

**CHANGE MANAGEMENT FOR MAINTENANCE  
MANAGEMENT SYSTEM IMPLEMENTATION IN  
INDUSTRIAL ENTERPRISE**

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Tämä opinnäytetyö on tapaustutkimus, jossa tarkastellaan muutosjohtamista kunnossapidon hallintajärjestelmän käyttöönotossa teollisuusyrityksessä. Tutkimuksen kohteena on Outokumpu Chrome Oy, jossa opinnäytetyön tekemisen aikaan oli käynnissä laaja projekti, johon kuului uuden järjestelmän käyttöönotto ja jonka onnistuminen edellytti vahvaa muutosjohtamista.

Työn tarkoituksena on tunnistaa onnistuneen muutoksen keskeiset tekijät, ymmärtää työntekijöiden kohtaamia haasteita siirtymävaiheen aikana sekä tarkastella, millä muutosjohtamisen keinoilla voidaan tukea uuden järjestelmän omaksumista. Työ perustuu laadulliseen tapaustutkimukseen ja siihen sisältyy teoreettinen katsaus järjestelmien käyttöönoton muutosjohtamisesta. Työssä käsitellään yleisiä muutokseen liittyviä haasteita ja esitellään muutosjohtamisen malleja. Lisäksi työssä tarkastellaan toiminnanohjausjärjestelmiä erityisesti siitä näkökulmasta, mikä niiden rooli on yrityksissä ja miten ne yhdistävät eri liiketoimintaorganisaatioita ja -toimintoja.

Tutkimusaineisto kerättiin puolistrukturoiduilla haastatteluilla ja puolistrukturoidulla kyselyllä. Haastatteluihin osallistui 8 avainhenkilöä, jotka työskentelevät projektissa tai Outokumpu Chrome -liiketoiminta-alueella ja kyselyyn osallistui 38 Outokumpu Chrome Oy:n työntekijää, jotka edustivat järjestelmän loppukäyttäjiä. Tulokset osoittivat, että vahva johtajuus, selkeä viestintä, riittävä koulutus ja henkilöstön aktiivinen osallistaminen ovat tärkeitä käyttöönoton onnistumisen kannalta. Onnistumisen haasteiksi osoittautui muun muassa uuden järjestelmän käytön oppiminen sekä uusien työskentelyprosessien omaksuminen. Sujuva käyttöönotto edellyttää järjestelmällisen tuen tarjontaa ja jatkuvan palautteen antamista.

**Avainsanat** muutosjohtaminen, toiminnanohjausjärjestelmä, kunnossapidon hallintajärjestelmä, järjestelmän käyttöönotto, kriittiset epäonnistumistekijät, muutosjohtamisen mallit

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This thesis studies change management in the implementation of a computerized maintenance management system (CMMS) within an industrial enterprise, using Outokumpu Chrome Oy as a case study. At the time of conducting this thesis, Outokumpu was undergoing a large-scale project that involved the implementation of a new system, which requires strong change management to succeed.

The purpose of the study is to identify the key factors for successful change, to understand the challenges employees face during the transition, and to explore how change management strategies can support adaptation to the new system. The study is based on qualitative case study that includes theoretical review from subjects of change management in the area of system implementation. Common challenges regarding change are examined as well as change management models are introduced. Overview of enterprise resource planning systems (ERP) is included especially from the perspectives of their role in companies and integration between different business organizations and functions.

The research data was collected through semi-structured interviews and a semi-structured questionnaire. 8 key persons working either in the project or in the Outokumpu Chrome business area, participated in the interviews and 38 employees of Outokumpu Chrome Oy representing the end users of the system responded to the questionnaire. The findings highlight that strong leadership, clear communication, sufficient training and active involvement of employees are important for success. Challenges such as difficulties in learning the system and concerns about work processes did arise. Systematic support and continuous feedback appeared to be the tools for managing this kind of challenges.

**Keywords** change management, enterprise resource planning system, computerized maintenance management system, system implementation, critical failure factors, change management models

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## ABBREVIATIONS

ADKAR	Awareness, Desire, Knowledge, Ability, Reinforcemen
BCM	Business Change Management
MMS	Maintenance Management System
CMMS	Computerized Maintenance Management System
DMS	Document Management System
ERP	Enterprise Resource Planning
FeCr	Ferrochrome
HR	Human Resources
KPI	Key Performance Indicator
MTBF	Mean Time Between Failures
MTTR	Mean Time to Repair
PM	Plant Maintenance
SCADA	Supervisory Control and Data Acquisition
SME	Small and Medium-sized Enterprises
SSO	Single Sign-On

## 1 INTRODUCTION

Computerized maintenance management system (CMMS), later the abbreviation CMMS will be used, plays a critical role in a highly competitive industrial enterprises by ensuring that machinery and equipment in the production processes are efficiently maintained which decreases production downtime and increases productivity. (Shankar, Singh & Singh 2023.) This thesis is based on Outokumpu's project called Chorus 3X for replacing its old ERP systems. Chorus is a business transformation program that aims to develop and improve business capabilities for Outokumpu. This will be done by harmonizing and improving the core business processes, ways of working, and the related IT systems and data. The project will bring a new ERP platform SAP P01 and renew existing processes and systems as well as implement completely new processes and systems. The first milestone for Chorus was achieved with the go-live in Outokumpu's mill in Germany in October 2019. The second rollout took place in Outokumpu's mill in Sweden in June 2021. The next milestone was the upgrade of the existing ERP system SAP P01 in April 2023. In August 2022 the Chorus 3X pre-phase and fit and gap -phase started with targeted go-live in November 2024 in the Netherlands, Lithuania, and Finland. (Outokumpu, 2025a.) In October 2024 the go-live was postponed and during the thesis finalization the targeted go-live is in October 2025. The transition to a new system is a complex process that involves significant changes to the organization's processes and ways of working. More precisely this thesis focuses on the change management of the replacement of Computerized Maintenance Management System KUTI to SAP PM at Outokumpu Chrome Oy. Effective change management in this project is important to ensure a steady transition and successful implementation.

### 1.1 Motivation and background

This thesis studies the change management process during the replacement of the CMMS at Outokumpu Chrome Oy. The focus is on the post-implementation phase where employees adapt to the new processes and tools after the system has been taken into use. This stage is in an important role for the long-term success of the change. The topic is limited to this specific phase to get a better

understanding on how the change can be supported after the actual system implementation moment. The subject fits well within the master's degree Programme in Digital Business Management at Lapland University of Applied Sciences as it includes themes such as digital transformation, change management and practical business development. The CMMS system renewal is just one part of the Outokumpu's enterprise-wide ERP project and in this case the practical business development is targeted to the organisational level, which is the business area ferrochrome, the end users of SAP PM and the managers and leaders of this organisation related to the project. The transition to SAP PM affects maintenance processes and roles, and there is a clear need to manage the change in a way that supports users throughout the transition. This thesis aims to respond to that need by identifying what kind of support, communication, and practical actions are most effective in helping employees adapt to the new system and working methods. With the fast developments in technology, it is beneficial for many manufacturing companies to change for more advanced systems to enhance their maintenance operations and thereby their business competitiveness overall. (Shankar, Singh & Singh 2023.)

The author is currently working as a project engineer at Outokumpu Chrome Oy, focusing on maintenance and development projects in the concentration plant. Previously, the author worked as a mechanical maintenance work planner in the same organization. In addition to the current role, the author is actively involved in the CMMS project, where SAP PM key user skills have been gained and are still being developed as the project progresses. Professional experience has also been collected from Stora Enso's sheeting plant in Veitsiluoto and Tapojärvi's concentration plant operations in Tornio while working in different organizations and roles. This background has provided a broad understanding of industrial environments, maintenance processes, and the practical challenges related to system implementation and change management.

## 1.2 Knowledge base

The knowledge base of the thesis consists mainly of subject related books and scientific peer-reviewed articles, which are searched through LUC-finna portal

with search words such as “change management”, “ERP implementation”, “Computerized Maintenance Management System”, “CMMS” and “successful change”. Few internet sources are used to fulfil some information. For example, the change management method Prosci ADKAR appears to be not studied extensively but is widely used in corporate environment. Discussion about enterprise resource planning systems has been kept as current as possible and latest publications have been searched for first. Some studies have been limited geographically as cultural aspects may have a big impact for example on managing people.

Previous studies about successful or unsuccessful system implementations have been referred to back up the results of this study. These studies help to understand what kind of factors are generally connected to the success of implementation and where typical mistakes could appear. The chosen perspective for this thesis is to look at the implementation from the point of view of end users and change management, especially during the post-implementation phase. This practical focus supports the aim of identifying what kind of actions and communication help employees to adapt to a new CMMS system in Outokumpu Chrome Oy.

### 1.3 Purpose, objectives and thesis questions

The primary objective of this thesis is to explore and analyze change management strategies that supports the successful implementation of CMMS in industrial enterprises. The study aims to investigate the challenges and opportunities related to CMMS implementation, identify key stakeholders and their roles in the implementation process, and examine best practices in change management that are important for the successful implementation of CMMS.

The thesis will consist of a literature review on change management, stakeholder analysis, case studies review, interviews, surveys, and result analysis. The study answers for these questions:

- What are the key factors for a successful change in a CMMS implementation at Outokumpu Chrome Oy?
- What challenges do employees face during the transition and how can they be managed at Outokumpu Chrome Oy?
- How can change management strategies support employees in adapting to the new CMMS system at Outokumpu Chrome Oy?

The purpose of the first research question is to identify the key factors that make the CMMS implementation successful and to understand what circumstances and practices need to be in place for the change to succeed. The purpose of the second question is to find out the most challenging aspects that employees face during the transition and how these can be managed. The aim is also to recognize barriers and find ways to support employees through the change. The purpose of the third question is to examine how change management strategies can support employees in adapting to the new CMMS system and to evaluate what kind of practices are most useful for helping employees accept and use the system.

#### 1.4 Methodological implementation

The study uses a qualitative case study methodology to examine change management for Maintenance Management System (MMS) implementation in industrial enterprise. This approach enables a thorough investigation into the practical situations, experiences, and viewpoints concerning CMMS implementation and strategies for managing change.

Gillham (2000, 1) specifies that a case study is:

- “a unit of human activity embedded in the real world;
- which can only be studied or understood in context;
- which exists in the here and now;
- that merges in with its context so that precise boundaries are difficult to draw.”

Data is collected with semi-structured interviews from key stakeholders involved in CMMS project, with semi-structured questionnaire targeted to system end users in different organizations, and analysis of relevant documents and records. This multi-method approach provides a comprehensive understanding of change management practices and their impact on CMMS implementation outcomes. (Gillham 2000, 13.)

### 1.5 Ethical foundations and reliability

The most important ethical principles in qualitative research include informed approval, voluntary participation, confidentiality, protection from harm, and protecting participants well-being. Informed approval requires that participants are clearly informed about the purpose, procedures, risks, and benefits of the study, and approval can be given in written, verbal, or recorded form. While some researchers argue that participants can never be fully informed, the researcher has a responsibility to explain the study as transparently as possible. Voluntary participation means that no one is forced to take part, and participants may withdraw at any stage without consequences. Confidentiality is maintained by avoiding identifiable information with using coding schemes and informing participants of any limits to anonymity. Protection from harm is also important because sensitive topics can cause emotional reactions. The researcher must ensure that risks are minimized, and both participants and the researcher are supported throughout the process. (Klenke 2016, 63-64.)

To ensure validity and reliability various strategies such as member checking, triangulation, and peer review can be applied. Member checking involves seeking feedback from participants to confirm the accuracy and credibility of findings. Triangulation involves using multiple data sources to confirm findings. Peer review involves discussing findings with colleagues to enhance validity and reliability. (Merriam & Tisdell 2015, 246, 249)

## 2 CHANGE MANAGEMENT IN CMMS IMPLEMENTATION

Theoretical basis of the thesis consists of the theories on CMMS, where the integration of the CMMS to a broader ERP system is also a reasonable topic to be discussed. Change management is introduced from the perspective of how managers can help individuals in the transition to a new system and the methods that it brings with. Examination of similar system implementations is also included in this thesis.

### 2.1 CMMS

Industrial maintenance plays an important role in the success of industrial companies. Maintenance as an activity has changed substantially over time. In the past, maintenance was seen as a "necessary evil.", but it has become a complex process that is integrated into many other organizations for example production, quality and safety. A well-functioning CMMS is in a central role enabling and supporting these activities. (Lopes et al. 2016.)

#### 2.1.1 Enterprise Resource Planning system

Enterprise Resource Planning (ERP) is a system used in companies that aims to integrate all departments and business functions into a single platform which allows organizations to streamline operations and improve data accessibility (Balić, Turulja, Kuloglija & Pejić-Bach 2022). The term itself appears to be focusing on planning and resource management but actually ERP's main purpose is to combine processes in for example finance, HR and production. ERP was originally developed for the manufacturing industry but has since expanded to various sectors worldwide. It supports the standardization of business processes and improves decision making. ERP systems provide valuable insights that helps to improve efficiency and coordination by integrating business transactions into a single system. However, ERP implementation often faces challenges such as organizational resistance, high costs, and system complexity. The effectiveness of ERP largely depends on selecting the right system and

aligning it with business needs to maximize its benefits. (Parthasarthy 2007, 1-2.)

ERP system integrates multiple business functions into a single platform, enabling companies to manage operations more efficiently. For example, these six key areas can be connected into areas such as accounting and controlling, human resource management, production and materials management, project management, quality management and plant maintenance, as well as sales and distribution. (Shehab, Sharp, Supramaniam & Spedding 2004.) In addition, many system providers have expanded ERP functions into supply chain management, e-commerce, customer relationship management and business intelligence (Parthasarthy 2007, 14). Figure 1 shows examples of what modules ERP architecture can consist of.



Figure 1. ERP modules (Behura 2021)

### 2.1.2 The role of CMMS in industrial maintenance

Computer Maintenance Management System (CMMS) can be integrated in ERP system as a module. CMMS, like ERP, is an information system that supports maintenance activities by combining several functions. It helps to manage for example equipment information, maintenance work orders, preventive maintenance, and inventory control. It can also generate different kind of performance reports. These functions help improving the overall efficiency of maintenance as a process like using information gathered in the system and then automating the tasks. (Lopes et. al. 2016.) One of the most important advantages is the elimination of manual paperwork and tracking activities which leads to increased productivity. CMMS enables the efficient collection, storage, and retrieval of data that is related to maintenance, and it ensures that important information is always accessible. CMMS does not make maintenance decisions itself, but it provides information for maintenance and operations managers and helps them to plan maintenance work, track performance, and ensure stable equipment operation. (Poór, Michal & Karková 2015.)

According to Poór et al. (2015), a survey conducted by A.T. Kearney and Industry Week found that companies using CMMS experienced an average 28.3% increase in maintenance productivity, a 20.1% reduction in equipment downtime, a 19.4% decrease in material costs, and a 17.8% reduction in inventory maintenance and repair costs. Additionally, the average payback period for CMMS implementation was 14.5 months. These results show the value of CMMS in improving maintenance efficiency, cost control, and overall operational performance. (Poór, Michal & Karková 2015.)

There are three main activities included in maintenance management system: planning, organising, and control. As shown in Figure 2, the process starts with planning, where the goals related to maintenance are brought forward to support a company's overall targets. This includes outsourcing decisions, forecasting maintenance workload, and identifying required resources. Planning also includes scheduling maintenance tasks into a timeline. Organising activities focus on putting the plans into action and monitoring the maintenance work that helps

to stabilize the operations. Control activities involve tracking performance and collecting feedback. This feedback is used to evaluate results and improve future planning, creating a continuous improvement cycle. (Shaheen & Nemeth 2022).



Figure 2. Maintenance Management System (Shaheen & Nemeth 2022)

A CMMS produces a large amount of data such as equipment failures, preventive maintenance plans, work orders and maintenance cost figures. It requires knowledge and understanding to turn this data into useful information. This helps maintenance managers to choose the right time and way to maintain different equipment. CMMS data supports decision-making by showing which machines are the most critical based on for example how often they fail, how long they are down, and how much is the overall cost. Tools such as Mean Time Between Failures (MTBF) and Mean Time to Repair (MTTR) can be used to support these decisions. (ElKhouly & Fadil 2019).

### 2.1.3 Integration of CMMS with ERP systems

Effective maintenance management requires strong coordination and efficient resource allocation. Systems such as SCADA, ERP, and CMMS play a key role in modern industrial operations by improving maintenance planning, reducing

costs, and integrating maintenance with other business functions and external partners. These systems for example enable predictive maintenance, optimize resource utilization, and minimize production downtime. Integrating maintenance with production systems helps companies improve efficiency and maintain stable operations. (Shaheen & Németh 2022.) Other systems than SCADA has been introduced more thoroughly in this thesis. SCADA in short, is a supervisory control and data acquisition system for devices in different industrial settings. It can monitor data for example from pumps, valves and transmitters and it can gather and store data from other systems as well. For instance, this data can be used to improve the cost efficiency of the process. (Alanazi, Mahmood & Chowdhury 2023.)

Real-time data sharing enhances collaboration between departments. For example, when a spare part is assigned to a maintenance work order, the system can automatically generate a purchase order for the vendor which enables the availability of the required part in the right time. This level of integration connects maintenance with the entire value chain such as suppliers, warehouse and production that leads to more efficient operations. A CMMS plays a critical role in this process by centralizing maintenance data, supporting predictive maintenance strategies and ensuring that industrial assets are managed effectively. (Shaheen & Németh 2022.)

Financial and human resource management functions may not be included in CMMS itself, but they can typically be found in ERP systems. HR information is important for example in monitoring employee skills or workload related in maintenance tasks. Financial data such as cost centers and cost groups support CMMS by tracking maintenance costs and spare parts expenses. Asset-intensive industries, like steel manufacturing can miss the key benefits if the CMMS is not integrated with ERP system. These benefits can be for example:

- Improved information sharing that allows organizations to store information such as employee skills, schedules and time reporting in a single system which increases efficiency.

- Better purchasing control that helps to optimize procurement, regulate spending, and manage spare parts inventory more effectively.
- Production efficiency is improved by integrating maintenance and production planning. It helps to ensure the optimal asset usage, improve quality and order fulfillment, and make the ramp-ups more effective overall. (Elkhouly & Fadil 2019)

Taking the listed benefits into account, integrating a CMMS with other organizations such as production, finance, procurement, inventory management and HR improves the decision making by managers which then improves overall performance. (Elkhouly & Fadil 2019)

## 2.2 Change Management

Change management is a systematic approach to moving an organisation from the current state to the state where it is desired to be in the future. Turning project results into real benefits usually requires some level of organisational change. Change involves both practical and psychological factors, therefore managing change in a structured and controlled way is essential for the realisation of the benefits in a business case. (Association for Project Management 2017, 13.) A change that is made for example in technology, business operations or in an organisation requires management. Change management is done to implement the change, to reduce risks and costs and to maximize the benefits of the change. Today change can be seen as a natural part of any organization and managing it effectively is an important part of a manager's role. (Murthy 2007, 3, 22)

### 2.2.1 System implementation

There are different phases that an ERP project undergoes (Murthy 2008, 265)

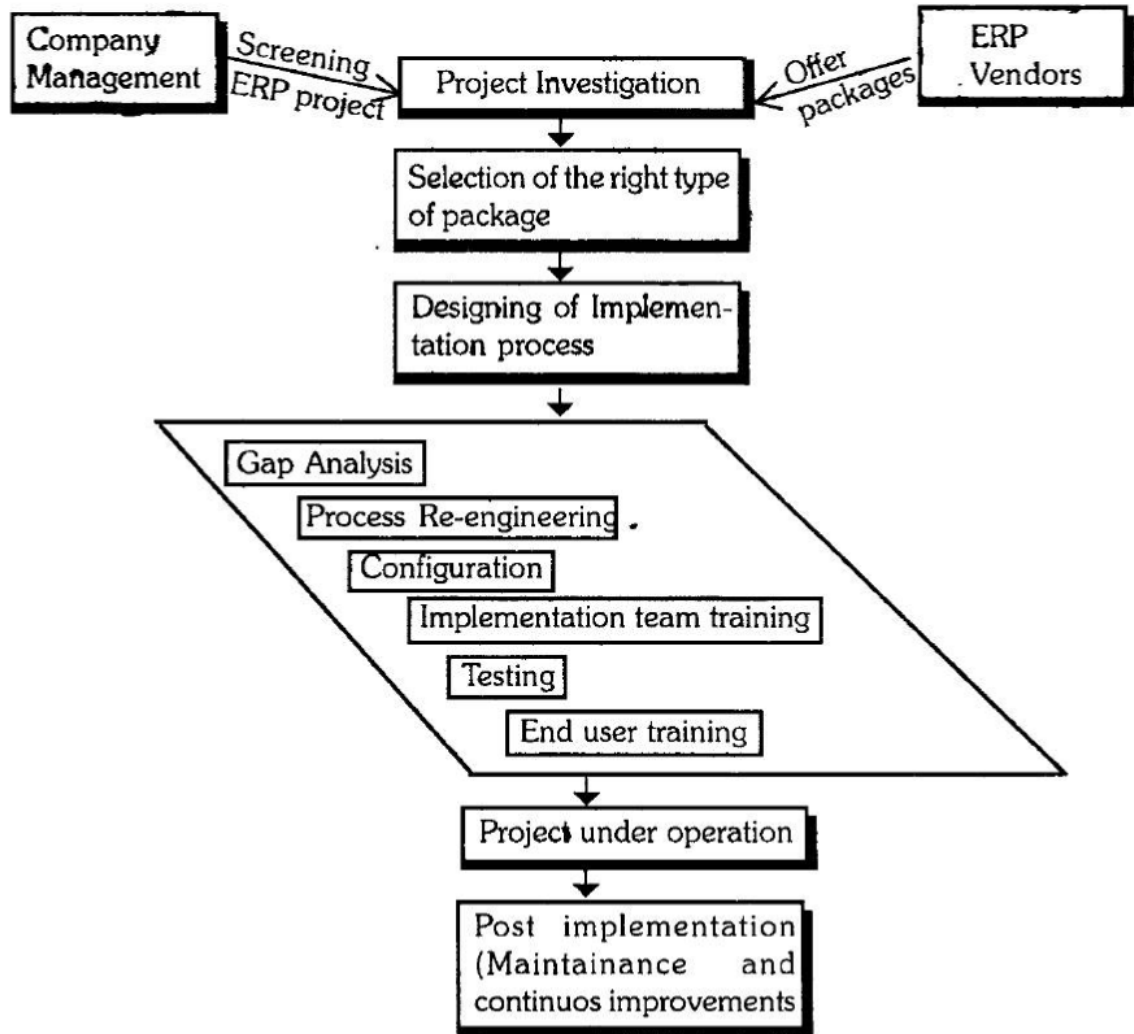


Figure 3. Different Phases of ERP Implementation (Murthy 2008, 265)

As presented in Figure 3 there is a total of 10 different phases in project implementation. The situation varies in different businesses as they can be in different situations when starting the project, but usually the order of completing phases needs to be in sequence. According to Murthy (2008), the phases are:

1. Project investigation or screening

In this stage, the decision from the company to go for a ERP system is made. Also the functionalities what are desired from the system are decided and the system vendor is selected.

## 2. Evaluation and Selection of the package

The desired functionalities are compared to suitable package from the vendor, which is then evaluated and selected in this stage. Also for example different business and IT related topics as well as total costs of the project are considered.

## 3. Designing of the implementation process

In the stage of designing the implementation process, the project plan is created with defined schedules, deadlines, and agreed ways of working. Roles are assigned from leaders to team members to ensure responsibilities are clear. In addition, the plan specifies how the progress will be monitored and how different risks will be managed during the implementation.

## 4. Gap Analysis

Analysis of the functionalities that a company requires and which differ from the standard system package is made in this stage. Different ways to fill these gaps are for example to agree to be without some functions, build own program for a missing function or change the ERP source code.

## 5. Re-engineering

This stage refers to the rethinking of business processes to achieve improvements in areas such as costs and efficiency to utilize the benefits of the ERP system as optimally as possible. For example, personnel downsizing can be analysed.

## 6. Configuration

In this stage the new system's functions are configured to meet the old system's functions. First the vendor builds a prototype of the new system and it is tested and approved before the actual implementation.

## 7. Implementation team training

During the configuration stage, the members of the implementation team are simultaneously being trained to use the system. This team will probably run the system after the implementation so the employees in this team should hold a right attitude and the willingness to participate, learn and change.

#### 8. Testing

In this stage, the system is tested with real situations and extreme cases to ensure its reliability and security. For example, scenarios such as hackers attempting to gain access, the system becoming overloaded or multiple users trying to perform the same tasks at the same time are simulated to verify that the system can handle unexpected conditions and maintain stable performance.

#### 9. End User training

Well before the actual moment of system implementation the end users need to be trained. This is an important part of the implementation as the end users are the ones who eventually makes the implementation successful. End user training is also the reason why most implementations end up being unsuccessful.

#### 10. Post-implementation

This phase is important for the long-term success of the system. At this point the work of the vendors and external consultants is done, and they leave after finishing their tasks. The trained employees in the organization must take over the responsibility. To get full value from the system, the responsibilities must be accepted across the organization. This means that more employees should be trained to handle any issues that may come up. Everyone who uses the system needs to understand how it works, how it supports business processes, and how one transaction can affect the entire organisation. New employees and new features in the system are introduced over time so the end user training needs to be an ongoing task. (Murthy 2008, 265-273.)

### 2.2.2 Common challenges in organisational change

In the study of Critical Failure Factors in ERP Implementation conducted by Rajapakse and Thushara (2023) a total of 55 papers regarding unsuccessful ERP implementations were reviewed. The study is also divided geographically meaning that out of these 55 papers, 18 were published in a European country. The results show the TOP 5 critical failure factors in European ERP implementations which are:

1. Lack of communication between organisation and consultants/vendor
2. Lack of top management support
3. Users are unwilling to use the ERP system
4. Mismatch between the system and business strategies
5. Lack of technical support (consultant) from system vendors

In comparison, in the literature review conducted by Momoh, Roy and Shehab (2010) the critical success factors presented in the Figure 4 were identified with the percentage of appearance.

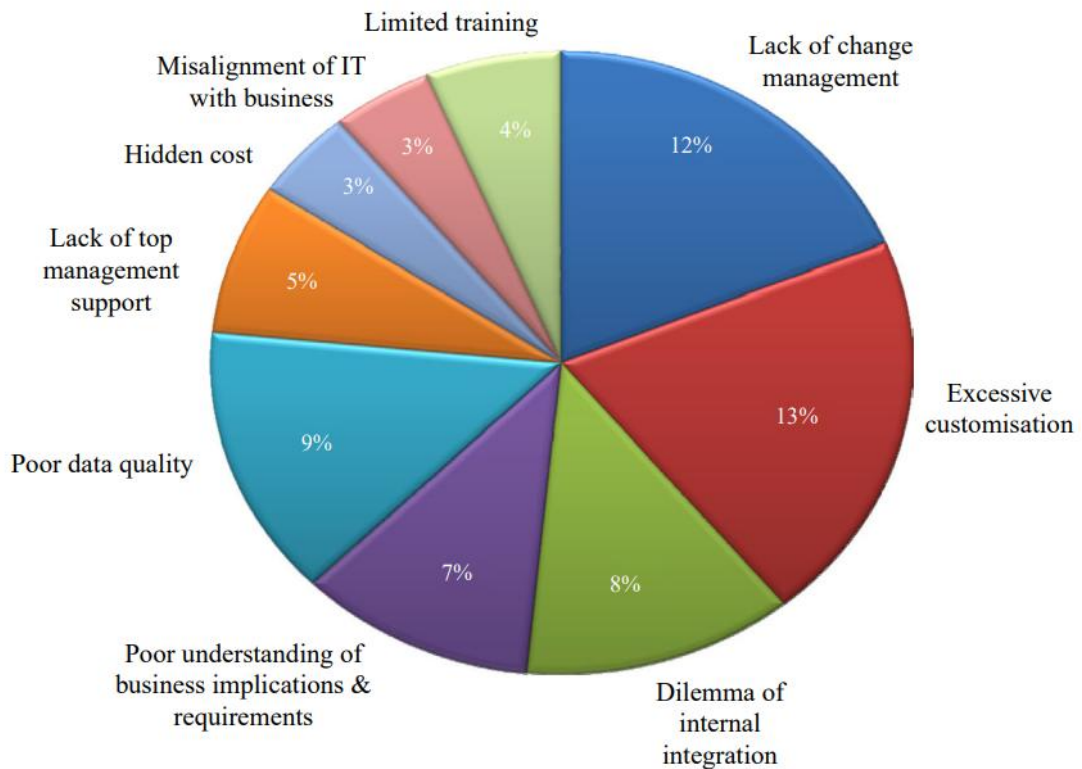


Figure 4. Critical failure factors (Momoh, Roy & Shehab 2010)

In addition to these findings, they also address the factors that are most likely to cause a failure of the implementation. These include a lack of change management, insufficient support from top management, excessive customization which can lead to the dilemma of internal integration and misalignment between IT and business, limited training, and a poor understanding of business implications and requirements (Momoh, Roy & Shehab 2010).

Even though there are more than ten years between the studies of Rajapakse and Thushara (2023) and Momoh, Roy and Shehab (2010), the findings are still quite similar. This could mean that while ERP systems and technologies have developed, many of the same organisational challenges remain. Factors like lack of change management and limited training are mentioned in both, but especially the lack of top management support stands out in the studies.

### 2.2.3 Change Management models and theories

Aligning an organization or at least ensuring that executive and lower management work together requires change. Lasting change relies on individuals, as their actions is important in managing short-term goals. Multiple models of change have been discovered to help the change management and 3 of them are introduced in this section, which are:

1. Action Research model
2. Prosci ADKAR model
3. Business Change Management (BCD) methodology

There are few very popular change management models that have been intentionally excluded from the thesis, they are Kurt Lewin's 3-stage model and John Kotter's 8-step model. These models are widely known but both have been criticised leastwise by Cummings, Bridgman and Brown (2016), and McCabe (2020, 7) for oversimplifying the complex nature of organizational change. According to Cummings, Bridgman and Brown (2016) Lewin's idea of unfreezing, changing, and refreezing assumes that after the change the environment is totally stable, and change is not happening anymore. However, modern organizations rarely return to a steady environment which makes the refreezing phase outdated. McCabe (2020, 7) also notes that Lewin's model is often used in a way that ignore the original focus of democratic social behaviour for example challenging authoritarianism. Kotter's model presents change as a clear series of steps that are led by strong leaders. This hierarchical process assumes that change can be managed like a tool where powerful individuals follow the process and expect specific outcomes. (McCabe 2020, 10–11.) Change is often unpredictable in reality and trying to force urgency or control may lead to heavy resistance towards the change from the beginning (Appelbaum, Habashy, Malo & Shafiq 2012).

**Action Research model** is an eight-step model which Cummings and Huse introduced in 1989 where planned change is viewed as a continuous cycle. The process starts with a familiarisation to the organization where important information is discovered to help to guide the coming actions. New data is collected after each action to evaluate its impact and feedback is gathered. After that the situation can be evaluated again and the next steps can be implemented with the help of the feedback. The Eight Steps are presented in the figure 5. (Murthy 2007, 16, 140)

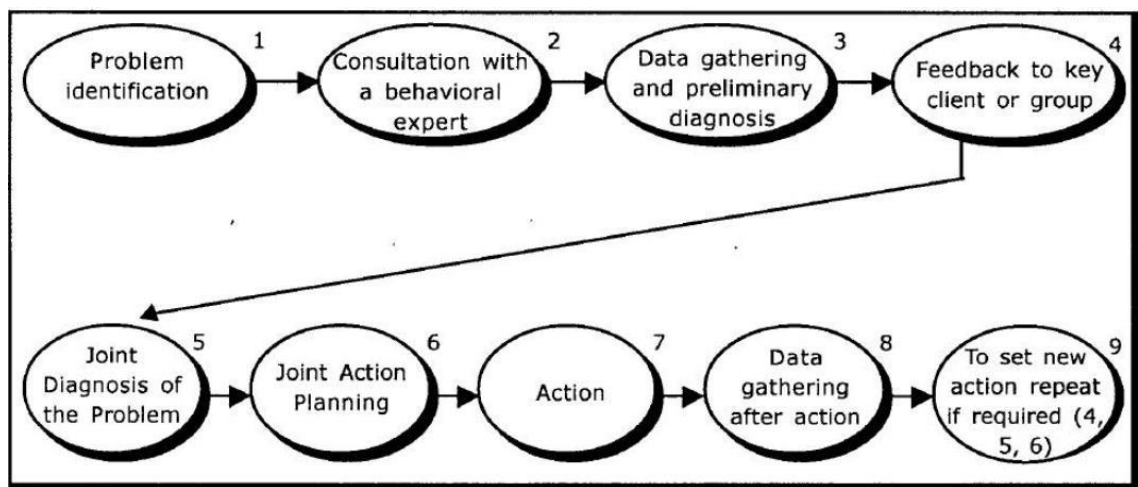


Figure 5. Action Research Model. (Murthy 2007, 140)

Since this thesis is regarding the successful implementation of change it primarily concentrates on the models steps 6, 7 and 8.

Steps 1-5 concentrate on recognizing the subjects that are included in the change. The process starts when the management team identifies a problem and starts to find assistance for solving the problem. Data is collected for example with interviews, observations, and performance analysis and the findings are shared with the assisting group solving the problem to show key strengths and weaknesses. The final step involves a joint discussion where the findings are reviewed, validated and diagnosed before deciding on the next steps.

Step 6 Joint Action Planning:

The management team works together with needed participants to decide on the best way to handle the subjects. After that different options are analysed, and the

most suitable actions are chosen. The decision depends on the organization's existing situation and the goals of the change.

#### Step 7 Action:

Action is about the change itself where the organization is moving from its current way of working to a new one. This may include implementing new processes or methods, organisational restructuring or work arrangements to be more suitable with the goals and encouraging to the new ways to support the change in a long term.

#### Step 8 Data gathering after action:

As stated the action research model follows a continuous cycle where new data is collected after an action is made. When feedback is gathered the situation needs to be reassessed and following actions are made based on the feedback. (Murthy 2007, 140-142.)

### **Prosci ADKAR Model**

The Prosci ADKAR model is a framework that includes five different steps that are developed to support individual transitions during organisational change. The model is based on the idea that successful change in organisations happens one person at a time. Each step in the model represents a result that individuals need to achieve in a specific order: Awareness, Desire, Knowledge, Ability, and Reinforcement The model is especially useful for understanding how individuals experience changes and for identifying possible gaps in adoption. (Prosci 2024e, 4).

#### Awareness

Awareness means understanding why the change is needed, including the business reasons and the risks of not changing. Individuals must first become aware of the need for change before they can engage to it. Clear communication from the right leaders and managers is essential for building awareness (Prosci 2024b, 3,5).

### Desire

Desire represents the individual's personal decision to support and take part in the change. This step is influenced by personal motivation, organisational culture, and the credibility of the change implementors. When people understand how the change benefits them or their team, their desire to support the change increases (Prosci 2024c, 3-5).

### Knowledge

Knowledge focuses on providing the necessary information and training for individuals to know how to change. It includes learning new behaviours, processes, and tools. Knowledge is learned or understood through structured training, job aids, coaching, and peer support. The training sessions should be timed right and adjusted with job roles and responsibilities (Prosci 2024d, 3-4,8).

### Ability

Ability is about putting knowledge into practice. Even when individuals know what to do, they may need support, coaching, and time to master new skills. Managers and experts help employees to apply those new skills by offering feedback and opportunities to learn by doing. It takes time to build the skills, and it should be reinforced by a supportive work environment (Prosci 2024a, 3-4).

### Reinforcement

The final step is to make sure that the change becomes permanent and continuous in the future. Reinforcement prevents people from going back to old habits and secures the long-term success of the change. This can be done for example with recognition, rewards, continuous feedback, and performance tracking. Reinforcement should be meaningful to the individual and it should be connected to real progress. It becomes especially important in the post-implementation phase. Once the system is in use, employees need continuous support to fully understand and learn new practices and avoid going back to old habits. At this stage, reinforcement strategies such as follow-up training, recognition of successful usage, feedback channels, and visible support from leadership plays a key role in taking the change into daily work and routines. To succeed in the long run, these actions help keep the change moving forward and

make sure that the earlier investments through previous steps of the change continue to pay off. (Prosci 2024f, 3-5.)

### **Business Change Management (BCM) Methodology**

The Business Change Management (BCM) methodology is developed by Jones and Recardo in 2013. It provides a structured model for managing organisational change. It is based on the idea that change should especially be strategic, meaningful, sustainable and it should be seen as an ongoing learning process. The model highlights that successful change needs to align with the long-term goals of the organisation, create real value for employees and stakeholders and it needs to be supported by the technical and people sides of change. Change initiatives should not be isolated, instead they should be integrated into the overall business solutions and approaches must be adapted to fit the culture and needs of each organisation. Change is ultimately about people and their experiences within the organisation. (Jones & Recardo 2013, preface.) The BCM methodology is divided into four phases (consist of numerous specific tasks in each phase):

#### **Phase 1: Create Change Platform**

In the first phase, the groundwork for the change is built. This includes the creation of project governance and sense of urgency. Stakeholder analysis and involvement is done in order to develop communication plan. This phase focuses on building momentum and aligning key players around the need for change (Jones & Recardo 2013, 140.)

#### **Phase 2: Design Change**

The second phase focuses on the upper-level design of the change. The design becomes clearer when information is gathered, which allows the project team to understand how the change will impact the organisation. A key part of this phase is to find a balanced solution that takes technology, organisation, and process architecture into account. Cultural adaptation and transition are also essential tasks at this stage (Jones & Recardo 2013, 140.)

#### **Phase 3: Implement Change**

The designed change solution is taken into use during the third phase. This phase focuses on closing capability gaps through training, knowledge transfer, and support activities. It makes sure that stakeholders have the necessary skills and resources to carry out the change successfully (Jones & Recardo 2013, 140.)

#### Phase 4: Institutionalize Change

The final phase concentrates on integrating the change into daily operations so that it becomes the new normal. Regular reviews are conducted to track progress, identify any gaps or negative effects, and, if necessary, launch corrective actions. Reinforcement activities are used to ensure that the change is fully integrated and maintained over time. In the Figure 6 the steps related to the phase 4 are provided. (Jones & Recardo 2013, 140.)

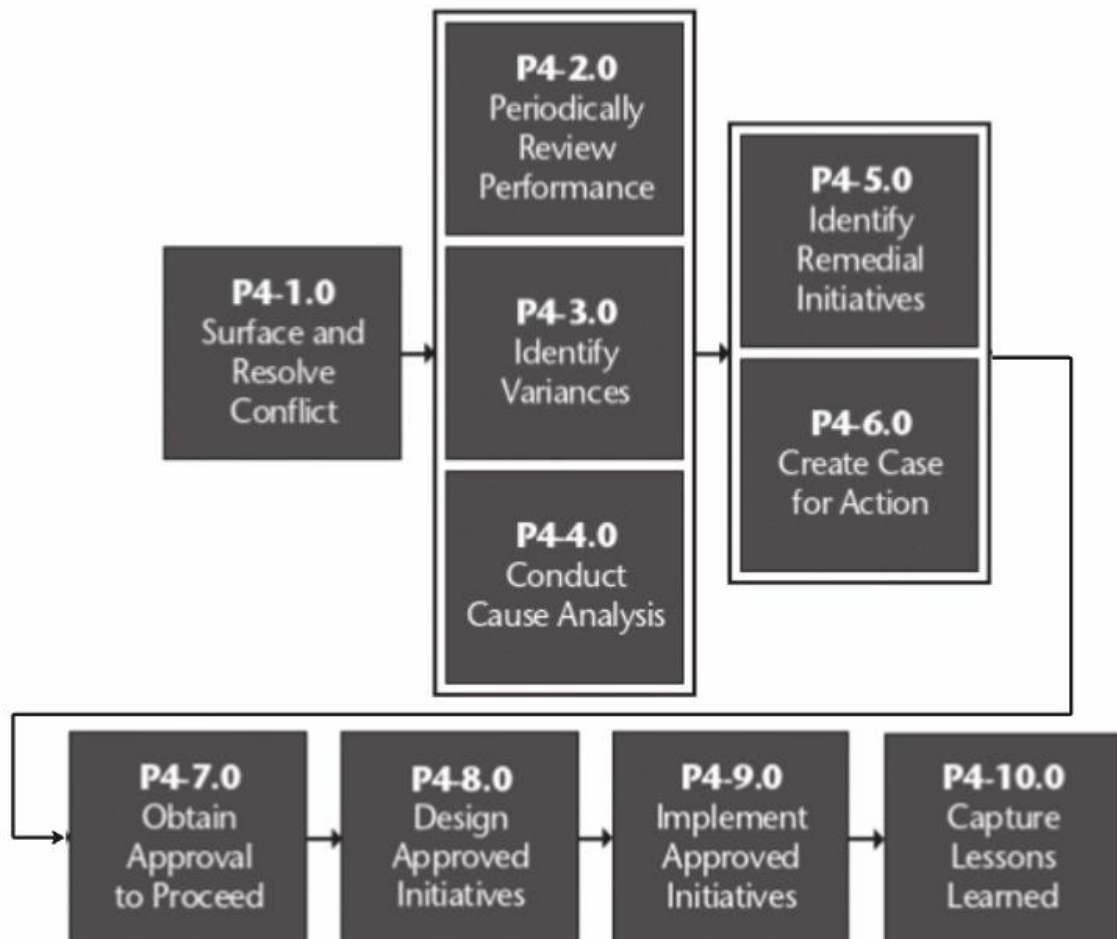


Figure 6. Phase 4: Institutionalize Change process flow. (Jones & Recardo 2013, 144)

In their model, each phase is constructed from several steps, like in the phase 4 shown in the Figure 6, which are fully described along with a set of tools with related deliverables provided to support the completion of each phase. For example, phase 1 includes a total of 13 steps with a set of 16 different tools that comes out with 8 different deliverables. (Jones & Recardo 2013, 184-185.)

#### 2.2.4 Continuity in succesful Change

Change in organizations usually has two sides, it can be both continuous and discontinuous, predictable and unpredictable, controllable and uncontrollable. If change is implemented without continuity, it can lead to difficulties in both individuals and the group in adapting to the new way of working. It is important to find a balance between stability and transformation to support the development of change in an organisation. This allows the change to take place in a structured way. Maintaining continuity during change can be achieved in two ways. Firstly, by sequencing which means that the future strategies are developed based on the present state, ensuring that the organization is prepared for a steady transition. Second is layering which means that new skills, processes, and activities are introduced gradually while using existing strengths and removing old practices. This step-by-step approach helps the organization evolve in a way that connects past, present, and future development. With these methods organisations can go through the change more effectively and reduce the risks that are associated with the transformation. (Murthy 2007, 8-9)

In addition to finding the right balance between stability and transformation, it is important to make sure that people are supported throughout the change. Change doesn't happen just by updating systems or processes, people need help in adapting to new ways of working. Building a network around the change can support positive behaviour and help others to follow. Communication should be clear, and new responsibilities needs to be well defined so that everyone knows what is expected from them. Knowledge transfer is also important so that key information doesn't get lost during the transition. Training needs should be recognised and planned with enough time and resources. In addition to the official change plans, it is also important to document and track the systems in use, key

partners, and main processes that support the new roles. The change is more likely to last when these actions are present in the daily work. Progress should be monitored and supported even after the project is finished because the full benefits often appear a little later. In the end, the people involved play a key role in how well the change will succeed. (Association for Project Management 2017, 22)

### 3 RESEARCH DESIGN

This chapter presents the research approach, methods, and process used in this study. It also describes the case selection, data analysis, and how the reliability and validity of the research were considered.

#### 3.1 Research approach

This study follows a qualitative case study approach. The aim is to understand the human and organisational aspects of change during the project of replacing a CMMS in an industrial environment. A qualitative approach is suitable when the goal is to explore how people experience change in a real-life environment (Yin 2016, 9). The case study method allows to examine specific organisation which makes it possible to explore the change process in this subject (Gillham 2000, 1).

#### 3.2 Research methods

The study uses two semi-structured methods for data collection which are interviews and a questionnaire. Semi-structured interviews are conducted with selected stakeholders involved in the project, prior or after the implementation. Consistent questioning is possible with this method, and it also gives space for open discussion and deeper insights. The questionnaire is also semi-structured which means that it includes both fixed questions and open comment sections. This allows the respondents to describe their experiences and views in their own words. (Gillham 2000, 60, 62-63.) This multi-method approach strengthens the study and improves the understanding of the topic from different perspectives (Yin 2016, 61).

#### 3.3 Research process

The research process started with discussions with the commissioner for suitable thesis topic. After a few meetings it was decided that the most beneficial subject for the thesis is the change management in the ERP project as the project was ongoing at the time and that the thesis worker was involved in the project. After the topic was decided the thesis plan was made, where for example the research

approach and methods were initially introduced. After the plan was finished the part of knowledge base was done. The planning of data collection and identifying the participants was the next step. The questions for both the questionnaire and the interviews were carefully thought and selected to fit for the topic of the thesis. The semi-structured questionnaire was sent to system users in different departments with 2 weeks' time to respond. A reminder was sent approximately 1 week before questionnaire closing. During this, the semi-structured interviews were conducted with people who had or will have a central role in the project. Notes and observations were collected alongside the responses. Questionnaire items are shown in appendix 1 and interview questions are shown in appendix 2. After the data gathering, the results were analysed with content analysis and the final discussion was finished. The research process followed a flexible structure where some early findings helped to shape later data collection, which is a common feature in qualitative case studies (Yin, 2016, 187).

#### 3.4 Case selection and description

The selected case is Outokumpu Chrome Oy, a company operating in the mining and metals sector in Kemi-Tornio area in Finland. Outokumpu Ferrochrome is one of the three main business areas of the Outokumpu enterprise. It includes the Kemi chrome mine and the ferrochrome production plant in Tornio. The mine is the only active chrome mine in the EU, and it supplies raw material directly to Outokumpu's own stainless steel production. (Outokumpu, 2025b.) The case was chosen because of its ongoing ERP renewal project, which includes the implementation of SAP PM as the new CMMS. The case is purposefully selected to study post-implementation change in a real organisational environment as the project had been going on for 1,5 years before the thesis subject decision. The researcher's internal role in the company provided direct access and understanding of the subject but also required special care to maintain objectivity and ethical standards.

### 3.5 Data analysis

The data collected from both the semi-structured interviews and the open-ended parts of the questionnaire was analysed using qualitative content analysis. This method is suitable for identifying repetitive topics, themes, and patterns across different types of qualitative data. The goal of the analysis is to move from raw data toward a structured and meaningful interpretation of what participants expressed. (Gillham, 2000, p. 71-73).

The process started with creating the transcripts and going them through several times to get a full understanding of the material. After that, meaningful statements were highlighted and grouped into categories that reflected shared ideas or experiences. Highlighted statements were coded with categorization and colour-coding. These categories were then reviewed and refined to form broader themes, which helped to answer the research questions.

Even though the structured part of the questionnaire provided numeric results, the focus of the analysis remained on the open responses, which gave more value and deeper understanding of user experiences. Combining insights from both the interviews and the questionnaire responses made it possible to compare the results between different roles and departments.

The use of content analysis made it possible to systematically go through large amounts of qualitative data in a way that respects the original voice of the respondents, and it still produced useful and organized findings.

### 3.6 Reliability and validity

Recommended strategies was used to support the validity of the results. One practical approach is to apply the eight-point checklist developed by Joseph Maxwell, which helps to reduce common threats to validity in qualitative research. Some of these strategies were applied to this study. (Yin 2006, 89.)

Triangulation was used by collecting data with semi-structured interviews and semi-structured questionnaire. This allowed the findings to be compared and verified from different perspectives. “Rich” data was gathered by using open-ended questions and recording full responses from interviews, which helped to keep the original voice of the participants. Respondent validation was also applied by confirming findings with participants during the analysis phase. (Yin 2006, 89.)

Although the researcher had an internal role in the project, actions like common interview questions, transparent documentation and accurate data analysis were taken to strengthen objectivity. These methods helped to make sure that the analysis remained systematic, fair, and grounded in the data.

## 4 FINDINGS

The research questionnaire and interview findings are presented in this chapter. The questionnaire gathered a total of 38 answers from the future end users of the CMMS. With the help of the answers, the study can answer to the thesis questions regarding the end user challenges and needs of support during the transition. With the help of the interview findings, the thesis question regarding the factors of successful change can be answered.

### 4.1 Questionnaire findings

The questionnaire consisted a total of 12 questions. 7 of them were closed ended and 5 of the questions were open ended. The opportunity to answer to the questionnaire was shared by an email sent out to a total of 222 recipients and by printed QR code shared to common areas of the departments. When taking the amount of email recipients into account, the total response rate is 17,1%. This can not be calculated accurately as there can also be responses outside of the email recipients. Response rate in Kemi mine was 17,5% and in FeCr plant it was 16,5%. There can be no conclusions made out of this difference. Figure 7 shows how the answers were divided between departments.

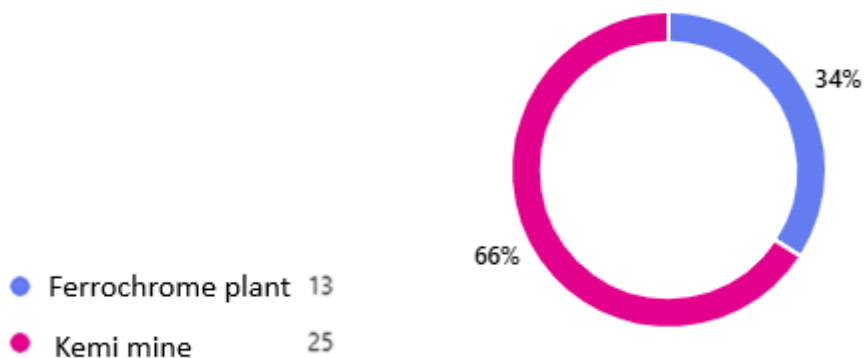


Figure 7. Department of respondents

The respondents were also divided by the work role and answers were successfully collected from each of the roles. The accurate roles mentioned in Figure 8 are representing the personnel that uses the system the most. With this information the right way of support can be customised for each role. To clarify

the roles a worker is responsible for example for performing assigned tasks and following operational procedures, while a foreman is assigned to supervise a team of workers and ensure that tasks are completed efficiently and safely. Work planner is responsible for example creating the weekly schedule for maintenance tasks, order the materials needed for executing the tasks and planning the maintenance shutdowns.

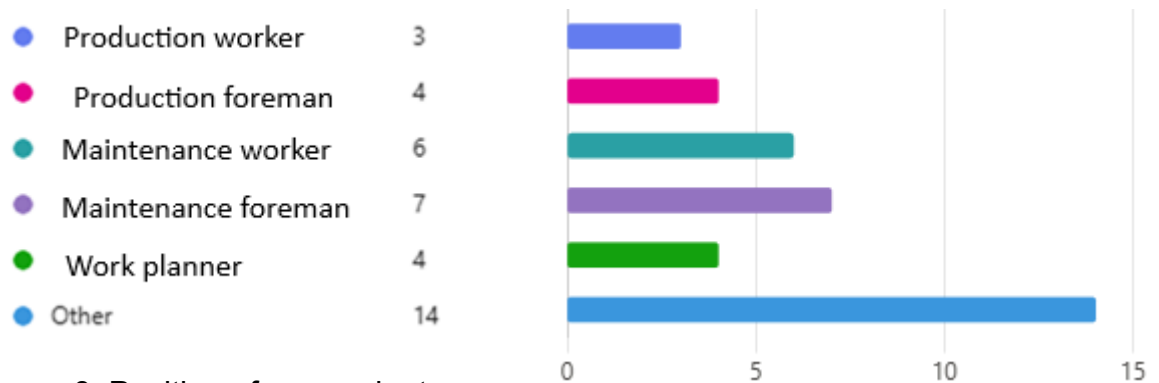


Figure 8. Position of respondents

The third question was to make sure that the respondents actually are the end users of the system. As the email that was sent was a common email group within the departments there was also recipients that will use the system rarely or never. The question was that how often do you estimate to use the system in your work, and the results were that the amount of responses for daily use was 24, the amount of responses for weekly use was 7, the amount of responses for occasional use was 3 and the amount of responses for rare use was 3

As the result it can be said that the respondents are mainly the persons that uses the system the most.

The next set of questions was to find out the attitude and feelings of the end users towards the change. The fourth question was what your attitude towards the change is. Scale of answers is shown in the figure 9 below.

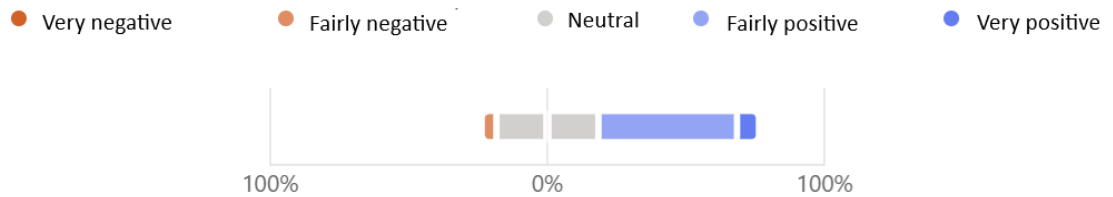


Figure 9. Attitude of respondents

On the negative side there were only 2 respondents that answered fairly negative to this question. 7 respondents were neutral and 22 respondents answered to the positive side and 3 of those were very positive. Referring to this question, the resistance towards the change appears to be very low.

In the fifth question the confidence at the moment of end users to use the upcoming system was asked and the results can be seen in the Figure 10.

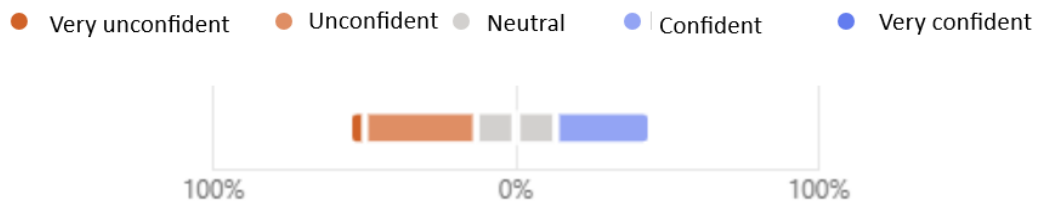


Figure 10. Confidence of the respondents.

The results suggest that the users are not very confident at the moment in using the new system. In the upcoming questions it will become clear what needs to be done in order to raise the confidence level but it is clear that the lack of hands on usage and training is one reason for the unconfidency. 16 of the answers were either very unconfident or unconfident, 10 neutral answers and 12 respondents were confident.

The sixth question was about the amount of training that the individual has received. These results are in correlation with the previous question. Also, the fact that the last training sessions were held approximately 9 months prior the conduction of the questionnaire is affecting to the results. The dividend of the answers is shown in the Figure 11.

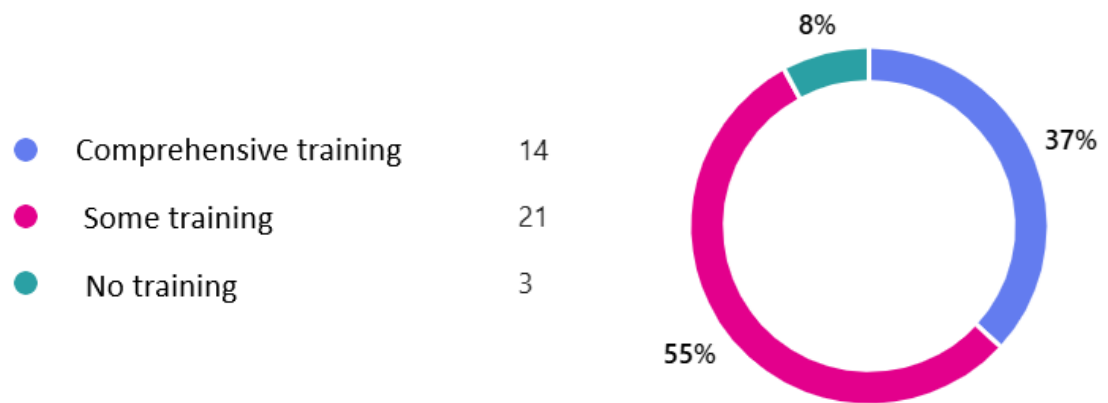


Figure 11. Training amount of end users

Do you feel that you or your coworkers will receive enough support in the transition was the next question and the scale of answers can be seen in the below Figure 12.

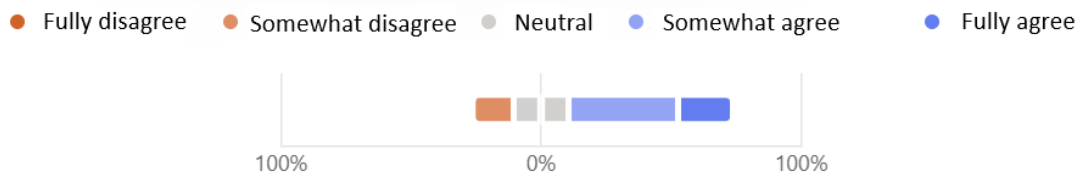


Figure 12. Support anticipation of end users

The answers suggests that even though the end users are feeling uncomfortable to use the system, they have a feeling that they have someone to guide them in the actual implementation of the system. In total of 6 respondents felt that they are somewhat hesitant to the support that they will get, 8 respondents were on the neutral side and 24 respondents felt somewhat or fully confident that they will get enough support.

From the next question forward there were only open-ended questions in the questionnaire and the response rate dropped slightly. In the previous questions the questionnaire got 38 answers but when the form of questions switched from closed ended to open ended, the questions received an average of 31 responses.

The eighth question was which system functions or tasks do you feel most uncertain about? The answers are categorized and summarized in below Figure 13.

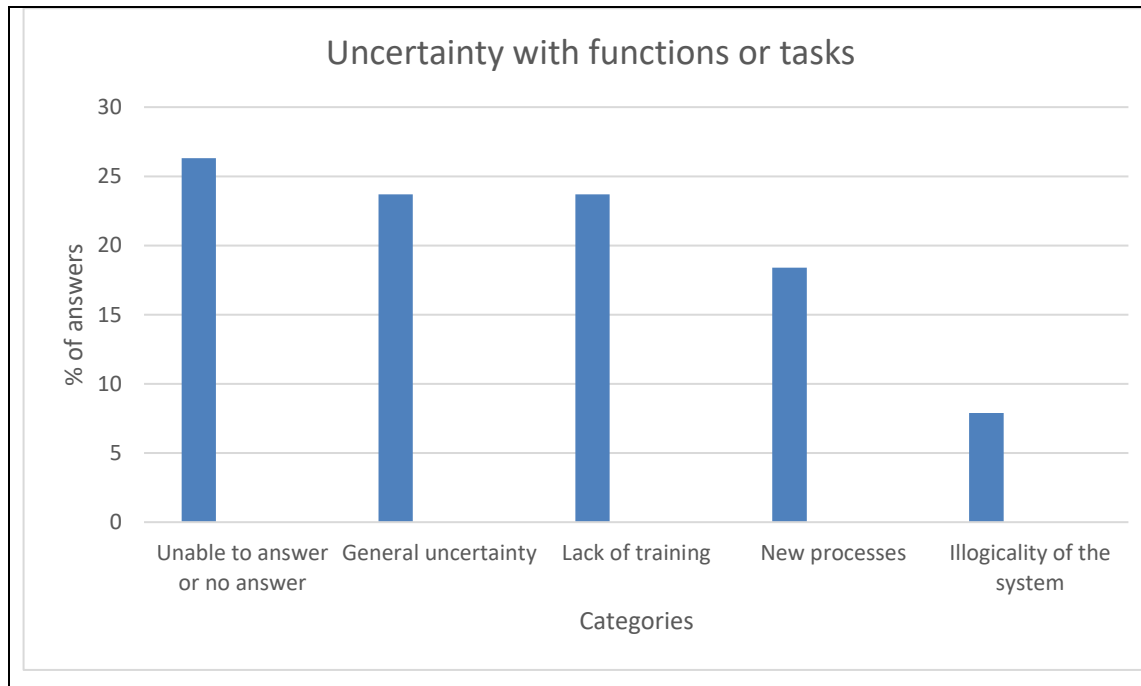


Figure 13. Subjects of uncertainty

Responses show that the end users are not familiar with the system and most of them can't say very specific issues with the system. Also, it becomes clear that the end users need more training. 18% of the respondents say that the new processes are causing uncertainty. With new processes, they are referring to for example work order phasing, work order creation and material reservation creation, use of the scheduling tool and the visual appearance of bill of materials.

Next question was what would make you feel more confident using the new system? Responses are in line with the previous question that the users need to become more aware of the use of the new system. Nearly half of the respondents answered that they would feel more confident if they would receive more training for the use of the new system. They highlighted that the right time for training is important and that the right time would be as near to the go-live date as possible. The first training sessions failed with the timing as the go-live was postponed during the time of the trainings. Interesting was that about 1 to every 4 respondents answered that they would be more confident with independent use

of the system, as those who participated to the first training sessions are able to use the test system already. The categorized answers can be seen in the Figure 14.

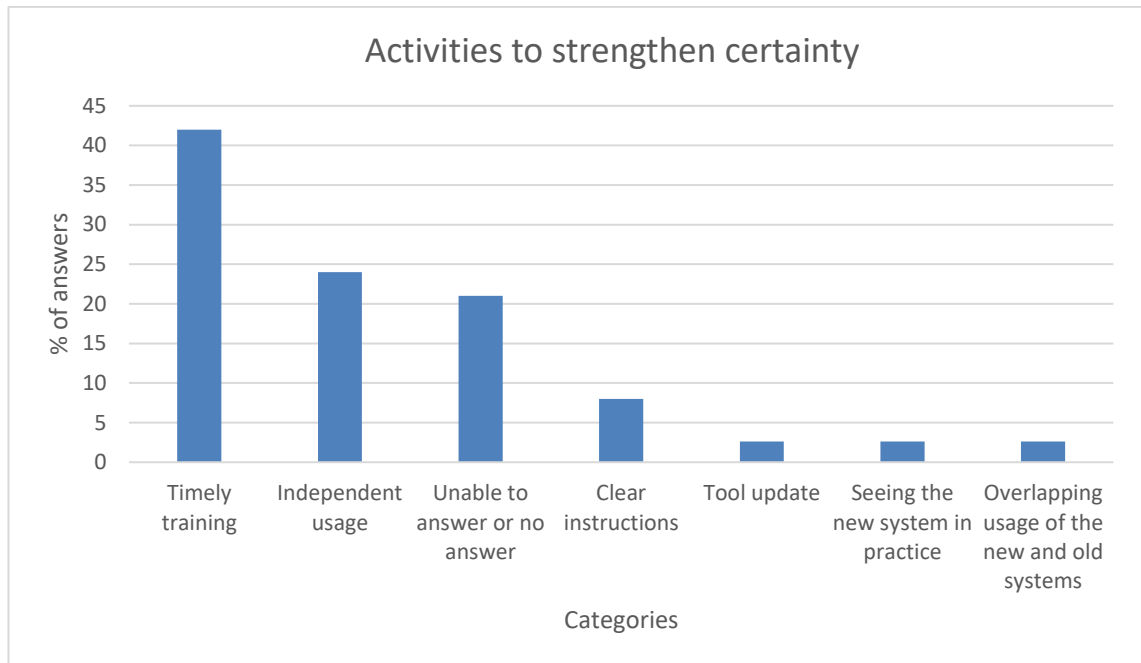


Figure 14. How to strengthen certainty

10<sup>th</sup> question was about the benefits of the new system. Responses are categorized to the Figure 15.

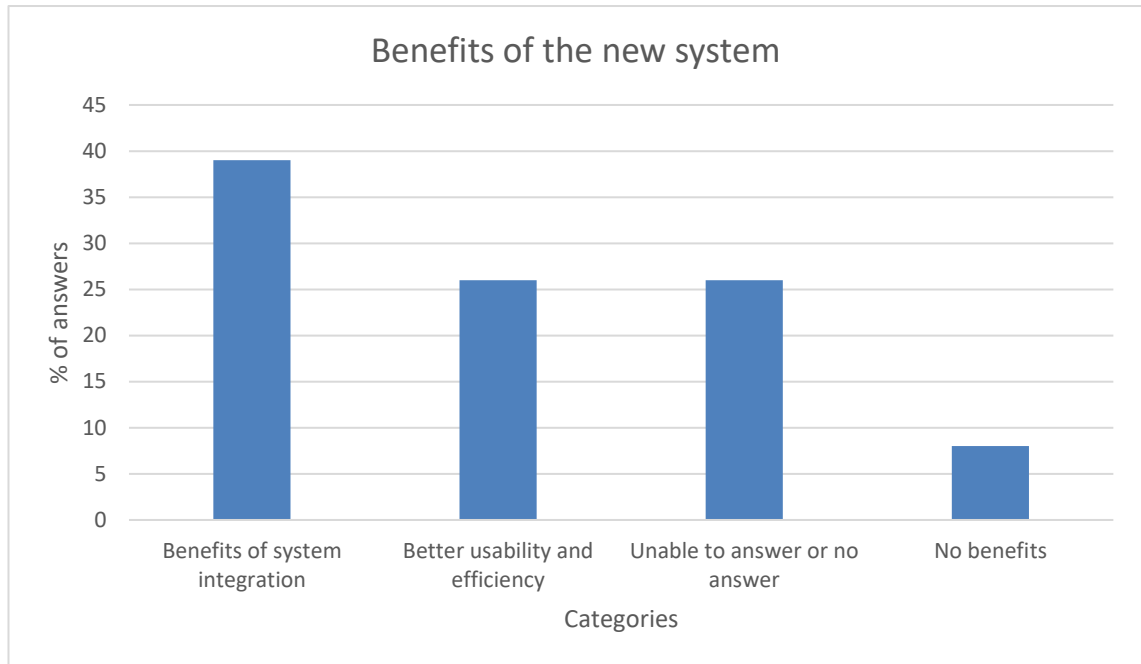


Figure 15. Benefits of the new system

Despite the low percentage of specific answers in the previous questions regarding the use of the new system, the end users were able to find benefits in it. Majority of the answers were heavily leaning towards the integrational benefits, meaning that in the new system various functions will be in the same system as, maintenance work orders, warehouse functions and procurement. As the old system is coming to its end the level of performance appears to be low as the respondents were quite sure that the new system will bring more stability and efficiency to the use. The new system will also bring modern solutions like mobile applications, to help the everyday work.

What challenges do you expect with the new system was the second to last question. As well as in the previous questions the lack of training and practising stood out with the total of 42% of the answers. It was highlighted that the learning is not limited only to the technical executions in the system, but it is also learning of the new ways of working. Other categorised answers were the system not functioning, resistance to change, increased workload and magnitude of the change. Distribution of answers can be shown in the Figure 16.

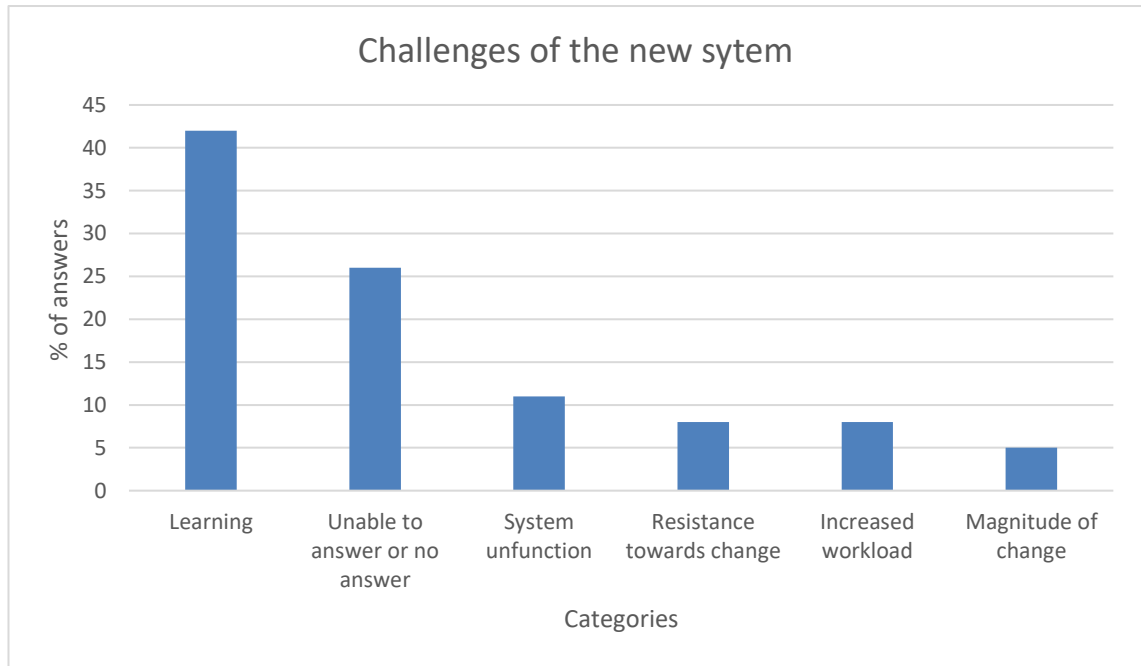


Figure 16. Challenges of the new system

In the last question the respondents were able to give their overall thoughts and feedback towards the change. 21 didn't answer or couldn't give any other feedback. 6 of them were concerned about the learning process to use the new system. 4 respondents were generally sceptical towards the success of the implementation. 3 respondents wanted to mention that they are having positive thoughts of the change and that it is overall a good and greeted change. Rest of the answers couldn't be categorized, and the results can be seen in the below Figure 17.

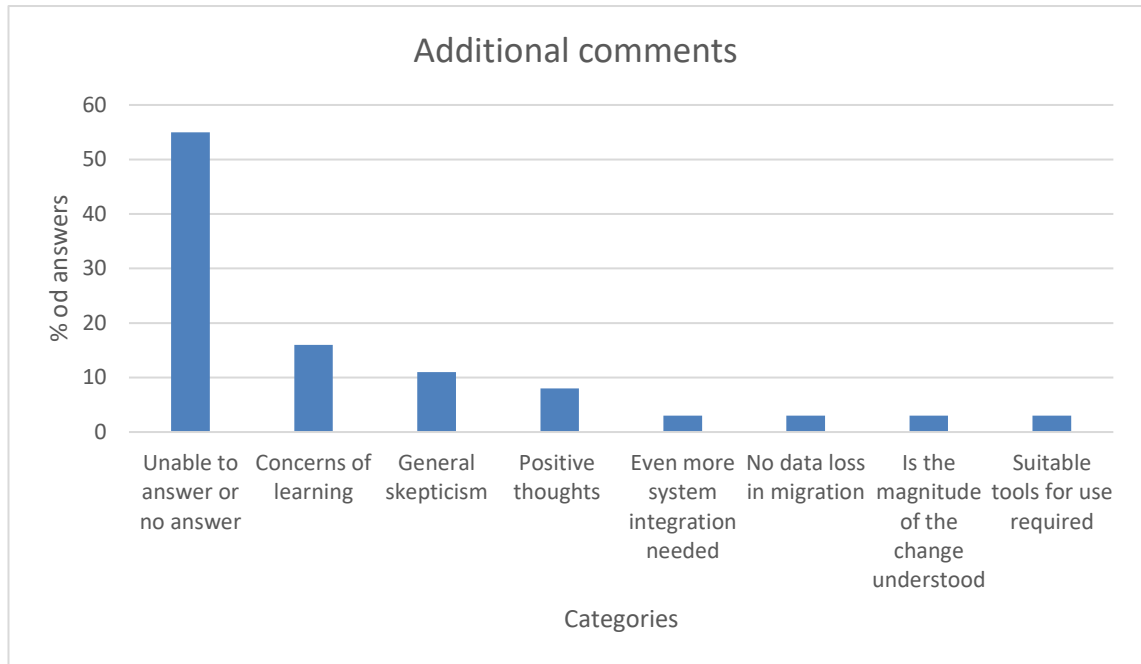


Figure 17. Additional comments.

## 4.2 Interview findings

Semi-structured Interviews were conducted as a teams interview or face-to-face interview. All of the interviews were recorded for later use and only for the use of thesis worker. Total of 9 interviewees were invited and in the end a total of 8 interviewees were interviewed. Interviewees were intentionally from different positions of different organizations or departments. 4 of the respondents are heavily involved in the project and contradictory and 4 of them are representing more the departments where the system will be used after the implementation. The same set of 8 prepared questions were presented to all of the interviewees to get the results as coherent as possible, even though that all of the questions were not fully suitable for all of the respondents. After the interviews the responses were transcribed and categorized for analysis. Each interviewee could give multiple answers to each question and the answers may fit into different categories.

Question 1 was what factors do you think determine the success of the SAP PM implementation? Answers could be categorized in six different categories which are right way of system usage, successful training, successful data migration, system readiness, sufficient support and successful leading.

Figure 18 summarizes how many interviewees mentioned a factor that is related to each category defining the success of the implementation. This question out of all the interview questions gathered the most answers. Interesting was that everyone who answered that the successful leading is one of the success factors were not working in the departments where most of the end users are and where the system is used the most.

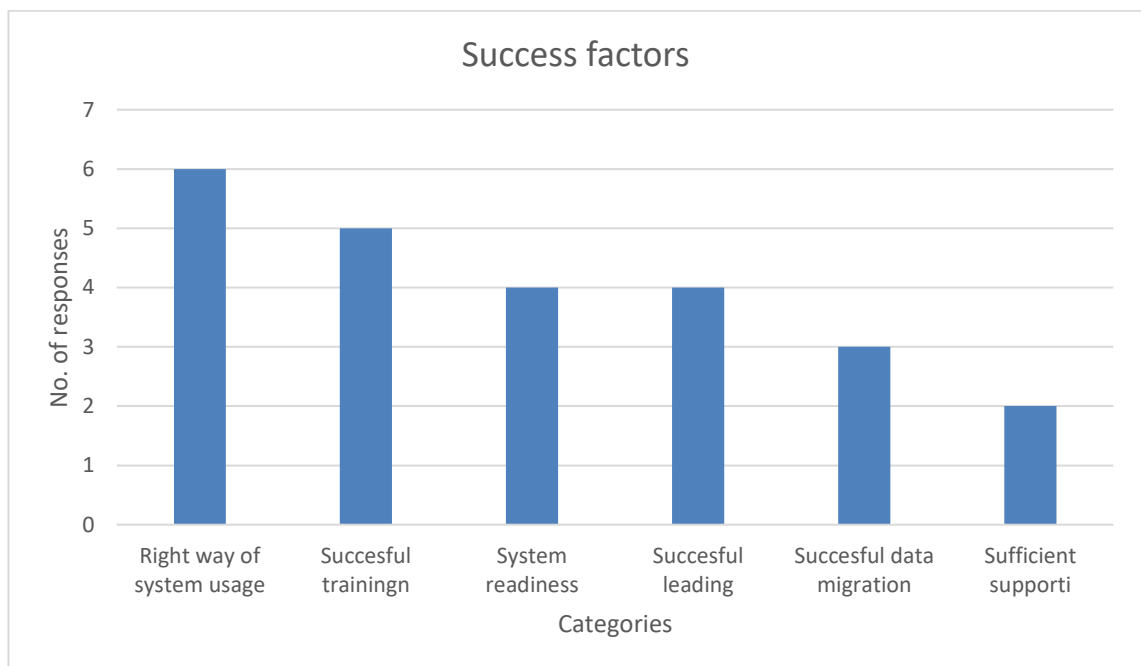


Figure 18. Success factors

In question 2 the interviewees were asked, how the success of the system implementation should be evaluated during the first year of use. The results can be seen in the below Figure 19. Answers could be combined into categories besides one of the answers that is shown as a single answer in the chart. Regarding this question during multiple interviews, it became clear that regarding the meters, the clear targets have not been set for the success of implementation.

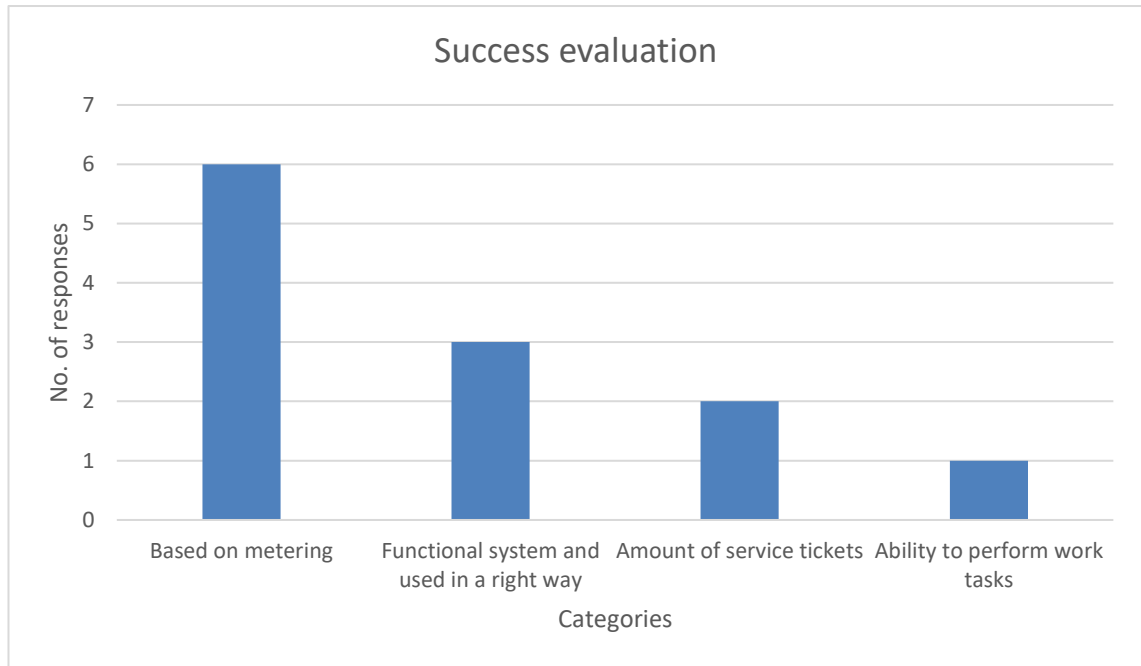


Figure 19. Success evaluation

The next question was what risks or uncertainties do you see that could affect the success of the implementation? From Figure 20 the category that gathered the most responses was the wrong ways to use the system collecting responses from 6 out of 8 respondents.

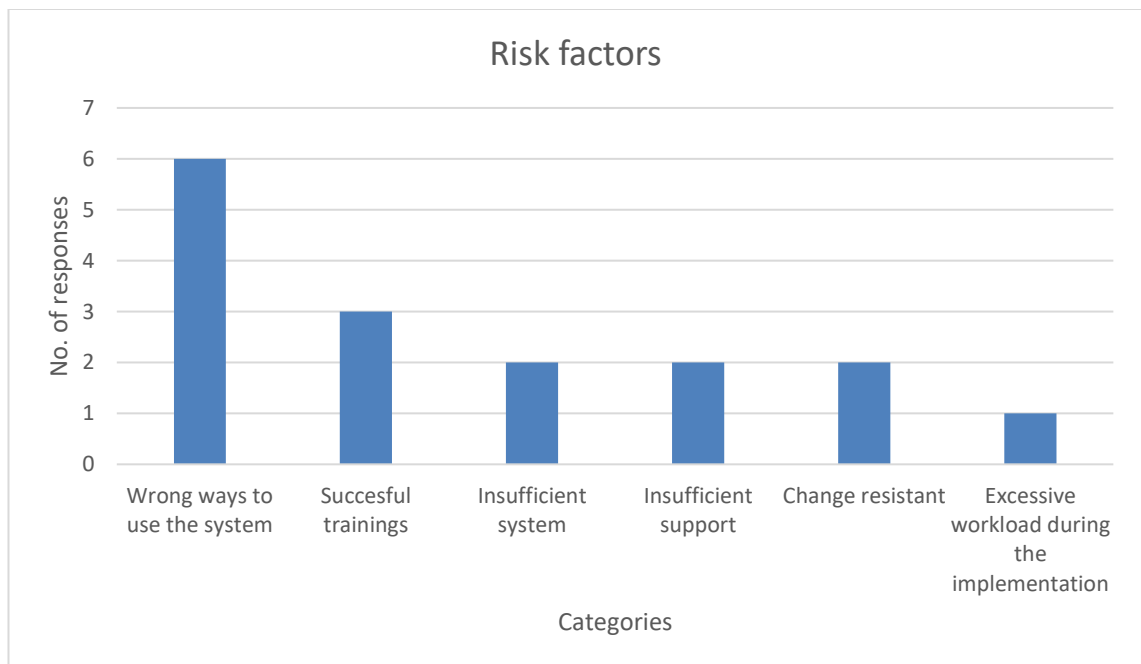


Figure 20. Risk factors

The fourth question was what challenges do you anticipate end users will face when using the new system? Two of the most answered categories were that the

users are having difficulties in learning the system and that the system itself is rigid or illogical. These categories can also be seen related, but they don't exclude each other. All the answers can be seen in Figure 21.

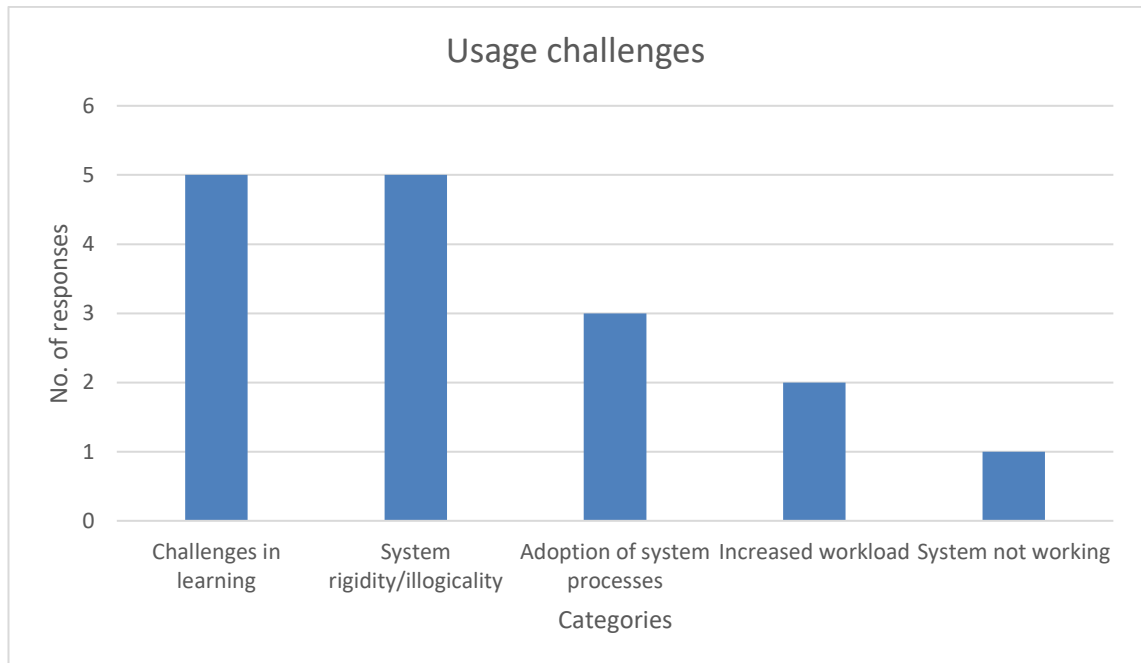


Figure 21. Usage challenges

The next question was about the support and to whom the respondents assume that the most support should be targeted. Responses are quite clear as 7 out of 8 respondents answered that the users who use the system the most are the ones that will need the support the most. Although there was one respondent who also thought the users who use the system rarely are the ones who need the most support. The group that was mentioned second most was the users that are monitoring the usage of the system. Meaning by monitoring the system usage, that the system is used in a desired way and that the system processes are respected. This was referred to the question of risk factors where the most popular answer was the risk of misuse of the system. All the answers can be seen in Figure 22.

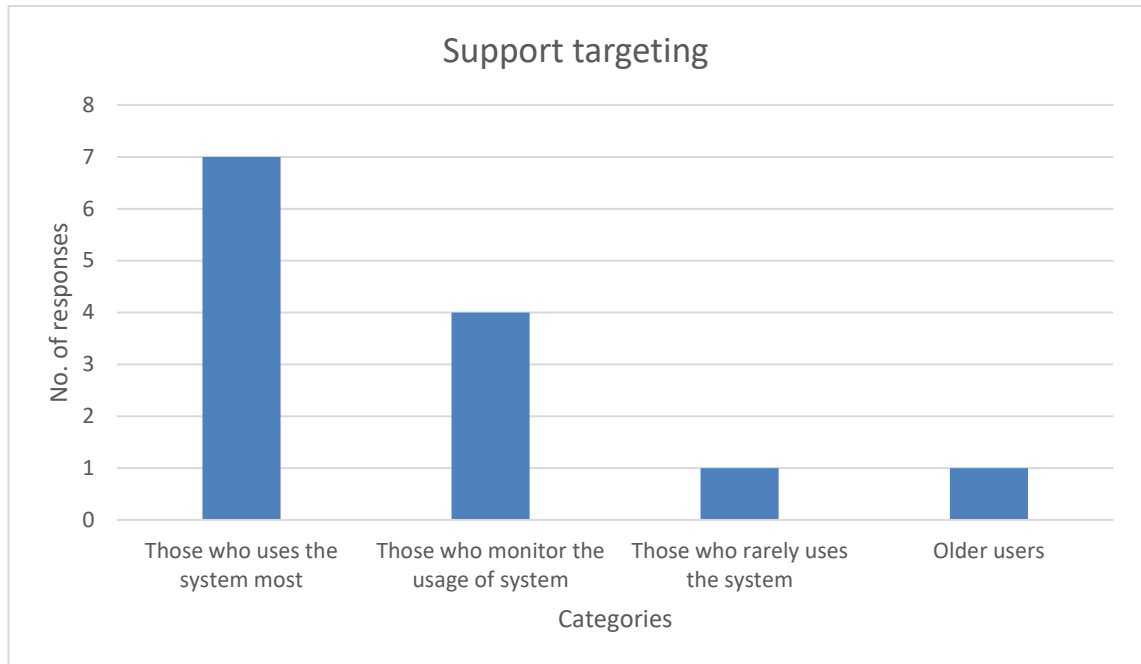


Figure 22. Where support should be targeted

Sixth question was how should user feedback be collected and utilized after implementation? As Figure 23 shows, most of the respondents answered that a feedback channel should be set up. The channel should be transparent so that everyone can see if they are, for example, having an issue with the system and if the issue is already addressed. The channel should also be monitored and reviewed regularly. One respondent answered that the feedback should be given to a person who can immediately ask for more details about the issue as the issues can often be quite complex.

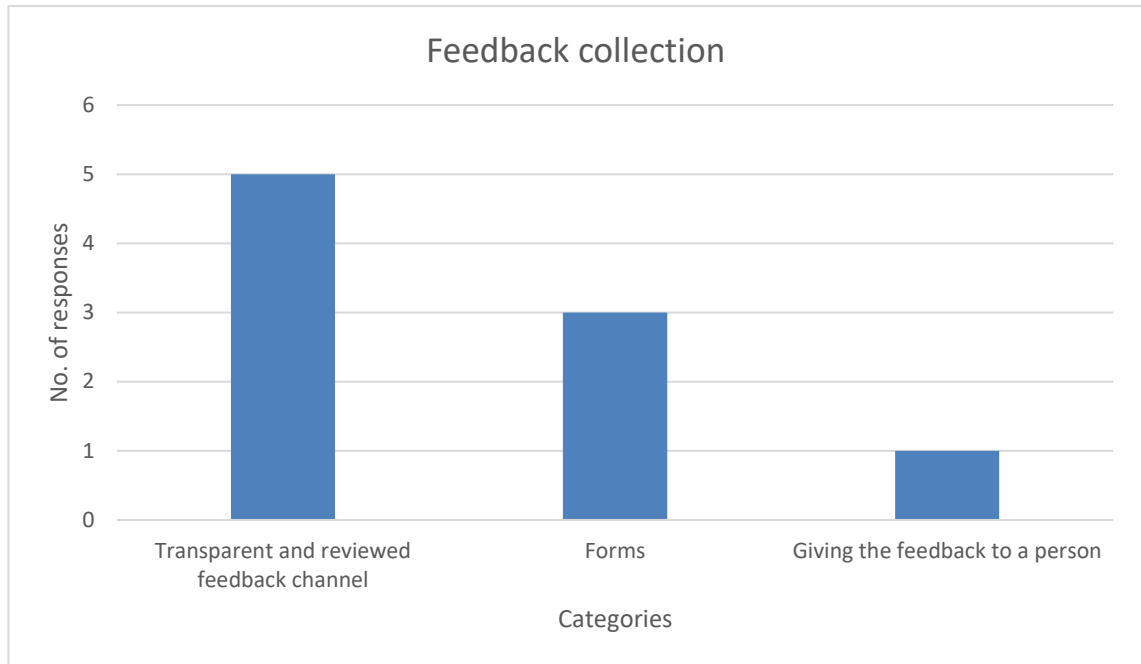


Figure 23. Feedback collection

The results of the question if a similar system change were to be started again, what aspects of the preparation phase would you consider especially important can be seen in the Figure 24. Topics such as system configuration, early access to the system and resource planning stood out. For example, the interviewees stated that the system should have been configured in a way that it is as easy to use as possible and that the configuration requirements should be clear and defined.

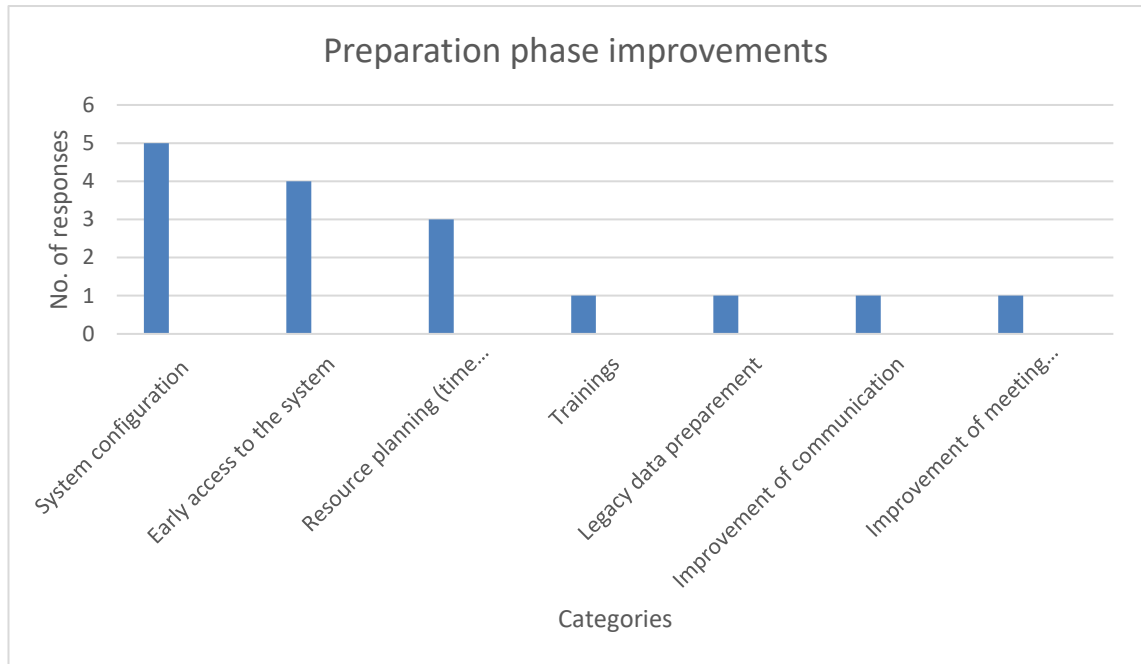


Figure 24. How to improve preparation phase

In the last question the respondents were able to say anything that they would like to say regarding the project and the answers are:

- There has been room for improvement with the participation of operative organisation
- Support given for the project needs to be more concrete and more attendance is needed from the business organisation
- Targets for the implementation needs to be defined
- System may be too tailored
- Cultural change is bigger than the system change, which highlights the importance of leadership

## 5 DISCUSSION

In the final chapter of the thesis the results are summarized and concluded. The results are compared with the theoretical aspects to find the most significant caps of Outokumpu's CMMS project implementation. Also, the reliability and validity of the thesis is discussed. Finally, the initial thesis questions are answered.

### 5.1 Summary of the results

The findings of this study highlighted multiple key themes regarding the CMMS implementation at Outokumpu Chrome Oy. It became clear from the questionnaire results that end users feel unprepared for the new system and they are hoping for more training and hands-on practice. Regarding the hands-on practice it needs to be stated that the end users have been able, or the ability has been arrangeable to train by themselves for a time period of ~9 months prior the questionnaire conduction. Also, the postponement of the implementation is affecting to the need of training as the last training session was scheduled accordingly. It was also noted that they need to learn not only new technical tasks but also new ways of working.

Despite the uncertainties it was positive that many end users did recognize clear benefits in the new system as many of the respondents pointed out the benefits of integrating different systems and looked for improved stability and efficiency compared to the legacy system. Some were excited of the modern features such as mobile applications, that could streamline daily work. This mix of optimism and anxiety among users highlights the importance of managing their transition carefully.

The interview findings reinforced the critical factors for the success of implementation and provided a broad vision on organizational readiness. In response to the question what factors determine the success of the SAP PM implementation, interviewees mentioned, among other responses, these success factor categories related to change management: ensuring the right and proper usage of the system by end users, providing successful training, having sufficient support available to users and successful leadership throughout the change.

Worth of notice was that every interviewee who mentioned leadership as a success factor was from the project side rather than the end user departments where the leadership is needed the most. This may suggest that the importance of leadership and management is not fully understood. The interviews also revealed some gaps in the preparation of the implementation. For example, when asked how to evaluate success in the first year, many interviewees stated that clear success metrics or targets are not defined. The lack of agreed targets will make it harder to monitor the progress. This lack can also affect to other important aspects such as the right way of using the system.

When risks and uncertainties that could affect the project implementation was discussed the most responded concern was the possibility of the system being used in the wrong way. This can lead to the kind of usage where the produced efficiency of the system is not fully utilized. Interviewees also predicted that end users would face challenges in adapting as the two most answered challenges were, the system rigidity and complexity and partially because of this, users having difficulties in learning the new system. To decrease this the interview participants stated that there will be need for strong support. 6 out of 8 interviewees felt that the users who will use SAP PM the most, should receive the most support and attention during implementation. On the other hand, the interviewees said that there is a need for support for the people who are monitoring the usage of system to ensure that the system is used in the right way. Interviewees suggested that some kind of transparent and reviewed feedback channel would be set up where everyone can see known issues and their resolutions.

## 5.2 Theoretical and practical implications

Overall, the findings are aligned with the themes in various research and change management theories. This case follows many common success factors and failure factors documented in the literature especially highlighting the importance of people side of the change. Issues like insufficient training, lack of management support, poor communication, and misaligned processes have long been known to increase the change of failure in enterprise system projects.

For example, studies by Rajapakse & Thushara (2023) and Momoh et. al. (2010) examined dozens of failed ERP projects and found that a lack of change management and poor leadership support are the most frequent reasons of implementation failure among these top critical failure factors: limited training, lack of communication between the organization and project, lack of top management support and misalignment between the system and business processes

Several of those factors are visible in this case based on the findings of interviews and questionnaire. During the interviews, participants expressed for example that stronger and more concrete engagement from business leaders was needed, and that the cultural change was more challenging than the technical change itself. When the review of success was discussed, multiple answers were gathered of the fact that in order to review the success there needs to be metrics, but it was partially unclear that what the metrics are and who should define them. This suggests that there has not been enough discussion between different stakeholders of the project.

Probably the most popular issue in both literature and the findings in this thesis is the importance of training and ongoing support. Lack of sufficient training is identified in the literature as a factor that can cause failure in ERP projects. In this study a large number of end users did not feel confident in using SAP PM yet, and they especially requested for more training opportunities and practice to improve their confidence. The fact that the initial training was delivered too early, affected to the responses.

The change that comes with Outokumpu's ERP project is large and it happens fast. In both the interviews and in literature, is stated that the change should be balanced. For example, Murthy (2007) states that continuity during change should be achieved by sequencing and layering, and what is meant by layering is that for example new processes should be introduced gradually, not all at once. Findings in the questionnaire also suggests that this should be considered in the implementation as the the end users stated that they are finding atleast some of the new processes confusing at the moment.

In the previous studies and in the literature the issue of change resistance was pointed out. In this case this issue appears to be irrelevant. When the feelings of every respondent were asked about the change, there was only a minimal number of indicators that suggested some kind of resistant. This was seen also in the response rate of the questionnaire and the participation of the interviews. Also, the findings that end users can name benefits that the change brings and that the level of scepticism was very low, is an asset that the managers should cherish.

In terms of change management models, the findings from Outokumpu's project support using a structured change methodology. For example, the BCM methodology by Jones & Recardo (2013) introduced in the thesis could be applied in the project. In the model the last 2 phases regard the implementation of the change and institutionalizing the change. Focus on the implementation phase is in the training, knowledge transfer and support, making sure that the stakeholders have the right capabilities to succeed. The last phase is about merging the change into daily business where progress is monitored, and new behaviours or processes are implemented. All of these subjects can be found also from the findings of the questionnaire and interviews.

### 5.3 Evaluation of the results: Validity, reliability and limitations

This study was conducted as a qualitative case study, focusing on one specific project. The findings are very specific in details in this case but may not be widely generalized. The sample included 8 interviewees, who are closely affiliated with the project, and 38 survey respondents who are the end users of the system, which provided a good view from different perspectives within the case company. To strengthen validity, a triangulated approach was used as data was collected from multiple sources. The reliability of the study was supported by using a consistent semi-structured interview guide for all participants and a standardized questionnaire format. This consistency ensures that the same topics were discussed with each respondent which made the results more comparable. Detailed notes and transcripts were kept, and content analysis was performed to categorize responses, which adds to reliability by reducing researcher bias in interpreting the data. Member checking was also used for the reliability.

There are also limitations in this study. One limitation is that all data comes from a single company, that means that the findings are representing this organization's point of view, which might be different in other cases. While the researcher was pleased with the number of participants, the number is still quite limited. Also, those who responded may be more motivated or concerned users. Another consideration is researcher bias. Since this project was an internal case study conducted by a person who is involved closely in the project, there is a risk that bias could have influenced data interpretation. The researcher attempted to reduce this by sticking closely to what respondents actually said and by being transparent about the analysis process. All participants were informed about the study's purpose and anonymity was maintained so that respondents could speak freely about possible sensitive issues without fear of repercussion.

#### 5.4 Final conclusion

In this final part the research questions firstly specified in the chapter 1.3 are answered. The answers are based on the findings of the gathered data from the interviews and questionnaire as well as the theoretical part of this study including previous literature and studies regarding the related subjects.

For the first research question, what are the key factors for a successful change in a CMMS implementation at Outokumpu Chrome Oy, the findings highlight several important aspects. Strong leadership throughout the project is essential for guiding the change during and afterward implementation. Clear responsibilities must be assigned especially regarding the targets used to evaluate the success of the implementation. Usage of the system should be monitored to ensure that new processes are respected. Effective training and thorough preparation of users are critical before go-live, and post-implementation support must be carefully planned and properly resourced.

The second research question, what challenges do employees face during the transition and how can they be managed, revealed that users feel uncertain and unconfident because of outdated training and lack of recent hands-on practice.

Concerns also exist about system complexity and whether it meets with the needs of daily work. Learning the new system and adapting to new processes was also seen to be challenging. These challenges can be managed with timely and targeted training, effective communication, and strong support.

For the third research question, how can change management strategies support employees in adapting to the new CMMS system, the results show that gradual implementation is needed to allow time for learning and adjustment. Accessible support channels help resolve issues quickly and build user confidence, while continuous training keeps skills up to date and keeps user engaged.

The findings show that success in a change is a combination of numerous aspects. It includes guidance, clear roles, and making sure people feel prepared and supported. It also includes seamless cooperation between different organisations that are involved in the change. Cooperation is built during the change project over the long term to ensure that all parties have a clear understanding of the overall change. Finally, successful change includes that people need to understand what is changing, why it matters, and how it affects them. Without that, even good planning and support will struggle to gain success.

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APPENDICES

Appendix 1. Questionnaire form

Appendix 2. Interview form

## Appendix 1 1(2) Questionnaire form

1. Which department do you work in?
  - Ferrochrome plant
  - Kemi mine
2. What is your position?
  - Production worker
  - Production foreman
  - Maintenance worker
  - Maintenance foreman
  - Work planner
  - Other
3. How often do you estimate using SAP PM in your daily work?
  - Daily
  - Weekly
  - Occasionally
  - Rarely
4. What is your attitude towards the upcoming system change?
  - Very negative
  - Somewhat negative
  - Neutral
  - Somewhat positive
  - Very positive
5. How confident do you feel about using the new system at this stage?
  - Very unconfident
  - Unconfident
  - Neutral
  - Confident
  - Very confident

## Appendix 1 2(2) Questionnaire form

6. How much training have you received for the new system?
  - Comprehensive training
  - Some training
  - No training
7. Do you feel that you and your coworkers will receive enough support during the transition?
  1. Strongly disagree
  2. Somewhat disagree
  3. Neutral
  4. Somewhat agree
  5. Strongly agree
8. Which functions or tasks in the new system do you feel most uncertain about?  
(Open-ended)
9. What would make you feel more confident about using the new system?  
(Open-ended)
10. What benefits do you believe the new system will bring?  
(Open-ended)
11. What challenges do you expect when the new system is implemented?  
(Open-ended)
12. Do you have any other feedback or thoughts related to the system change?  
(Open-ended)

## Appendix 2 Interview form

1. What factors do you think determine the success of the SAP PM implementation?
2. What risks or uncertainties do you see that could affect the success of the implementation? How could they be prepared for?
3. How should the success of the system implementation be evaluated during the first year of use?
4. What challenges do you anticipate end users will face when using the new system?
5. Which group of employees do you think will need the most support during the change? And what kind of support measures could be taken to help employees?
6. How should user feedback be collected and used after the implementation?
7. If a similar system change were to be started again, what aspects of the preparation phase would you consider especially important?
8. Other comments: