YRKESHÖGSKOLAN NOVIA

Warranty Handling in Wärtsilä North America

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Abstract

This thesis was made on behalf of the area warranty team in Wärtsilä North America of the Energy Warranty Services division. With the purpose of analyzing the processes used to represent the way of working to uncover problem areas and find the most critical areas of improvement.

This thesis covers the theory of process management, Lean Six Sigma, problems in workflow, and definitions of nonconformity and warranty.

This thesis also covers the current state of the warranty handling processes used in Wärtsilä North America to establish an ”as is” statement for the processes.

The methodology used to gather relevant information to uncover the problem areas in the warranty handling processes was to conduct qualitative interviews with experienced professionals currently working in the team that the thesis was made on behalf of.

The result consists of in-depth walkthroughs of the discussions that came up during the qualitative interviews as well as a presentation of what is considered to be the problem areas within the warranty handling processes in Wärtsilä North America.

Language: English
Keywords: warranty, process management, bottleneck, warranty handling

EXAMENSARBETE

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Abstrakt

Detta examensarbete gjordes på uppdrag av garantiteamet i Wärtsilä North America inom Energy Warranty Services-divisionen. Syftet var att analysera de processer som används för att representera arbetssättet för att avslöja problemområden och hitta de mest kritiska områdena för förbättring.

Examensarbetet omfattar teori om processhantering, Lean Six Sigma, problem i arbetsflöde samt definitioner av icke-överensstämmelse eller nonkonformism och garanti.
Examensarbetet omfattar också det nuvarande tillståndet för de garantihanteringsprocesser som används i Wärtsilä North America för att etablera en förklaring för processernas situation i nuläget.

Metoden som användes för att samla relevant information för att avslöja problemområden i garantihanteringsprocesserna var att genomföra kvalitativa intervjuer med erfarna teammedlemmar som för närvarande arbetar i det team som avhandlingen gjordes på uppdrag för.

Resultatet består av djupgående genomgångar av diskussionerna som uppstod under de kvalitativa intervjuerna samt en presentation av vad som anses vara problemområden inom garantihanteringsprocesserna i Wärtsilä North America.

Språk: Engelska
Nyckelord: garanti, process hantering, flaskhals, garantihantering

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1 Introduction

Given Wärtsilä's extensive product portfolio within the energy segment, consideration of how product warranties are managed is of critical importance. Wärtsilä has its own warranty departments which deal with the handling of warranty cases from its customers. The warranty process is well-defined, comprehensive, and continuously improved in Wärtsilä Energy Warranty Services.

The Energy Warranty Service process in Wärtsilä is quite complicated and it involves several departments. This thesis work is carried out on behalf of Energy Warranty Services North America area, whose job is to analyze the processes of warranty handling and to bring out the critical points for improvement within the processes of this department.

This chapter describes the background of Wärtsilä as a company, Wärtsilä Energy as a division, and finally the Energy Warranty Services (EWS) department in Wärtsilä Energy. Following this introduction, the background, purpose, and scope will be presented. Additionally, this chapter also outlines the structure and disposition of the thesis.

1.1 Background

Since the handling of customer complaints is centralized within Wärtsilä’s own warranty departments, there is a large workload on the warranty teams processing these cases on a day-to-day basis. The process can easily become quite complicated with the extensive workload and therefore, discussions regarding actual improvements to the warranty processes can easily fall behind.

Implementation of valuable improvements to increase efficiency is needed before that can be taken into consideration, the problems within the processes need to be addressed and evaluated.

The background of this thesis was the need to identify and evaluate the most critical problems within the warranty handling processes to enable the possibility of implementing improvements to the processes in the future.

1.2 Purpose

The purpose of this thesis was to analyze the warranty handling processes in Wärtsilä Energy specifically for the North America area department, aiming to identify problems within the processes and thereby evaluate and assess the severity of said problems to identify critical problem areas within the processes in need of improvement.

This would provide the targeted department with solid ground to begin discussions regarding the issues and a good overview of the main problem areas that need to be prioritized when planning improvements in the processes in the future.

1.3 Wärtsilä

With a powerful history dating back 190 years, Wärtsilä has become a global leader in advanced technologies and complete lifecycle solutions for the marine and energy markets.

Back in 1834, the municipality of Tohmajärvi was granted approval from the Karelia County Governor to build a sawmill in the town of Värtsilä. From those humble beginnings, the company expanded and evolved, moving from sawmilling to producing steam engines, and eventually, manufacturing diesel engines. In 1938 Wärtsilä launched its first diesel engine, a major milestone and the company's entry into the marine industry. The story has continued at a rapid pace through the decades, Wärtsilä has brought standout solutions for marine propulsion, power generation, and environmental sustainability to the market.

In the 21st century, Wärtsilä has emerged as a pioneering force across the maritime and energy sectors. Through strategic acquisitions and partnerships, Wärtsilä has placed digitalization, smart technologies, and renewable energy solutions at the core of its product offering and has played a large role in shaping the future of sustainable shipping and energy generation.

Today Wärtsilä operates in more than 200 locations globally, serving customers in a broad range of industries with products, solutions, and services. Fueled by a legacy of innovation, excellence in engineering, and customer orientation, Wärtsilä remains focused on progress and delivering value to its stakeholders, while remaining committed to the principles of quality, reliability, and sustainability. (Wärtsilä, 2024a)

1.3.1 Wärtsilä Energy

Wärtsilä Energy is part of the Wärtsilä Corporation, offering innovative solutions for the energy industry. The company focuses on sustainability, efficiency, and reliability, and its products and services offer a complete portfolio designed to cater to the requirements of its clients.

Wärtsilä Energy delivers flexible power plants and energy storage solutions in order to optimize energy systems and incorporate renewable energy sources into these systems, allowing customers to achieve operational flexibility, as well as improve energy efficiency and thereby, reduce emissions. Combining these solutions with its range of services, the company creates increased lifecycle value while continuing to drive the energy sector forward.

Wärtsilä Energy's portfolio also includes advanced technologies such as smart grids, microgrids, and hybrid energy systems, enabling smooth integration of renewable energy into existing power infrastructure. By utilizing digitalization and intelligent energy management systems, Wärtsilä Energy encourages its customers to maximize the value of their assets and optimize energy consumption.

In addition to its innovative product offerings, Wärtsilä Energy provides lifecycle services, including maintenance, optimization, and asset management solutions. These services are designed to ensure the long-term reliability and performance of energy systems, thereby maximizing the return on investment for their customers. (Wärtsilä, 2024b)

1.3.2 Energy Warranty Services

Within the Energy Services organization, Energy Warranty Services (EWS) is a global organization that provides warranty specialists to Wärtsilä Energy customers worldwide. There are six area warranty teams under the direction of area warranty managers situated in key areas where clients have their operations. The EWS warranty teams offer customer support and timely information for resolving warranty cases for Wärtsilä products in the customer's preferred language and time zone.

During the contractual warranty period, Energy Warranty Services oversees the processing of the product warranties. Energy Warranty Services is also in charge of supplier reclaiming and offering quality input for the improvement of products in relation to warranty issues.

The EWS central team supports the area warranty teams by providing product warranty knowledge and critical competencies for fund management, warranty decision-making, and supplier reclaiming. (Laitila, 2023)

1.4 Scope

The scope of this thesis is based on the following questions:

- What do the Warranty Handling processes in Wärtsilä Energy’s North American area department look like?
- What do the employees within the department find problematic?
- What are the most critical problem areas within the processes?

1.5 Delimitation

This thesis is made on behalf of EWS North America, Wärtsilä Energy, meaning that the processes that are being analyzed in the thesis are specific processes used by said department, other warranty departments within the entire Wärtsilä Energy organization are not covered in this thesis.

This thesis does not provide solutions to the problems that are identified in the analysis and cost calculations regarding eventual solutions are not considered, the scope is limited to identifying critical problem areas within the processes.

1.6 Disposition

The second chapter presents relevant theory for the thesis, defining the terms process management, lean Six Sigma, problems in workflow, warranty, and non-conformity.

The third chapter presents a walkthrough of the current processes used in the targeted department as well as an explanation of the general terms and conditions regarding warranty.

The fourth chapter presents the empirical method that was used to produce a result together with the theory based on the scope.

The fifth chapter presents the result, answering the questions that were brought up in the scope based on interviews that were conducted with relevant candidates for this thesis.

The sixth chapter provides a final discussion and conclusion of the thesis, covering implications, reliability, and final words.

2 Theory

This chapter consists of relevant theory related to the thesis. As a starting point, process management will be covered as well as lean Six Sigma. Problems in workflow will also be a topic. Lastly, nonconformity and warranty will be defined to provide a solid ground of understanding regarding the topic of the thesis.

2.1 Process Management

Process management is the methodology of managing and optimizing business processes constructed to complete tasks and objectives in a recurring way of working. This practice is also known as business process management (BPM), it involves assessment, design, implementation, monitoring, and optimization, to maintain and even increase efficiency and effectiveness. (Argent & Estrellas, 2023)

2.1.1 Process Management Lifecycle

To ensure that process management results in efficiency and effectiveness, it is necessary to follow a certain set of stages known as the process management lifecycle. These stages help the organizations organize their work around a framework that ensures full coverage and not missing any crucial components. The process management lifecycle includes five stages: Analysis, Modeling, Execution, Monitoring, and Optimization.

The first step is the analysis stage, where organizations investigate the current status of the process, this is usually referred to as the “as-is” state. This stage includes an overview and evaluation of different parts of the workflow, including inputs, outputs, tasks, documents, data, handoffs, systems, and applications.

Internal examination of these parts allows the organization to see the work process in its entirety, including what initiates it, what it produces, and the tasks and working processes inside the methodology. There should also be a focus on what kinds of documents and data are used during the process and points of handoff or transition between stakeholders and departments.

The analysis stage also usually involves drawing a process map with the use of standard flowchart symbols. It provides a straightforward visual representation of how the process flows. Overviewing this makes it easier for stakeholders to visualize the actual workflow to identify areas of inefficiency.

Having conducted a thorough analysis of the current or “as-is” process, the next step in the process management lifecycle is developing an enhanced or the so-called "to-be" version of the process. This point in the process evolution provides the opportunity to approach the existing inefficiencies identified during the analysis stage.

Process modeling is the key ingredient in formulating the improved “to-be” process. Whether done traditionally on a whiteboard or piece of paper or done electronically using modern process modeling tools, the goal remains the same, to present the envisioned workflow clearly and accurately.

After completing the modeling stage, the next step is the execution stage. This stage takes the planning into action. This is the stage at which essential changes must be made to systems, workflows, and personnel to adjust to the new process. Management of the execution stage must involve continuous monitoring to ensure optimal control of the process. Open communication, flexibility, and a passion for reaching perfection are critical.

The next stage in the process management lifecycle following the execution of the new process is the monitoring stage. It involves the process manager’s primary responsibility for continually assessing qualitative factors, including team member adaptation and overall process flow. Quantitative metrics such as productivity, output, and overall KPIs also need to be assessed during this stage.

The last stage of the process management lifecycle is optimization, which can be considered a never-ending journey. After a new process has been implemented, the aim for perfection should never end. The monitoring stage continually collects data on the performance of the new process leading to new eventual opportunities for further improvement being revealed. (Lopes, 2024)

2.1.2 Importance of Process Management

Process management can be beneficial in many ways for an organization, mainly for boosting efficiency in the workflow. Streamlining an organization's business process can help reduce unnecessary time and resources allocated to a task. As a result, costs can be reduced while achieving a relatively higher output.

Effective Process Management also provides transparent information on how precisely the systems operate. It helps identify eventual bottlenecks making the workflow inefficient.

Additionally, the usage of effective Process Management can make organizations more flexible and responsive to their customers’ needs. Since they are well-informed about their systems, they can readily respond to market needs and easily adjust accordingly. This ensures that they can provide an efficient service to their clients. (Argent & Estrellas, 2023)

2.2 Lean Six Sigma

Lean Six Sigma is a business methodology that mixes two business philosophies, lean and Six Sigma, to improve organizational performance and optimize processes. It combines lean manufacturing’s culture of efficiency inspired by Toyota with the data-driven methodology of problem-solving pioneered by Six Sigma from Motorola. According to Lean Six Sigma, the organizational process must be driven by those who have an interest in and understand wastefulness in the process. Data and facts impact all organizational decisions, and this is recognized in Lean Six Sigma. (Yasar, 2022)

2.2.1 Types of Waste as Defined by Lean Six Sigma

Lean Six Sigma defines eight types of waste, these types of waste represent resources that do not add value to customers.

- **Defects**: Products that do not meet the quality standards and require correction.
- **Overproduction**: Exceeding the customer's demand, resulting in unnecessary inventory buildup.
- **Waiting**: Delays and time-wasting caused by bottlenecks or unplanned downtime in processes.
- **Non-utilized talent**: Underutilization or misuse of expertise.
- **Transportation**: Inefficient movement of materials or products, leading to increased costs and evident delays in lead times.
- **Inventory**: Extra inventory that ties up capital and storage space without meeting the customer's needs.
- **Motion**: Unnecessary movements of people, equipment, or materials that do not contribute to any value.

- **Extra processing**: Performing tasks or activities beyond what is necessary, leading to wasted time and resources. (Yasar, 2022)

2.2.2 Process Management and Lean Six Sigma

For an organization's Business Processes to stay effective and efficient, continuous improvement is critical. Business Processes Management (BPM) and Lean Six Sigma are two tools that work well together in this matter.

Lean Six Sigma leveraged with BPM has a major key advantage, it fast-tracks the process execution in real-time. This is especially relevant if team members are geographically spread out across different locations and require coordination and communication over larger distances. Organizations can reach exceptional process planning, inputs, outputs, assessment, documentation, feedback, failure analysis, and more with the proper amount of input from BPM and methodologies such as Lean Six Sigma.

BPM paired with Lean Six Sigma also results in faster, more agile execution of business-critical processes. For example, by reducing lead times for supplying services can help put a third-party vendor in a more competitive position. Additionally, an organization using BPM and Six Sigma can create a value stream map that prioritizes measurements striving to minimize lead time overall.

Processes are broken down to the point where failure and waste can be addressed via the value stream map. This will cause the BPM automation to spend less time waiting for approvals and signatures in many of the key areas of the processes since most of the data needed to improve process performance will be obtained in real-time.

In some cases, Six Sigma focuses on solutions that can be very particular and restricted. However, when Six Sigma is used together with BPM, this enables the ability to efficiently calculate the amount of data needed to eliminate waste. However, sometimes a normal Six Sigma procedure does not reach all the expected benefits. To obtain the most benefit, companies need to have the experience and resources to integrate the two concepts effectively. (Rodriguez, 2024)

2.3 Problems in Workflow

Increased productivity and operational efficiency are the primary reasons behind the need for business process optimization. The two critical first steps to take for various companies might include establishing process mapping to understand the current workflow as well as identify issues and workflow limitations. When the work processes are completed problem areas need to be identified as well as the reason behind them. (Sinanian, 2019)

2.3.1 Workflow Bottlenecks

In workflow management, a bottleneck is referred to as the point where the demands of a system exceed the capacity to be handled efficiently. This happens when the rate of incoming work exceeds the ability of employees or resources to process it effectively, resulting in delays in workflow processes. Bottlenecks can occur in various forms and are often caused by a combination of factors.

Outdated equipment, for example, where old equipment might find it difficult to keep up with modern demands. Similarly, shared resources or insufficient staffing levels can lead to bottlenecks by creating constraints on available resources or by causing tasks to pile up, contributing to a larger workload. Although, it is important to note that all bottlenecks are not necessarily permanent. Temporary bottlenecks, such as a key stakeholder being unavailable may occur but are usually resolved by itself over time. (Stanislaw, 2023)

Learning the types of bottlenecks is crucial to identifying them in time and effectively handling them. They may land in different categories for classification, but the most convenient way to categorize them is by separating them as short-term and long-term bottlenecks.

Firstly, short-term bottlenecks occur unexpectedly due to temporary or unpredictable reasons. They are irregular and cause unexpected fluctuations. For example, an employee's unplanned absence or a server crashing for an entire day.

Secondly, long-term bottlenecks are the ones that occur frequently. They usually have a larger impact on the process. A few normal examples can be delays in the suppliers, unreasonable or unexpected expenses, and poor resource allocation resulting in resource unavailability. (Krasteva, u.d.)

2.3.2 Identifying Issues

Making a process map may sometimes initially reveal evident problem areas, but it may not always reveal the causes of the problems, making it a challenge to tackle the issue.

Out of habit, a lack of resources, or a decision to focus on other areas of business development, the old and outdated processes often remain a company's generally followed way of working. If it has been a long time since the process was last checked or updated, there may have been significant changes within the business. They may regard new goals or workflows. Business processes often outgrow their initial goals which causes inefficiency in the workflow if continuous improvement is not kept in mind.

Fortunately, it is not necessary to map or track every activity or process that takes place in order to pinpoint the largest bottlenecks in the process. This cannot be reasonably done at most firms. One useful method for determining where process bottlenecks may occur is to map and walk through the key steps in particular business processes and thereby discover eventual unnecessary steps in the processes. These bottlenecks can exist for multiple reasons. They may exist because of human reasons: staff turnover, simple input errors on the parts of the staff, inadequate system integration; departments that are limited from one another and thereby prevent efficient communication, or redundant systems causing bottlenecks.

Even though it may be challenging to identify these bottlenecks, there are some telltale signs that can always be looked for. Is there a department or a system where the workflow regularly seems to slow down? This could be caused by the constant excessive use of resources in one area. Such a failure is like a pipeline stuffed with dirt, a clear indicator that something is wrong. Therefore, one must clear the obstruction, no matter if it is to be done via process adjustment, correcting activities that are performed incorrectly, or automation of the workflow. (Sinanian, 2019)

2.4 Nonconformity Defined

In this thesis, the word nonconformity will be frequently used in the explanations of the internal documents provided by Wärtsilä.

The word nonconformity means, an event with a process, service, or product resulting in the requirements not being met, in other words, a non-fulfillment of a set requirement. (De Lucca Caetano, 2023)

2.4.1 Difference Between Nonconformity and Noncompliance

Nonconformance is any failure to meet mandated standards or expectations. As such, it indicates that the product, service, or process is out of line with the needs of the customer in question.

Meanwhile, noncompliance refers to a breach of the law or associated rules and regulations. Meaning, a nonconformance may lead to a breach of law, but non-compliance is a breach in itself because it directly leads to penalties, sanctions, or other legal consequences. (De Lucca Caetano, 2023)

2.5 Warranty Defined

A warranty is a promise about the condition of a product made by a manufacturer or retailer. It tells you what the seller will do to correct problems, or to make sure that the item performs as expected. Warranties give consumers peace of mind that their purchases will perform as promised.

Warranties can be explicit or implied promises about the condition of goods or services purchased. They typically have a specified period during which repairs or replacements are covered. However, once this period expires, the issuer is no longer obligated to help.

Warranties often come with exceptions, limiting the conditions under which repairs or replacements are available. (Kenton, 2023)

2.5.1 Express Warranty vs. Implied Warranty

Express warranties are promises made by the seller to the buyer, verbally or in writing while implied warranties are guarantees of a product or service's performance.

Express warranties represent specific promises communicated from the seller to the buyer about the condition, quality, or performance of the product, assuring the buyer.

In contrast, implied warranties are not stated in writing, but they are assumed to exist as part of the transaction. They are an automatic part of a product or service purchase when the seller does not explicitly disclaim them. They set a standard for the product or service to perform and be of quality that is generally accepted, even if the seller does not say them precisely.

For example, if someone buys a pair of headphones, there is an expectation that they will work. That's due to an implied warranty that is included in every purchase unless the seller notes otherwise at the time of purchase. (Liberto, 2023)

2.5.2 Grounds of Denial

In general, warranties are designed to cover products and services in the condition in which they are purchased. Products that have been altered or modified after purchase are typically not covered by a warranty.

Each company handles warranties differently. Often, a company may require multiple proof points to show that a product has failed in normal use and within the time covered by the warranty.

If the fault that caused the product to fail was the result of the owner's actions rather than a design or manufacturing defect, a warranty is unlikely to be honored. For example, the owner may have placed the product in a particularly extreme environment that was much too hot or cold for its normal use. (Kenton, 2023)

3 Current State of Warranty Handling as Documented

This chapter presents the current state of the warranty handling processes in Wärtsilä North America, including the relevant terms and conditions used in warranty handling and a walkthrough of the processes.

As mentioned in the theory chapter, improving a business process always begins with the first stage of the process management lifecycle, analysis. In this stage the "as is" processes are presented. This is a vital step when implementing an improvement to processes.

3.1 EWS Warranty Terms and Conditions

In Wärtsiläs terms and conditions for warranty, details regarding supplier's warranty, warranty periods, and exclusions from warranty are covered. These are the most relevant subjects for this thesis and therefore these will be summarized and explained in this chapter.

3.1.1 Supplier's Warranty

During the Primary Warranty Period or Extended Warranty Period (if applicable), the Supplier shall at its sole cost, quickly repair or replace any part or component of the Equipment which appears defective because of faulty design, materials, and/or workmanship, provided that when required by Supplier, the part or parts replaced shall be returned to Supplier, at the Supplier's cost.

The Buyer shall immediately take all necessary precautions to prevent any defect from becoming worse and to prepare the way for the Supplier to resolve the defect. Warranty claims or requests shall be put in writing without delay within the Primary- or Extended Warranty Period.

The supplier shall bear the responsibility for all costs of repairing or replacing failed parts supplied by the supplier. Shipping costs of defective material or repaired material between the supplier's location and the site location shall also be covered by the supplier. (Wärtsilä Energy, 2024)

3.1.2 Warranty Periods

The Primary Warranty Period shall apply for 24 months from the provisional acceptance date, 36 months after the generator sets arrive at the plant site, or a period consisting of 8000 operating hours.

The warranty period concerning parts having been replaced or repaired during the Primary Warranty Period is called the Extended Warranty Period and shall be in effect for a period of 12 months starting from the date of repair or replacement., provided that the Extended Warranty Period shall never exceed 42 months after the beginning of the Primary Warranty Period. The Extended Warranty Period is only applicable for the parts having been replaced or repaired during the Primary Warranty Period. (Wärtsilä Energy, 2024)

3.1.3 Exclusions from Warranty

The supplier warranty does not cover defects due to or related to components or designs provided by the buyer or on behalf of the buyer; negligence of the buyer, employees of the buyer, or other third parties involved; use of parts not supplied by the supplier; improper installation or alteration; or parts that are not sold, supported, or approved in writing by the supplier.

Specifically, the supplier's warranty does not cover any defects caused by or related to normal wear and tear, use of unsuitable material regarding the parts in question, maintenance, operation, or service of the equipment not in conformity with the suppliers or subcontractor's manuals, instructions or technical specifications. (Wärtsilä Energy, 2024)

3.2 Warranty Handling Process EWS (Confidential)

4 Methodology

This chapter presents the empirical methodology used in the thesis, along with other relevant information and theories that were used as tools to reach a result. In this thesis, the empirical method of choice was to conduct two separate interviews with two of the team members working according to the processes presented in the current state of warranty handling chapter. This was done to achieve a deeper insight into how the processes work in practice. As these processes and working procedures may differ within different warranty teams and departments, this empirical methodology does not necessarily provide a general benchmark for warranty handling procedures within Wärtsilä.

The interviewees showed extensive knowledge of the warranty handling procedures used by the team and were also aware that there are issues that need to be brought up regarding the processes. The interview questions will also be presented in this chapter.

4.1 Methodology

When facing the question of what method should be used to research this topic there were a few evident options at hand. The vital step of conducting successful research aiming to highlight problematization in the warranty handling processes is to balance material to understand the phenomenon and the route to take when investigating what is sought to be investigated.

In method literature, the two options of quantitative and qualitative methods often arise. Quantitative methods often refer to questionnaires, statistical analysis, or experiments, where large amounts of hard data are handled and used as material. Contrary to this, qualitative methods often include interviews or observations, providing soft but rich data that can be considered reliable without a large quantity. (Blomkvist & Hallin, 2015)

4.1.1 Methodology of Choice

When considering options for methodology for this thesis, the usage of a qualitative method shined through as the better option quite naturally, although the usage of quantitative methods in the form of questionnaires was considered and planned to be combined with a qualitative approach.

The final choice of using a qualitative approach was settled based on the fact that the team that this thesis is made on behalf of consists of only three people, making it impossible to use a quantitative approach as the quantity would not be enough to support the theory behind the concept.

Furthermore, it is important to note that documented processes are usually not the complete truth of what is happening in the practical work, therefore interviewing the experienced professionals working with these processes daily was essential to uncover the critical problem areas within the processes aiming to discover bottlenecks that might not be an evident spot.

4.1.2 Qualitative Interviews

One of the most valuable research techniques is the qualitative interview. It can open up people's experiences, as well as their attitudes, beliefs, and perceptions in a way that is impossible for a structured questionnaire or even a conversational survey. The open-conversation-interview techniques focus on unveiling the meaning that people attach to the answers.

Unlike other research methods in which the responses are limited, this method is informal in the way that it highlights a real conversation. While shaping questions in advance, the truly important follow-ups happen on the fly as the interview progresses. Qualitative interviews work more as dialogues instead of simple Q&A, they offer insight into people's perspectives. Qualitative interviews do not only uncover people's ideas but also how they have learned to express them.

As opposed to its quantitative counterpart, qualitative interviews aim to reveal the complexity of human experiences, viewpoints, and feelings beyond numerical data. At the heart of this are interview techniques that involve asking open-ended questions. Such interrogations allow participants to present their viewpoints and stories in their own words, enhancing a greater understanding that numerical data alone would not be able to provide.

Interview techniques act beyond mere data collection; they foster a relationship between the interviewer and interviewee. This mutual or dual relationship enables a comfortable level of trust where the interviewee can share an experience comfortably. This foundation enables open, honest responses contributing to a clear understanding of human stories. (Damyanov, 2023)

4.1.3 Interview Questions

In this chapter, the heart of our research methodology is presented, the interview questions that were created to highlight the complexities of the warranty handling processes in Wärtsilä North America. The questions asked during the two separate interviews were the following:

1. Can you describe your role in the warranty handling processes?
2. Do you feel that these processes translate well in practice to your daily way of working?
3. From your perspective, what aspects of the warranty handling processes do you find most effective or efficient?
4. In your experience, what are the biggest challenges or pain points you encounter when executing these processes?
5. Are there any specific issues or bottlenecks that you notice frequently arising during the warranty handling processes?
6. How do these issues or bottlenecks affect the workflow?
7. Can you recall any recent incidents or situations where the warranty handling processes did not function as intended? What were the root causes of these issues?
8. In your opinion, what role does continuous improvement play in the context of warranty handling, is it considered? And how do you contribute to identifying areas for enhancement?
9. Are there any specific metrics or performance indicators that you track to monitor the success of the warranty handling processes?

10. Looking ahead, what changes or enhancements would you recommend to improve the efficiency and effectiveness of the warranty handling processes?

11. Do you have anything that you would like to add, regarding the questions or processes in general?

These interview questions were carefully designed to explore different aspects of the warranty handling processes. Each question is unique in that it provides different angles on how the interviewees view, experience, and respond to the process.

The questioning involves the interviewees assessing their knowledge about the process, identifying pain points and bottlenecks, involving practical aspects, evaluating operations, and the need to recall incidents. In addition to understanding the processes from a theoretical angle, the questioning also aims to gather information on practical implications. By specifically asking about continuous improvement and recommendations for enhancement, the question allows the interviewees to present their ideas and perspectives on which areas to modify for the better.

The questions aim to achieve a collaborative collection of information to point out which processes require innovation. Overall, the questions are meant to provide a foundation for the stakeholders to begin a discussion on the subject.

4.2 Topics Discussed in the Interviews

The first topic in the interview was to gain an overview of the role and daily work of the two interviewees to get an understanding of how the warranty handling processes are implemented in practice. As this team is quite small and only consists of three employees the options for choosing candidates for the interviews were quite restricted. Luckily the interviewees have different roles which contributes to a wider perspective of the daily tasks.

The second topic of the interview was to highlight what works and what does not work. To get an overview of a process it is important to not only highlight the downsides but also acknowledge what is making up for eventual hidden problem areas. Evident bottlenecks and challenges within the processes were brought up, as well as areas that work well and contribute to an effective workflow. The main areas of discussion turned out to be field service availability, customer communication, and stakeholder communication. Both interviewees highlighted some similar topics but thanks to their different experiences they also had some differing topics.

The third topic of the interview focused on how problems in the processes affect the daily work of the interviewees and their team. Including discussions regarding recent “process failures "and the usual root causes of this. The results of process-related issues on workflow are usually prolonged lead times, extended follow-up, and overall more work. This was brought up in the interviews and even in this situation this seems to be correct. Regarding recent process failure, topics such as human error and excessive amounts of stakeholders were highlighted.

The fourth and final topic discussed during the interviews was continuous improvement along with performance metrics and general suggestions for improvement. Continuous improvement is often considered and should be, in a team handling non-conformities, although whether improvements can be made frequently is not up to the team, to support this the interviewees brought up relevant performance metrics that are used to contribute to continuous improvement and to keep the team members goal oriented. Furthermore, both interviewees had great ideas regarding improvements covering overall communication and resource availability.

4.3 Discussion of Empirical Method

Although a large part of information was procured through internal documentation of processes, to find the real problem areas that may not even be evident in the process charts themselves, conducting interviews seemed like the logical solution. The plan was to conduct three interviews but due to differences in time zones and overall busy schedules, two interviews were enough. The interviews allowed me to get a good insight into the thoughts of the people working with these processes daily.

The interview was initiated by proposing the idea of individual interviews during one of our biweekly online meetings with the team that we have maintained during the thesis writing process. Shortly after this, we scheduled individual interviews with two of the three team members. The interviews were arranged as Microsoft Temas meetings, the questions discussed during the interviews are presented in chapter *4.1.3*.

The interviewees showed great knowledge regarding the warranty handling processes and provided me with a deeper understanding of the processes in terms of problem areas and effectiveness.

5 Results

This chapter presents the results of the thesis, answering the questions presented as the scope.

The discussions brought up during the interviews will be separately brought up in this chapter to enable the path to a conclusion. In the first interview, Bradley Vaughan, Warranty Manager, is interviewed using the questions presented in chapter *3.2.3.* In the second interview, Ana Tribin, a Warranty Expert, is interviewed using the same questions as a base for the discussions.

Lastly, a conclusion will be presented where the most evident problem areas will be highlighted, based on a combination of the interviews and theory.

5.1 Interview with Bradley Vaughan

The first interview that was conducted for this thesis was arranged as an online meeting via Microsoft Teams on the first of May 2024.

Bradley Vaughan has recently achieved a new role in the team, formerly he worked as a Senior Warranty Expert but has now been promoted to Warranty Manager, this new role is as described by Bradley similar to the former one but with some added responsibility. His responsibilities include handling claims on a daily, registering new claims, taking decided actions on active cases, and keeping the costs of the claims in mind. With his new role, he is now also responsible for overviewing new installations coming into warranty and helping to get them set up online while also taking part in budget discussions with Finland keeping the customer's satisfaction in mind.

When discussing whether the processes translate well into daily working tasks Bradley highlights that the processes generally translate well into practical work with the exception of more complicated cases where technical investigations may be needed. When the issue requires technical service or investigation, the workflow is often impacted, and the workload becomes enlarged as more creativity and research might be needed to reach a solution. Bradley also highlights that when the problem is electrical, rather than mechanical, solving the problem becomes more challenging, this is because getting a field service technician of electrical discipline is usually harder and once they are available, the situation might not be as clear as it seems and even more resources may turn out to be needed to reach a solution.

Regarding the topic of what is effective and efficient with the processes, Bradley states that he finds it very effective that the customer can file a claim resulting in the team receiving an email notification connected to SAP, enabling the team to open the claims rapidly when a problem is reported. However, for this to be considered effective, the customer is also expected to provide valuable and accurate information regarding the issue. As long as that is the case, this remains one of the more effective parts of the process. An example of this can be when a customer prepares and files a claim with enough information regarding a simple case, and thanks to the information provided, the warranty handling team can instantly see that they only need to order a certain part to resolve the case.

When proceeding in the interview and bringing up challenges and pain points Bradley highlighted PIP (Product Improvement Process) cases. These cases become problematic as more people get involved and validation and internal access become a limiting factor. During this discussion an example is lifted up: HT header leaks, a frequent problem that the team deals with where a simple change to an O-ring would solve the problem. This change has been suggested for around three years, but the team has been facing internal resistance of some sort and therefore the issue is still officially ongoing. Overall, the PIP cases are extremely inefficient and challenging and many times the solution that is delivered to the customer is changed by the customer afterward and then the process repeats.

In terms of frequent bottlenecks in the processes, Bradley instantly highlights that getting field service engineers is a very evident bottleneck as they are almost never available in time. When discussing bottlenecks Bradley also explains that the team has a lead time target of ten days, including creating the claim, ordering eventual parts, getting a field-service engineer, and travel time. The job counts as finished when the field service engineer has completed the job on-site. He then states that if the field service engineer is not available right away, the lead time targets will not be made.

Another thing that Bradley highlights as a bottleneck is more niche spare part orders that may not always be in stock. Sometimes this can be due to some certain spare parts having a limited shelf-life meaning they are not stocked unless ordered.

After discussing bottlenecks, the topic moved over to how the workflow is affected by bottlenecks. Bradley highlighted that there is not really a huge interruption, but more of an added workload. For example, when parts are not available or delivery dates are not met the following-up becomes more important and frequent.

When discussing how and if something could be changed within the processes to avoid unnecessary inefficiencies Bradley stated that there is often an unnecessary “middleman” type situation with these cases. He suggests that instead of him acting as a middleman between technical service and field- service it would be much more efficient if they could communicate directly with each other instead, this would save lots of time but is limited by validation, approvals, and internal access. Even though it might be an efficient way to decrease lead time, he also states that it is not possible and there are obvious reasons for it, everything needs to be recorded and there is a chain of communication to keep traceability. Bradley also states that they have discussed simplifying the processes from time to time but usually, the conclusion is that there are too many people involved to that that effectively.

Another topic that was brought up during the interview was how performance is measured. Bradley explains that they do have general KPIs, one of the performance indicators used was already discussed earlier in the interview but is not brought up again, the lead time target of ten days. Another KPI that is used within the team is that a claim must be opened within 24 hours of receiving it, according to Bradley this is a good metric that contributes well to the effectiveness of the team. Bradley does not necessarily agree with all the KPIs especially when one frequent limiting factor is resource availability.

Approaching the end of the interview discussions regarding overall changes that would positively contribute to the team were raised. When asked about this, Bradley suggested that having a team of field-service engineers specifically available for warranty cases would be great, although it would be a huge thing to ask for, it would be an interesting approach that may even be a winning concept if tested.

Another thing that was once again raised during these discussions was that regarding the PIP cases, it would be efficient to in some way cut down on the needed approvals for reaching a solution, but then again how possible that would be is a whole other question. But at least from the outside, it seems prolonged and it would be interesting to know if it would be possible to cut down on something at that end to make it more efficient.

The interview with Bradley was very productive and he showed a deep understanding of these processes, great ideas and issues were highlighted ultimately contributing to reaching a conclusion in this thesis.

5.2 Interview with Ana Tribin

The second interview that was conducted for this thesis was also arranged via Microsoft Teams and was held on the ninth of May 2024.

Ana’s role is Warranty Expert, in this role her daily tasks and responsibilities consist of receiving claims, registering them in SAP, and taking actions to reach a solution for the problem, other than this the responsibilities also cover following up on cases and coordinating communication between field services and the customer and finally closing the claim when the solution is reached.

According to Ana, the processes translate well into her daily work in the big picture, they are accurate to her tasks but there are also smaller steps in between the different processes that are not mentioned in the process maps, such as tasks in different systems and customer meetings that are held to discuss certain cases and overall development.

When discussing what Ana finds particularly efficient in the processes, she highlights that she finds the online services to be very efficient as every piece of information is gathered in one place, in the past the team used Excel forms to centralize information but the usage of the online services such as SAP and a customer portal for non-conformities is a big improvement compared to this. Another thing highlighted in the discussion is internal procedures such as short team meetings to discuss ongoing cases and other relevant topics keeping the whole team updated on what is going on.

As the discussion topic changes towards what is particularly inefficient, Ana explains that a big pain point is that resources are not often available when requested, the main resource that is challenging to get a hold of is field-service engineers. Ana states that for some reason it seems like there are not enough resources for field service in the North American division of Wärtsilä, resulting in the team having to source workers from for example Finland making travel time a big factor impacting the lead time. Sometimes workers are even sourced locally if the case in question is in urgent need of attention. The team is not getting the support that is needed from field service.

Regarding the most frequent bottlenecks affecting the workflow of the team, Ana brings up that another issue that acts as a bottleneck is that it seems like there are too many stakeholders involved. As seen in the processes there are many different stakeholders that are part of the communication and according to Ana, this communication could be improved. She also states that they have brought this issue to the management team explaining that improving this communication would make their work a lot easier, but it still feels like it is a bit too complicated when it comes to this. When discussing this, Ana also mentions that in the past, the team was able to monitor the costs in a more efficient way because they were sent draft invoices from field service, but nowadays as there are more stakeholders involved in the processes, they do not have the same control over this and costs basically just show up in the system making it more challenging to monitor.

Ana states that the biggest impact of these bottlenecks is that time is wasted. This is inevitable when the communication becomes more complicated. Getting in contact with the right person regarding a topic can be difficult when too many parties are involved resulting in a prolonged lead time and evident time-wasting. It is especially problematic when the case in question only requires a simple task but is then prolonged because of the time-wasting that appears because of this.

When the topic switches to continuous improvement, Ana states that it is often in discussion within the team and the aim is to communicate this to the management team as they are the ones responsible for making decisions regarding the topic, the topics of discussion regarding continuous improvement is usually as earlier mentioned, the evident bottlenecks that limit the work from being simple and efficient.

According to Ana the most important metric that is used to measure performance is the lead time target of ten days. Furthermore, costs are also important to take into account. The costs are checked with the finance and controlling department to make sure that the demands of the budgets are met. All in all, Ana thinks that cost control and lead time are the most important metrics to take into consideration when handling warranty claims.

Regarding suggestions for improvement, Ana states that having one unique centralized system for handling warranty claims would be a major improvement, at the moment there are several systems used for handling warranty claims, and centralizing this to one tool would improve the work efficiency for the team by a considerable amount. The intention of the different systems is to make things easier but according to Ana sometimes it just becomes more of an issue than a solution as workflow may be impacted because of this. When discussing this Ana also mentions earlier in the interview that the overall communication between the different stakeholders could be improved as everyone has their own system, for example, project management has its own system, the warranty has its own system, and field service also has its own system. This makes the communication a bit complicated, if there were a way to centralize the communication where everyone would use the same system, the communication would be positively impacted.

To conclude the interview Ana highlights that in the big picture, the processes are good, but the problems lie in between the different steps and might not be as evident as they are not there in writing, the problem areas that Ana mentions in the interviews are often steps that happen in between the different steps in the process and this might be a reason to why these problems exist, they are hard to spot when they are not visually there in the process map.

5.3 Problem Areas in Warranty Handling for Wärtsilä North America

To conclude the result chapter of this thesis the main problem areas that were discovered through the empirical method will be presented and some eventual improvements will be speculated.

5.3.1 Technical challenges

Technical investigations are among the most challenging aspects of the warranty handling processes at Wärtsilä North America. When dealing with complicated cases, employees consult with specific experts, and communication issues can disrupt the ordinary flow of the process and create an additional workload. The two interviews showed that similar technical difficulties occurred during both interviewee's work. Bradley Vaughan stated that technical investigations requiring technical service or investigation alter the normal process flow. It requires being more creative, thinking outside the box, and doing more research, taking more time and resources. He also noted that the number of field service technicians should be higher because the availability is very limited. Ana Tribin shared this issue, stating that technical challenges are among the most influential factors in the warranty process efficiency. Mentioning that integrated information systems like SAP and customer portals are helpful but not always sufficient for resolving the technicalities of technical matters. To address the discussed problem, it is essential to pay attention to multiple aspects.

First, is resource improvement. Lastly, it is essential to take into consideration the communication and collaboration of the technical and field services to ensure that the problem-solving process is faster and more client-friendly.

5.3.2 Prolonged Approval Processes in Product Improvement Cases

Prolonged Approval Processes in Product Improvement Cases (PIPs) Product Improvement Cases have an impact on solving repeated problems in the Wärtsilä North America warranty handling process. Usually, cases are characterized by extended approval processes and overwhelming internal obstacles, making it difficult to conclude the cases in time and achieve process efficiency.

Bradley Vaughan and Ana Tribin note that despite clearly defined solutions, such as finding an alternative to the HT header leaks that were mentioned as an example in the interviews, there were significant internal obstacles to implementing the solution. These bureaucratic hurdles in the application of a solution cause the process to waste time.

Delays in case completion will only provoke the customer's annoyance. The need for approval procedures is obviously necessary but may also be acting as a limit to the necessity of clear guidelines and defined decision-making procedures.

5.3.3 Resource Constraints and Lead Time Targets

Availability of resources, including field service engineers and niche spare parts, is a key determinant of meeting lead time targets in Wärtsilä North America’s warranty handling processes. However, the ability to access required resources presents several challenges, contributing to delays that might damage market competitiveness through the failure to meet lead time targets.

Bradley Vaughan and Ana Tribin stated that the ability to access resources is one of the main challenges in meeting the team's lead time targets. The lack of available field service engineers in fields such as especially electrical services limits the ability to respond to technical challenges rapidly. Additionally, the delay in acquiring niche spare parts exacerbates the situation further by ensuring that the resolution process remains incomplete, thereby increasing the customers’ downtime while increasing operational costs. Although the situation may be understandable and inevitable regarding spare parts with a limited shelf life, it still remains a problem causing eventual delays. Addressing the resource constraint challenge and delays in the resolution of warranty claims because of this issue could largely improve customer satisfaction.

5.3.4 Communication and Coordination Challenges

Ineffective communication and coordination among stakeholders result in challenges for the warranty handling process at Wärtsilä North America. The involvement of many stakeholders and communication barriers prevents productive collaboration and disturbs the effectiveness of the process. In the case of multiple stakeholders that work according to different communication channels and systems, information sharing becomes difficult when it comes to decision-making and result in inefficient processes. While multiple players operate within the system, not all of them may receive the necessary information at the right time. As a result, processes are delayed and problem-solving becomes less effective. The development of more efficient communication channels and principles based on increased transparency and accountability levels could be necessary to address the issue.

The implementation of centralized communication units designed to address information-sharing needs and decision-making processes may increase communication efficiency and ensure that information reaches all stakeholders in time.

6 Discussion

The results of this thesis met the purpose that was stated in Chapter *1.2*, as the main problem areas that are faced within the Warranty Handling Processes for Wärtsilä North America were identified.

6.1 Author's Thoughts

In my opinion, the most significant change that could be made would be regarding communication between stakeholders. As I have worked in a similar team handling similar tasks on a daily, I find that I can agree that communication can easily become challenging when involving too many parties in decision-making and approvals. Not only that, but the lead time of completing the set daily tasks is also affected making the performance look poor from an outer perspective when the issue is not individual.

The biggest challenges of this thesis were finding relevant theory and not getting sidetracked as this can be a niche subject to write about. Although, I am happy with the results that the thesis produced.

6.2 Implication

The results of this thesis create a strong foundation for the management of the team to unravel the discovered matters. Armed with these findings, the management is expected to undertake an in-depth review of the root causes of the problems identified. The course of action will allow them to develop holistic approaches to the implementation of the changes.

Using the information obtained from the analysis, the management team can push the team to greater performance and productivity. Such a development does not only deal with the active challenges but also promotes a tendency of constant improvement in the team, guaranteeing success in the future.

6.3 Reliability

The reliability of this thesis is strengthened by the fact that the interviewees who were questioned regarding the subject are very experienced in the industry and have deep knowledge of the processes that were analyzed.

The reliability of this thesis might unfortunately be a little bit negatively affected due to the small number of interviews, preferably, more interviews would have been conducted but unfortunately, two interviews were the only possible option in this thesis.

The empirical method was chosen since experience is critical when researching a topic regarding problem areas in processes that demonstrate the workflow of a team. Luckily the entire team that this thesis was made on behalf of, is very experienced in this. The questions that the interview consisted of were aimed to be open in a way that the interviewees could answer freely and hopefully initiate a discussion.

6.4 Final Words

To end this thesis, I would like to thank everyone who was involved in the process of writing the thesis.

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