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Implementation of the functionalities of Computerized Maintenance Management System

DEGREE PROGRAMME IN INDUSTRIAL MANAGEMENT
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ABSTRACT

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This thesis was done for Cimcorp Oy. Its objective was to determine the most optimal functions for the maintenance management system to serve the needs of the company and its customers and to develop an implementation plan. The system to be implemented will be integrated into the Enterprise Resource Planning system already in use.

The research was conducted as a qualitative thematic interview with three company employees and one customer. The interviews focused on the views and expectations of the future maintenance management system. The themes covered were customization, communication, user-friendliness, expected challenges and long-term expectations. Theoretically, the research methodology, the ERP system, maintenance, and the maintenance management system were introduced. The needs definition and the implementation of the system were also discussed.

The interviews gave very similar answers about the need for the system. The system was expected at Cimcorp and is expected to bring ease and systematicity to maintenance scheduling, resourcing, and reporting. Traceability and transparency were highlighted as a positive outcome of the interviews. It is hoped that the functions to be implemented will be easy to use and that the whole system will be simple to use. Training and involvement were seen as an important part of the whole implementation project.

The implementation project of the maintenance management system was started during the thesis. The results of the study were shared with the project team even before the thesis was completed.

Keywords: enterprise resource planning, implementation, maintenance, thematic interview

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1 INTRODUCTION

The subject of the thesis was the implementation plan for the functionalities of the Computerised Maintenance Management System. The implementation project was started before the thesis was completed, so the thesis focuses on which functions will be implemented as part of the maintenance management system. The thesis is driven by Cimcorp's need to implement a maintenance management system. The aim of the thesis is to make maintenance operations smoother, more efficient, and more cost-effective, both for the company and its customers.

Cimcorp will integrate a maintenance management system into its existing ERP system. Consequently, all maintenance-related documentation for the company will be consolidated in one location. The maintenance management system will additionally serve as a portal for customers, allowing them to access maintenance reports and facilitate actions such as placing and confirming future maintenance orders, as well as ordering spare parts.

Until now, various maintenance documents have been stored in files on the company's cloud service or on employees' own computers, such as plans for future maintenance. Regular preventive maintenance has been agreed to be carried out every six months. At other times, it is the customer's responsibility to monitor and observe the condition of the machines, ensure basic cleanliness, and carry out the necessary measures, such as greasing. A maintenance report is sent to the customer for the agreed preventive maintenance, detailing the measures taken. The report includes a summary of the maintenance, spare parts replacement, and other observations.

1.1 Purpose and objectives of the thesis

This thesis aims to create an implementation plan for Cimcorp, focusing on the incorporation of new functionalities into their maintenance management system. The primary goal is to optimize maintenance processes and enhance overall system efficiency through the successful integration of these advanced features.

The objective of the thesis was to determine, through interviews, the optimal functions (represented as work orders) to be incorporated into a maintenance management system. The goal was to identify features that would maximize benefits for both the company and its customers.

2 RESEARCH AND IMPLEMENTATION METHODS

This thesis was conducted as a qualitative interview study. In qualitative research, the goal is to comprehend, interpret, explain, and, at times, model and apply phenomena. The analysis of qualitative data revolves around the concept of meaning and the examination of meaningful action. In qualitative research, the emphasis is not placed on the formulation of theory but rather on the interaction between theory, data, and conceptualization. In qualitative research, theory development occurs at a relatively late stage. (Hirsijärvi & Hurme, 2022, p. 33.)

According to deductive reasoning logic, the starting points of research are grounded in theory, resulting in hypotheses derived from previous research findings and theories, which are subsequently tested with empirical evidence. In contrast, inductive or abductive reasoning proceeds based on insights gained from the study of an observed and identified phenomenon and the data describing its characteristics. This process leads the reasoning towards the development of theoretical models. (Hirsijärvi & Hurme, 2022, p. 33.)

In qualitative research, data analysis, acquisition, and conceptualization overlap and are difficult to separate analytically. Qualitative research should not be conceived of as a deductive, theoretical, or inductive, data-driven process. Instead, it should be seen as an abductive or inferential process, in which theoretical and practical perspectives alternate to formulate conclusions. (Hirsijärvi & Hurme, 2022, p. 33.)

The results of qualitative research, like quantitative research, do not attempt to generalize. Qualitative research aims to describe a phenomenon or event, to understand a particular activity, or to provide a theoretically meaningful interpretation of a phenomenon. It is important to choose individuals who possess a comprehensive understanding of the phenomenon under study or have experience with it. The selection of interviewees must be done in a thoughtful and appropriate manner. (Hirsijärvi & Hurme, 2022, p. 98.)

2.1 Interview research

This thesis uses interview research to understand how the functions introduced in the maintenance system will affect the organisation's operations and the work of the staff. This will help to identify users' needs, expectations, and potential challenges, which in turn should allow the system to be optimised and deployment to be streamlined. In addition, the interview survey provides valuable feedback and information to improve the system and provide a better user experience.

The ideas behind the interview and the questionnaire are very simple. It makes sense to ask a question when you want to know what a person is thinking or why they act in a certain way. An interview is a face-to-face conversation where the interviewer asks questions orally and notes down the answers. Interviews have the advantage of flexibility. The interviewer can correct misunderstandings, ask the question again, clarify wording, and engage in

discussion. Another advantage of the interview is that the interviewer can ask the questions in the order she sees fit. (Hirsijärvi & Hurme, 2022, p. 91.)

The most important thing is to gather as much information as possible. This is why it makes sense to provide the interview questions and topics to the interviewee beforehand. For the interview to be successful, it is advisable to give the interviewees at least a chance to familiarize themselves with the interview topic beforehand. In practice, this is done when the permission and the time of the interview are agreed upon. (Hirsijärvi & Hurme, 2022, p. 91.)

2.2 Thematic interview

The selected method was a thematic interview, which was conducted as an individual interview. Thematic interviews allow for individualised responses, long and reflective or short and concise. The open-ended nature of the interview allows for the individual experiences and views of the respondents and enables the interviewee to share thoughts and feelings freely. The thematic interviews also inspired good interaction and in-depth discussions to get answers.

Thematic interviews, questionnaire interviews, and in-depth interviews are employed to address various needs and study different phenomena. This thesis utilizes thematic interviews, which are characterized as semi-structured interviews. The interviewer has the discretion to determine whether each interviewee will be posed the same questions in the same order, whether the wording should be consistent across interviews, and other related aspects. (Hirsijärvi & Hurme, 2022, p. 92-93.)

Thematic interviews aim to provide meaningful answers to the research question or task. In principle, the themes chosen are based on the research framework, i.e., what is already known in the research. (Hirsijärvi & Hurme, 2022, p. 93.)

2.3 Interview framework

The body of the interviews (Figure 1) and the questions were structured in different sections to keep the interview clear and the interviewees easily aware of what was being discussed at any given time. Before the interview started, a short Power Point presentation was given to introduce the principle of the system to be implemented. The interview focused on the customisation needs of the future system, communication channels, user-friendliness, challenges of implementing the system, support, long-term expectations, and collaboration. The interview was sent to the interviewees before the interview to give them time to familiarise themselves with the questions. The interview followed the interview framework shown in Figure 1.

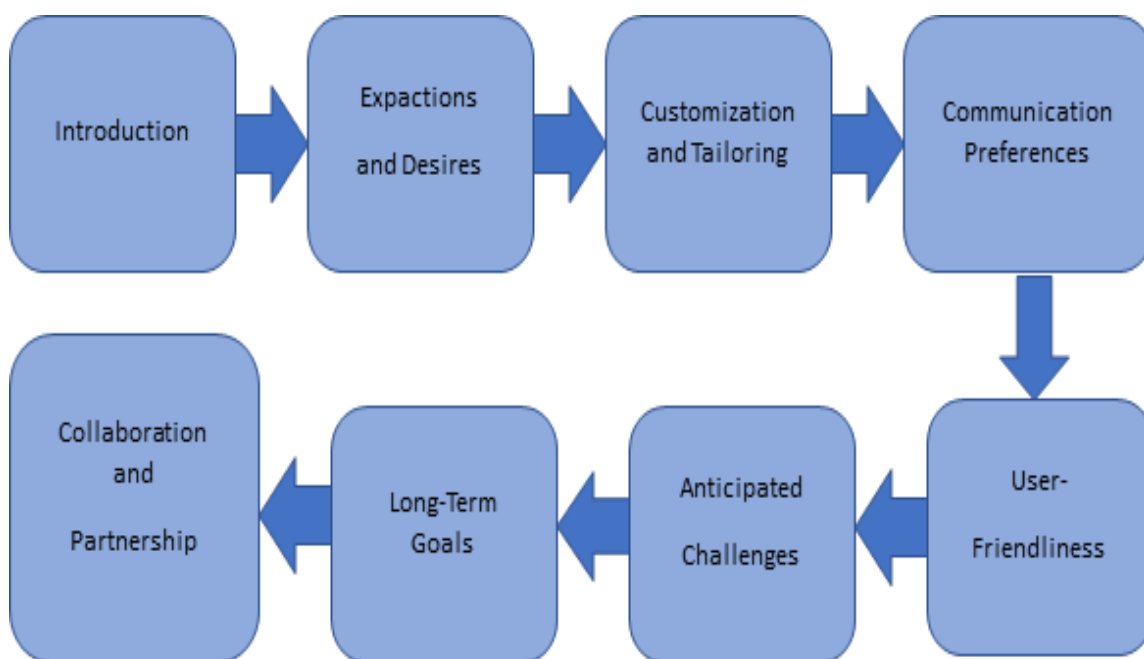


Figure 1. Framework of the interview

The interview questions selected for this thesis, which can be seen in Appendix 1, cover a wide range of important aspects related to the future functionality and implementation of CMMS. The interview questions started by asking how well the interviewee knew the purpose of the future system. It was important to understand the interviewee's basic knowledge of the subject matter so that future questions were clear to the interviewee. It was important to find out what expectations the future users had of the system and what customized features

would be best. The questions on customisation were designed to identify the specific features considered essential to the operation of Cimcorp.

Effective communication is key to the successful implementation of a CMMS system. Questions on communication preferences were used to determine methods and channels for communicating updates and maintenance activities. User-friendly design is crucial for efficient use and take-up. The User-friendliness questions sought to identify features that would improve the user experience. There may be challenges associated with system deployment and it is important to address these in advance. The questions sought interviewees views on future challenges and ideas for overcoming them, including the support needed.

The implementation of the CMMS should be in line with long-term objectives. These questions were used to find out the interviewee's views on how the system can contribute to these objectives, as well as additional information that the interviewee believes would be useful in the long term. Stakeholder cooperation is essential for the successful implementation of CMMS. Collaboration and Partnership questions were used to assess interviewees' expectations of collaboration and the level of commitment and support they expect from Cimcorp throughout the process. Overall, these questions were thoughtfully designed to gather information on various aspects of the system implementation, considering both immediate needs and long-term goals, while also taking into account user preferences and potential challenges.

The interviewees were selected together with the Cimcorp contact person. The selection of interviewees was carefully considered to get the best possible idea of which activities would be the right ones in terms of user-friendliness, cost-effectiveness and long-term objectives, and which activities would best serve the employees. Responses were sought from Cimcorp employees who will be using the future system daily. Three Cimcorp employees and two representatives of Cimcorp's client company were selected as interviewees. The representatives of the client company were asked to participate in the study because the system will also be a portal for customers. A view from

outside Cimcorp was sought to compare whether the views and expectations of the customers matched those of Cimcorp. This also gave an insight into whether customers have an interest in, and knowledge of, such a system. The interviewees participated in the study on an anonymous basis.

3 CIMCORP

Cimcorp is a systems integrator that develops and delivers solution to simplify and streamline material flows in intralogistics. Cimcorps solutions are used to transport and store material flows in the grocery and tyre industries, among others. Cimcorp was founded in 1975 with a business focus on the picture tube industry. Cimcorp started its business in the food industry in the 1990s and in the tyre industry in the 2000s. (Cimcorps website.)

Since 2014, Cimcorp has been owned by Muratec Machinery Ltd of Japan. Cimcorp's head office is in Ulvila. The North American headquarters is in Grimsby, Canada, whit other office in the USA, India, Spain, and Germany. The Group's core values are community, creativity, caring and reliability. The company employs around 400 people. (Cimcorps website.)

Picture 1 shows a of Cimcorp's customer's distribution centre with fresh goods. The picture shows the Gantry robot supplied by Cimcorp.



Picture 1. Cimcorp's customer company distribution centre (Cimcorp Media Collections)

3.1 Cimcorp's strategy and objectives

Cimcorp's values and strategy underpin everything they do. Cimcorp aim is to grow into a truly global group, to make a difference and be a partner to be reckoned with globally. Cimcorp's core mission is to develop tailor-made solutions for its customers, operate locally close to the customer and provide lifecycle services for the system. (Future Cimcorp 2023.)

At Cimcorp, the word value means a genuine concern for employees, customers, and the well-being of communities. The courage to try new ideas and challenge ourselves. A supportive culture and awareness of the modern world. Most importantly, being a trusted partner for employees, customers, and partners. Cimcorp's core values are caring, creativity, community-oriented and credibility. Each value considers the customer, the employee and the partners. (Future Cimcorp 2023.)

4 ENTERPRISE RESOURCE PLANNING

ERP – Enterprise Resource Planning systems continue to be one of the fastest-growing, largest, and most influential commercial software products. As a term, ERP describes multi-module application software that helps companies run their businesses, including product planning, parts purchasing, maintaining inventories, interacting with a relational database system. It also includes application modules for the finance and human resources aspects of a business. (Nestel & Olson, 2018, s. 1.)

At first ERP Systems focused on manufacturing, but quickly they expanded to support all sorts of organizations. ERP enables an enterprise-wide integrated information system that covers all functional areas, performs core functions, and extends customer service. ERP's goal is to integrate all aspects of the business. (Nestel & Olsin, 2018, s. 3.)

The ERP system consists of modules. Not all companies need all the modules available. In the 1990s there were about ten modules available. Today, there are many different targeted tools available for companies according to their needs. In almost every case, the implementation of enterprise software requires customisation, and the modular system makes it possible. (Nestel & Olson, 2018, s. 21-24.)

4.1 Industrial and Financial System

IFS – Industrial and Financial Systems is the Enterprise resourcing planning system used at Cimcorp. The ERP system delivers cloud-based software worldwide to companies in various industries. The system streamlines operations and improves the overall efficiency of the company throughout its lifecycle (Figure 2). (IFS website.)



Figure 2. Enterprise Resource Planning Systems Lifecycle (Novacura website)

IFS offers companies pre-built packages for the most common activities. The ready-made packages can be easily customised to suit different needs. All packages can be developed and updated, and new functionality can be introduced. The system also provides a B2B (business to business) portal for its users. The portal facilitates communication between the company and the customer, for example by allowing real-time recording of responses and orders. (Aveso website.)

Cimcorp has a versatile system package from IFS, covering a wide range of business areas. The IFS integrated system is a daily tool for Cimcorp. The system already includes human resources management, customer relationship management, reporting, financial management, quality management, service management, purchasing, sales, project management, manufacturing, and time reporting.

5 MAINTENANCE

Maintenance is defined as a maintenance operation that includes inspection, adjustment, cleaning, greasing, oil changes, filter changes and similar activities. Repair is also a maintenance measure. A repair restores the required function of a defective item. Other anomalies, such as a safety risk, may also require repair. (PKS 6201, 2022, p. 4.)

The SFS-EN 13306:2010 standard states that maintenance is all technical, administrative, and managerial actions taken during the life cycle of a machine to maintain and restore it to a state where it can perform its intended function. (Järviö & Lehtiö, 2010, p. 17).

Maintenance plays an important role in the development and productivity of a company. At Cimcorp, the maintenance management system is seen as the tool of the future, used by more than 100 people. The system will become an everyday tool for the customer support, including System support, maintenance, spare parts services, after sales. The system aims to make the company more efficient, facilitate the flow of information and modernise documentation practices. Currently, maintenance is agreed by email and billing estimates are based on historical data. With the system in place, the company could optimise its human resources, and thanks to a uniform documentation policy, all the necessary information would be easily accessible to users. This would allow tacit information to be distributed to all parties concerned.

Currently, Cimcorp has a service contract with most of its customers. This means that Cimcorp sends its service teams to customers' premises twice a year to carry out maintenance work. In addition, Cimcorp also offers a second level of support, called Standby service, which allows unexpected maintenance needs to be dealt with immediately within an agreed time window.

5.1 Computerised Maintenance Management System

Maintenance management information systems are the information management systems needed to plan, control, and monitor the reliability of production equipment. These systems are designed to maintain the reliability of equipment at the required level throughout its life cycle. Maintenance management information systems are created to oversee and control maintenance operations effectively. The system can be linked to various enterprise resource planning systems within the plant, such as material, finance, and human resource systems. (PKS 6201, 2022, p. 38.)

Figure 3 shows the functions of the system that facilitate the planning, monitoring, and optimisation of maintenance. It illustrates the functions provided by the CMMS.



Figure 3. Computerized maintenance management systems services (Infraworks website)

CMMS – Computerised Maintenance Management System is an automated maintenance management system that operates as part of the IFS ERP system. The maintenance planning reduces downtime and costs by anticipating maintenance needs. (IFS website.)

The work order is an essential part of the maintenance system, as it serves as a plan and a guideline for carrying out the maintenance work. A work order is a request processed in the maintenance information system and approved by the person in charge of the costs arising from the work, which contains the relevant information for the object, the task, the planned date, identification, and cost allocation. (Pks 6201, 2022, p. 23.)

5.2 The purpose of maintenance

The key objectives of maintenance are overall production efficiency and good reliability. Reliability consists of reliability, maintainability, and maintenance supportability. In addition, safety, environmental considerations, and cost-effectiveness are important maintenance objectives. (PKS 6201, 2022, p. 5.)

Dependability operation refers to the state in which an object can perform the required function under a given set of conditions. Operational reliability is the ability of an object to perform the required function under specified conditions for the required time. In turn, maintenance supportability describes the effectiveness of the maintenance organisation in performing the required function under specified conditions for a specified period. (PKS 6201, 2022, p. 9.)

5.3 Preventive maintenance

For a maintenance organisation to be effective and productive, it needs to be controlled and systematic. In preventive maintenance, effectiveness is determined by the extent to which maintenance can be planned and scheduled in advance. In good maintenance, about 80% of the work is known about three

weeks in advance. The planning of operations, the procurement of spare parts and tools, and the scheduling of work enables production to be disrupted as little as possible (Järviö & Lehtiö, 2012, p. 97).

The basic requirements for effective preventive maintenance are planning and scheduling. Careful planning eliminates delays in the execution of work, and scheduling eliminates delays between jobs. The result is the best possible control of equipment failure and more efficient use of resources within the company. Preventive maintenance planning is one of the most difficult aspects of maintenance. The traditional preventive maintenance worklist is based on the following information: past experience of failures, spare parts and their usage rates, the operating procedures of the machine and its parts, and the recommendations of the machine manufacturers (Järviö & Lehtiö, 2012, p. 100).

According to PKS 6201:2022, the maintenance plan includes measures for the planned maintenance of the site at different stages of its life cycle. If necessary, the plan will be updated to meet the requirements of the site. The maintenance plan includes, for example, information about the object, the planned maintenance measures, the periodicity, the time required for the measure and the human, equipment and spare parts resources required for its implementation. (PKS 6201, 2022, p. 21.)

6 DEFINITION OF SYSTEM REQUIREMENTS

Defining needs is more challenging when purchasing services than when purchasing products. When buying a service, you must consider what you want from the service and who is best equipped to deliver it. At the very least, the procuring organization needs to articulate the desired outcome of the service. By defining the service outcome for the supplier, there is room for flexibility in how the service is delivered in the most competitive way. The

service provider, in its own business, develops services from the perspective of the customer's needs. The buying organization and the supplier collaboratively develop the service and its added value, focusing on the overall aspects rather than delving into small details and hourly rates in the service process. (Nieminen, 2016, 3.1.)

When defining maintenance, it is important to consider the life cycle of the equipment and how it is maintained and serviced. When defining equipment, the goal should be to achieve consistency. If there are many different models of a given piece of equipment, numerous spare parts will be needed. (Nieminen, 2016, 3.1.)

The needs definition should be conducted collaboratively with the end-users to gain a thorough understanding of their requirements. The end-user may be a customer or a company's staff. Assessing the end-user's needs without proper mapping can result in "over-definition," where additional features are acquired randomly. This may lead to additional costs without certainty about the necessity of the added features. Conversely, relying on guesswork might overlook a crucial feature, resulting in a final product that may not sell at all. (Nieminen, 2016, 3.1.)

It is beneficial to be proactive in defining needs. The earlier you start, the better you can exploit the opportunities offered by the supplier market. The definition must consider all legal requirements and accountability issues. This can also encompass target budgets, cost transparency, or cost development. The company needs to comprehend the full implications of the definition. (Nieminen, 2016, 3.1.)

7 IMPLEMENTATION

Deployment is much more than training. It involves meeting the set objectives and implementing and enabling the changes planned during the project. All activities are directed toward embedding the change in the organization and fostering a culture of use. Before the roll-out, the focus is on internal marketing, launching the vision of the change. Explaining what is changing, why, and what it will entail. The aim is to energize the organization and the user community for the upcoming change and to create positive anticipation. During implementation, the goal is to ensure that no one feels uninformed. When the roll-out takes place, users will be reminded of what the new policies mean in practice. When the benefits of the change are perceived as more than just a technical alteration to the system, it is easier to tolerate the negative aspects of the roll-out. (Oksanen, T. 2015. 12.1.)

7.1 The challenges of implementation

To be competitive in the marketplace, it leads to trying to do more with less effort and thus outperform your competitors. To achieve this, organizations need to be willing to take greater risks in their product development processes. When these risks are well-understood and effectively managed, they have the potential to contribute to improved financial performance. However, if these risks are not properly managed and understood, the outcome of processes may lead to unfavourable results. By understanding the typical causes of project failure, a methodology can be developed to ensure that risks critical to success are considered, communicated, and accepted. (Bissonette, 2016, 1.)

Publications on health information system implementations have identified information system challenges and problems. Gillingham (2019: 135-136) writes about the problems and risks that have arisen in the implementation processes of information systems: information systems have not been fit for purpose, missing necessary functionality, expensive to implement and maintain, systems have undermined the organisation rather than improving it,

and systems have been too complex and have caused frustration for staff. Bimerew (2015: 71) highlighted four major challenges to the use of information systems: lack of resources in system development, failure to involve end-users in development and design, poor accessibility of essential information in the information system, and ignoring quality in the implementation project.

Mistakes can be made early in the implementation of an information system if the opinions and needs of future users are not taken into account. Financial losses can occur if a new system is introduced but remains unused or has low take-up. It is therefore important to design both the system itself and the implementation process in such a way that all future users at all levels of competence are motivated to use the system and see it as delivering tangible benefits for their work.

8 RESULTS OF THE INTERVIEW

8.1 Introduction

All interviewees were familiar with the concept of CMMS and had previously used similar system in their work. The new system is expected to bring Cimcorp significant improvements in processes, data, integrity, service quality, reduced response times, better understanding of customer needs and a consistent reporting format to customers globally. The system is expected to provide documented old maintenance and scheduled new maintenance, with resources available in one place and no longer managed by one person in Excel. It is hoped that the system will contribute to making data easily accessible to all. The customer wants the system to provide periodic updates tracking of maintenance activities, as well as simple and structured documentation.

Once the system is in place, communication between departments is expected to be unrestricted. Transparency is important to ensure that all employees have access to the same information. The system is expected to bring better quality for reports, faster delivery, automatic storing, faster quotation of spare parts. The portal is also expected to allow customers to view reports, schedule and order maintenance and spare parts.

8.2 Expectations and Desires

A positive outlook raised by all interviewees was that in the future all maintenance-related issues will be available in one place. Transparency came up several times in the interviews. Having an employee visible in the reports will improve the planning of future maintenance visits, for example, it will be easier to assign an employee who already knows the site to rarely visited sites. One interviewee considered it important to see live data to be able to react earlier if there are problems at the maintenance site or if something unexpected has happened.

A concrete benefit of the system that the customer wanted to see was an overview of maintenance costs, for example, broken down into preventive maintenance visits and urgent maintenance. The system would provide an up-to-date view of the condition of the plant and the need for preventive maintenance. As a minimum, the customer would require the system to provide maintenance documentation, cost view and cost sites.

The following list collects all the interviewees' wishes for the functions to be introduced in the maintenance system:

- Qr-stickers/Device ID
- Reporting
- Work order
- Work tasks
- System support tickets

- Resources
- Scheduling
- Calendar
- Customer portal (reports, calendar)
- Service prices
- Spare parts
- Adding photos and notes
- Offline use possibility
- Use on a phone or tablet
- Customer signature on the device (with a pen)
- Root Cause Analysis

Identifying devices with a QR code or ID makes it easier to locate them in the system. A move to paperless reporting in the future could allow reports to be transmitted to the customer immediately after the service has been carried out, provided of course that legislation allows such an operation. This would significantly reduce paperwork by making work orders and reports electronic, which in turn would standardise reporting and make all reports professional.

Cimcorp's System Support ticketing system is already in place. It is hoped that the system will allow labels to be sent directly to maintenance if necessary and received back once maintenance is complete.

Displaying the prices of spare parts and maintenance in the system would make it easier to quote customers in the future. The system should also scale well to different screens, such as phones and tablets. Customers should be able to easily adapt their own contact details, especially when changing employees, in the customer portal.

8.3 Customization and Tailoring

When we interviewed Cimcorp employees about the possibilities of customisation, the need to keep the system easy to use was clearly

highlighted, so that working time is not spent on using the system but on the tasks themselves. The aim is for the system to provide the necessary basic functionality, such as client site / device specific templates for reports and checklists, as well as work tasks, resources, and schedules/calendar. One Cimcorp employee pointed out that it would be easier to define the desired features of a system if there was more precise information about what the system could offer. The customer's response indicated that the customisation option is not important to them. On the other hand, it is important that the software fits the system.

One specific feature that was felt that the system would benefit from is the recording of fault reports in the ticketing system. This feature would allow data to be measured and would help to clarify matters in the future. When reporting a fault, it is important to record how the emergency service was carried out, who carried it out and how long it took. Finding equipment by equipment ID in the system was mentioned in the responses. The device ID would allow the system to display more detailed information related to the fault report, as well as any other necessary information about the device and maintenance. The desire for a device ID and QR code on devices underlines the idea that employees want a simple way to retrieve information from the system.

8.4 Communication Preferences

Cimcorp employees were satisfied with the current methods of communication between colleagues. They rated Teams and emails as the best ways to communicate between the system and employees. For communication with the customer, email was unanimously perceived as the best way to communicate, and email was also perceived as the best way by the customer.

It is hoped that reminders of the scheme will be sent by email with a clear subject line. For example, an email from the system is desired for customer service requests and when a service report is completed and sent to the customer. In general, no communication is expected from service visits unless

there is a specific need. However, the interviews did note the company and customer perspectives on the measurable variables. The company and the customer could be interested in maintenance times and estimate times in the future.

8.5 User-Friendliness

Responses suggest that an emphasis on a less is more approach would significantly improve user-friendliness. The system should give priority to simplicity and ease of use.

In the customer interview, the user-friendliness aspect was highlighted when the customer expressed the wish to be able to use the system remotely from their own device, for example through a web application. This would mean being able to access the system from their own device, whether through a web application. The desired devices for accessing the system would be Windows, Android and Apple systems.

It is hoped to include pre-set options in the reporting functions, which would be available for example through drop-down menus, e.g. cleaned, greased or replaced part. As well as checkbox options, e.g. cleaned, greased, replaced part. The possibility to add additional comments and pictures were important features for each interviewee. To ensure usability under different conditions the use of the system in offline mode is an important factor. Not all locations have access to the internet.

Currently, it is difficult to find historical data in the Cimcorp system. Improving the availability of historical data would be crucial for user convenience. This could be addressed by introducing features that streamline the search process and make historical data more accessible.

The use of a tablet was disagreed. One person considered tablets useful for employees. Another felt that there was no need for new devices because

tablets are too big to carry and inconvenient, especially for those travelling by air for maintenance checks. In this case, the tablet would be yet another additional device to carry. In contrast, a mobile phone was found to be always carried by the employee. The system interface should scale well to both mobile and tablet screens to maximise the user experience.

8.6 Anticipated Challenges

Interviews with Cimcorp employees showed that they are positive about the implementation of the system, provided that it is easy to use, and that training is provided properly. They appreciate easy and clear instructions. However, questions were raised about how customers feel about the implementation of the system, particularly in terms of language skills, especially for German-speaking customers. There was uncertainty about how well customers know how to use the system in English and how motivated they are to implement it. There were also questions about how to make access to the system work smoothly in the event of a change of client employee.

In one interview, the responses raised the idea that compliance with the General Data Protection Regulation is a major challenge, as it requires strict measures to ensure the protection of sensitive data and user privacy. Information security was seen as another key challenge, with technical aspects such as protection against cyber threats and ensuring data integrity and confidentiality, technical security, whether the system has these things in place. The implementation of user-defined access rights can also pose challenges in defining and managing access rights for different users. At the same time, it was noted that even setting up and updating the system can prove to be a challenging task.

Interviews with Cimcorp staff revealed that creating site/device templates for a new system is notoriously challenging. For new projects, it is possible to import data into the system during the project, but for existing clients, importing

equipment-specific data into the system is certainly a manually intensive moment.

The customer interview revealed challenges and concerns related to employee training. Employees have already had to learn many systems, so the introduction of a new maintenance system would again increase the need for training. To overcome these challenges, it is important that the maintenance system is intuitive to use. The customer would like the manufacturer to provide training to support them with these challenges.

8.7 Long-Term Goals

Based on the responses, Cimcorp employees agreed that the system enables them to provide each customer with proactive maintenance that minimizes downtime. As long as the system can be deployed with the necessary features. The system would make maintenance more systematic and would also take into account customers who do not have a maintenance contract, as the system would remind of maintenance.

The whole organisation is expected to be more cost-effective with the system. Another positive aspect is that in the future Cimcorp will be able to measure, for example, how often a piece of equipment/part breaks down and how long it takes to service it. This will make it easier to anticipate the future. For example, when a particular component will break down.

The customer interviews revealed that the long-term goal of the system is to achieve cost savings. Cost savings are expected to come from proactive maintenance and legal documentation.

8.8 Collaboration and Partnership

Cooperation with Cimcorp was considered particularly important in the design of the system's functions. Being able to test the system during the development phase to ensure that the system has the necessary functionality and to listen to what users want, and of course testing user-friendliness is important.

The system should be as simple as possible to make it easy to use. One interviewee believes that if the system is simple enough and has minimal functionality, it may not need much support. However, he thinks that some kind of workshop would certainly be good for employees. If you have a basic understanding of how it works, support may not be needed. However, everyone agrees that training is important and the current training situation at Cimcorp for systems is also mentioned. More training would be welcome, as training at Cimcorp is currently self-directed. In the interviews, it was also hoped that the resources for implementing the system would be in place.

The client stressed the importance of collaboration, so that the client is considered in the development and implementation of the system. In addition, the customer felt it was important that Cimcorp's commitment was strong so that maintenance work was properly documented.

9 SYSTEM DEPLOYMENT

The whole system implementation project started already during the thesis. This thesis forms one part of the system to be deployed, providing answers as to which functions will be implemented. The results and findings of the thesis were shared with the project participants even before the thesis was completed. These results were considered as the project progressed and will be used in its future planning and implementation. The company's first objective is to implement a maintenance side, including preventive

maintenance, maintenance orders, resource management and reporting. Later, the system will also be used for spare parts services.

From the very beginning, the system implementation project involved a member of the consultancy service, who is responsible for the overall implementation of the entire system. The company's employees were involved right from the start and training was organised to learn about the system and try it out together. In addition, it would be a good idea to appoint someone from within the company to be responsible for the implementation, scheduling, and training of the initial phase.

10 CONCLUSION

The thesis was motivated by Cimcorp's need to implement a Computerized Maintenance Management System. There was a need to change the old way of doing things, and the deal with the customer included a promise of a maintenance programme. In the past, maintenance activities were mainly managed using Excel spreadsheets and files stored in the cloud or on the employee's own computer.

The thesis was successful and interesting. However, the originally planned implementation plan was put aside at the beginning, as the implementation project was already started during the thesis project. Nevertheless, I was able to personally participate in planning meetings and a few training sessions, which provided valuable information and deepened my understanding of the thesis topic. The thesis stayed well on schedule.

Qualitative research provided a deep understanding of the need for the functionalities to be implemented. The thematic interviews were a reliable way to collect data, as it allowed for a flexible discussion and a deeper exploration of my research question. I thought the framework of the interview was well

constructed. The interviews went well. We interviewed four people instead of five. I thought the response rate was sufficient, especially as the interviewees were experienced workers and knew a lot about the subject beforehand.

The consistent interview responses obtained increase the reliability of the survey. The uniform answers suggest to me that the issue being studied is important and that the activities highlighted in the answers are useful for both the company and its customers. In the context of these considerations, I feel that the study appears to be reliable and provides a good basis for conclusions.

10.1 Recommendations

Based on my research, I recommend a gradual implementation of the functionalities. A gradual approach would ensure that employees can easily learn to use the system and receive the necessary training. It would also give employees the opportunity to influence future activities and ensure that the system continues to evolve to match the needs of the organisation. As was clear from the interview responses, it is important that the resources are in shape when the system goes live. This is why I recommend that Cimcorp designate an employee to oversee the implementation of the system.

One of the challenges of the implementation project that emerged from the interviews was the language skills of the German customers in using the system. Cimcorp should take this into account when training client companies. I would suggest that training should be in the client's own working language. This would guarantee proper learning and correct use of the system. It would be good to have a person involved in the implementation project who could provide training in German.

In a training situation, language skills are particularly important, as trainees are learning a foreign system, in a foreign language. Irrelevant translated sentences in training, on the other hand, confuse learning. In terms of time,

interpretation slows down training, but it is perceived as a better alternative to low-quality learning. (Oksanen, T. 2015. 2.5.)

10.2 Suggestions for further research

As a further research proposal, I propose to create a marketing plan for the customer using the CMMS system. The client interviews revealed that it can be difficult to get employees to embrace the system in a positive way. This is why it would be particularly important for Cimcorp to have a good marketing plan. The plan would clarify the role of the system from the client company's point of view and explain all the benefits that the client can obtain from the system, including at the level of the individual employee.

It would also be interesting to examine how the implementation project at Cimcorp went, whether the system achieved the expected benefits and whether the functions introduced were necessary. This would also help to find out whether employees feel they can influence the implementation of the system in the way they want.

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APPENDIX 1: QUESTIONS

Introduction:

- How Familiar are you with the concept of Computerized Maintenance Management System?
- What do you think CMMS will bring to your Company?

Expectations and Desires:

- What specific outcomes or benefits are you hoping to achieve through CMMS?
- Are there any particular features or functionalities you would like to see on such a program?
- What would be the minimum requirement for you for CMMS functionality?

Customization and Tailoring:

- How important is for you to have CMMS tailored to your company specific needs?
- Are there Specific features that you believe would be essential for your company?

Communication Preferences:

- How would you prefer to receive updates and communication about maintenance activities?
- Are there specific channels or formats of communication that work best for your team?

User-Friendliness:

- What features do you believe would contribute to a more user-friendly experience?
- On which devices would you like the system to work?

Anticipated Challenges:

- As you thinking implementing CMMS, are there any challenges or concerns you anticipate?
- How do you envision to overcome these challenges with support of a maintenance programme?
- What kind of support do you need to overcome these challenges?

Long-Term Goals:

- How do you see CMMS aligning with your organization's long-term goals?
- Are there any additional features that you think will contribute in the long term?

Collaboration and Partnership:

- How important is it that we work together to develop and implement the CMMS?
- What level of engagement and support would you expect from Cimcorp?