been very interesting and challenging. I have learned a lot about the current systems within Wärtsilä and about new technologies that I was not familiar with before.

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